Land Improvement and Reclamation: The Experiences of the First World War in England and Wales

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THERE have been numerous studies of how farmers responded to changes in the profitability of their crops by changing the use and management of the land. A wide range of response was possible, reflecting the differences in the outlook and resources of the individual landowners and occupiers. One farmer might quickly turn his land over to a more profitable crop whereas his neighbour might be more hesitant and unable to meet the cost of a change in husbandry.

The variety of response has been studied in detail for such periods as the decades between 1874 and 1914 which were marked by relatively low wheat prices, and particularly sharp falls in 1874–5, 1883–4, and 1890–4.[1] The area under wheat in England and Wales declined by 52 per cent of that in 1874, and the area of permanent pasture rose by 34 per cent. As an extension of these studies, it is logical to analyse the way in which agriculturalists responded to the sudden prospect of higher prices for grain during the years 1914–19 when there was an urgent demand for more home-grown food, precipitated by the wartime threat to food imports.

During 1915–16, the government encouraged the occupiers of the 435,000 holdings in England and Wales to produce more grain and potatoes, but the response was varied and sluggish. The situation was so critical by 1917–18 that the Board of Agriculture was compelled to intervene in three ways. First, it took unprecedented powers to enforce rapid improvements in arable husbandry and the reclamation of the 4 million acres of grassland which had become established since 1874.[2] Secondly, the Corn Production Act was passed in August 1917 which guaranteed the minimum price of wheat and oats over a period of six years. This was designed to ensure the continued profitability of changes in land-use and management.[3] Thirdly, the Board tried to provide the means to carry out these changes, namely through the supply of the requisites of arable husbandry. In this way, the Board hoped to secure significant improvements in yields from existing arable in 1917 and large-scale reclamation of grasslands by 1918.

Although the targets were not fully met, probably never before had the use and management of land changed so dramatically. The area of wheat rose from 1,912,000 acres in 1916 to 2,557,000 acres in 1918, and that of potatoes from 428,000 acres to 634,000 acres.[4] This paper will examine the way in which horses, machines,

[1] P. J. Perry, *British Farming in the Great Depression 1870–1914*, 1974.

[2] Lord Ernle, 'The Food Campaign of 1916–18', *J.R.A.S.E.*, 82, 1921, pp. 1–48; T. H. Middleton, *Food Production in War*, 1923; P.R.O.; MAF 42/8, 900/1

[3] P.R.O., CAB 23/1, 66. [4] Ministry of Agriculture, *A Century of Agricultural Statistics*, 1968.

implements, and other essential supplies and services were obtained and deployed in order to secure the rapid improvement and reclamation of farmland. It will examine ways in which the longer-term problems of land drainage and pest control were resolved in order to assure a greater output of food crops. These aspects are unusually well documented. County agricultural and executive committees were established to provide guidance and assistance to farmers, and some of their minute books, reports, and correspondence have survived. The documentation provides an insight into the response of landowners and occupiers in individual counties and districts, and, together with memoranda and correspondence from the Board of Agriculture and its Food Production Department, it is possible to discern national trends in land use and management during the period of the war.

I

THE FOOD PRODUCTION CAMPAIGN

The threat of a breakdown of food supplies and thereby military defeat precipitated the changes in the use and management of farmland between 1914 and 1919. The United Kingdom grew only sufficient grain to sustain the population for an equivalent of 125 days in the year: for the rest of the time, the population depended on imported food. Yet shipping was also required for transporting armaments and industrial raw materials, and about 5,924,000 gross tons were sunk by submarine warfare. Farmers were accordingly urged to produce more grain and potatoes, and the area under cereals rose by 194,000 acres in 1915. This was largely because farmers abandoned their normal crop rotations, but soon the land became weedy and infertile. Accordingly, the area under cereals fell by 148,000 acres in 1916.

A departmental committee reported in June 1915 that the decline could only be halted by an improvement in land husbandry, the planting of wheat on land normally occupied by oats and potatoes, and the reclamation of at least 1 million acres of grassland for the production of the two displaced crops. The departmental committee recommended that the Board of Agriculture should facilitate these changes by inviting each county council to set up an agricultural committee which would provide guidance to farmers and identify shortages in labour, horses, and other requisites for arable husbandry.[1] The committees were established in most counties in the autumn of 1915, and the growing crisis in food supplies caused the Board to create smaller executive committees in January 1917, called the county agricultural executive committees. These became agents of a new executive body within the Board, called the Food Production Department, and the larger county committees became virtually defunct.

The main task of the county executive committees and their district committees was to invoke the powers taken by the Board of Agriculture under Regulation 2M of the Defence of the Realm Act in 1917. Under these powers the Board could

[1] Board of Agriculture, *Departmental committee on the Home Production of Food (England and Wales)*, Cmd. 8049, 8095, 1915.

issue orders for the improvement of cultivation: it could demand an improvement of husbandry on any farm and field, and prohibit the growing of less essential crops. Among other powers, it could end a tenancy, take possession of land, and commandeer machinery, implements, produce, and stock, if this would secure higher food production. By delegating these powers to the county committees, the Board and its Food Production Department could invoke the powers on any holding, and thereby increase the size of the grain and potato harvests from 1917 onwards.

The second objective was to extend the area of arable land in 1918 and subsequent years. Prothero, who was President of the Board of Agriculture, wanted farmers to reclaim all the grasslands which had become established since 1874, namely 4 million acres. In May 1917, the Food Production Department set a target of 3 million acres to be reclaimed by the summer of 1918, and every county was given a quota of this amount of grassland to be ploughed. The county and district committees used both persuasion and compulsory powers to achieve this end. The Food Production Department and the committees also had the obligation of helping farmers to meet the growing shortages of labour, horses, machinery, fertilisers, and other essential supplies. About 250,000 farmworkers had enlisted in the army, and others had left for higher wages and better conditions in other industries. The committees were given powers in June 1917 whereby they could prevent the call up of most skilled workers, and they assisted in the deployment of auxiliary labour on farms where the arable area was being extended. Within a year 400,000 soldiers, women, and prisoners-of-war had been provided.

HORSES

Large numbers of horses were required by the army, and the Director of Remounts bought 3,000 a month, mostly from industry and urban transport. The vendors thereupon bought many farm horses at lower prices, and the Food Production Department was worried lest there should be insufficient farm animals to reclaim the grasslands. In order to control losses, the Sale of Horses Order was introduced in June 1917 (under Regulation 2T of the Defence of the Realm Act) which forbade the sale of farm horses without a licence from the appropriate county committee. The latter could grant a licence only if the animal was surplus to farm needs and was sold to another farmer or authorized person. The Norfolk committee granted 8,500 licences up to 23 November 1918, when the order was rescinded, and refused only thirty-five applications. There was a shortage of horses on many of the smaller farms of less than 200 acres, and the need to obtain a licence discouraged many from trying to sell further animals to pay the rent or buy seed.[1] The Worcestershire committee refused a licence to a farmer at Clevelode, for example, until he had broken up further grasslands.[2]

Having regulated the loss of animals, the Food Production Department laid plans for providing 30,000 horses with their requisite ploughmen, harness, and

[1] Norfolk R.O., County Council committee books, vols. 3–7.
[2] Worcs. R.O., MSS. 599: 1–310.

implements, for hire by the county committees to farmers who were extending their arable land. West Sussex requested 1,600 horses and 800 ploughmen.[1] The teams were hired in two ways. By the first, farmers could hire them for a period of up to 1 month on the condition that they broke up at least 8 acres of grassland. The cost of hiring varied according to the type of work, condition of the soil, and time of year. The ploughmen received a normal wage, and the farmer had to feed the animals. By the second system, the horses worked in gangs, and were looked after by a Horse Officer and staff appointed by the committees. This was more popular in areas of small farms. The Food Production Department wanted to charge 5s. 6d. a day per animal, but the Lancashire committee thought the cost should be based on the area of land ploughed by the gangs. It argued that small farmers and those with little experience of cultivation would be afraid of hiring teams because of the uncertainty of the ultimate cost.[2] The Department eventually concurred in the use of either form of payment for gang-work.

The number of animals hired by the committees rose from 1,200 in September 1917 to 5,000 in late December, and 11,000 by June 1918. The Kent committee drew up 1,500 contracts for the loan of horses of up to 1 month, and 1,040 contracts for work on a daily or piece-rate basis.[3] The success of the scheme varied: Shropshire was one of the few counties where it worked well, whereas the Gloucestershire committee incurred a deficit of £6,000 which had to be offset by the Food Production Department.[4]

There was a chronic shortage of skilled ploughmen, healthy horses, and suitable harness, and the Gloucestershire committee reported at one stage that it had 100 outstanding contracts owing to the lack of ploughmen. Many of the soldiers supplied as ploughmen were unskilled. Only one of the forty-seven men sent to Herefordshire could lead horses, and the remainder had to be trained at Monmouth. The Lindsey committee arranged for eighty-five town carters to be trained as ploughmen, and 150 metropolitan policemen with ploughing experience were shared between several county committees.[5] Prisoners-of-war played an essential role, and several committees set up special camps under the surveillance of the War Office, provided with horses, harness, and implements. By March 1918 Essex had twelve such camps, containing 350 men and 480 horses.[6] The animals were either borrowed from the army prior to their being sent overseas, or bought by the Army Purchasing Officers. Since the officers could not pay more than £100 for each animal, many turned out to be old, or sick, or light vanners which were not "heavy enough in size and bone for work on heavy soils." An outbreak of parasitic mange caused further dislocation of the ploughing programme in the winter of 1917–18, and the Peterborough committee appealed to every blacksmith to disinfect his premises in order to contain the epidemic.[7]

[1] West Sussex R.O., 2/12/1–2, 2/13/1–3, 2/14/1. [2] Lancs. R.O., WAM 1–2, WEM 1–4, WCM.
[3] Kent R.O., County Council minute book, vol. 14.
[4] Shrops. R.O., MSS. 207, 1168/1; Gloucestershire R.O., CWA/M/1–3.
[5] Herefords. R.O., K/1–2; Lincoln R.O., minute books and folders, 1915–20.
[6] Essex R.O., WAC 0–6, D/Z 45/1–14.
[7] Hunts. R.O., minute books for Soke of Peterborough, 1917–20.

STEAM PLOUGHING AND THRESHING

It was widely believed that steam ploughing was the most efficient way of breaking up grasslands, but fifteen of the forty-six sets of tackle in Kent were unused, and half of the 500 sets in England were idle. Some required repairs but most were unused because the engine drivers had left for the army or the munitions factories. Within two months of their establishment the county executive committees had encouraged the repair of all but forty obsolete sets, and had succeeded in obtaining the recall of 300 men.

Steam tackle was especially useful in breaking up grasslands on heavy soils, and where the fields were generally "too banky or too steep for tractor work." The Huntingdonshire committee estimated that it had sufficient sets to plough up 5,000 acres in 1917 but asked for a further set for each additional 500 acres, preferably manufactured by Fowler & Company of Leeds.[1] Most farmers hired contractors for the work, but the West Sussex committee discovered instances where contractors refused to accept contracts for ploughing up very heavy land or small fields. Accordingly, several counties formed joint committees with the contractors, and in Hertfordshire a sub-committee met each week to review all applications for steam ploughing, and to plan the deployment of the tackle.[2] Committees were authorized by the Department to guarantee payment for any work undertaken at their request, which helped to remove any fears as to whether the contractors would be paid for the work. The Middlesex committee divided the county into three parts and tried to allot each set of tackle to one part so as to reduce the amount of time spent moving the machinery between holdings.[3] It is estimated that 1,200,000 acres were ploughed in England and Wales during 1917–18, about three times the normal area tilled by steam power in peacetime.

The committees intervened in the deployment of threshing tackle because sets had been commandeered in some areas by the military authorities for threshing the straw for the military horses, and the smaller farmers were experiencing difficulties in obtaining contractors to thresh their ricks. The Food Production Department supplied eighty machines in the autumn of 1917, and persuaded the Ministry of Munitions to give priority to the manufacture of new tackle and spare parts. Threshing sub-committees were formed in many counties, made up of representatives of the county committees and tackle owners. In 1918, the Kent sub-committee allocated one of the 158 sets in the county to each 700–1,000 acres of grain crops, and in an effort to secure 1,000 extra workers the committee recruited 750 women. As a result, an average of 150 machines threshed 6,360 acres of grain crops, or 26,335 quarters of grain per week. The machines visited an average of 420 holdings and worked 4.41 days of 8 hours each week between September and December 1918.

[1] Hunts. R.O., minute books for Huntingdonshire, 1917–20.
[2] Herts. R.O., AEC 1–35.
[3] Middlesex R.O., minute book 1917–18.

TRACTORS

The demand for labour-saving machines grew as the number of farm labourers declined through recruitment. By 1916 the orders for tractors exceeded supply, and the Pershore district committee in Worcestershire urged the Board of Agriculture to take over the production and supply of tractors. In January 1917 the Essex committee claimed that 100,000 acres of grassland could be broken up in 10 weeks if 500 extra machines and skilled drivers could be secured. From 1917 onwards, the Food Production Department intervened, and bought almost every tractor that was available. The county committees hired the machines to those farmers extending their arable land. There were soon 477 "government tractors" at work, and 135 machines were borrowed from farmers who did not require their machines all the time. Thus, there were sixty-eight tractors in Hertfordshire in the spring of 1917: forty were privately owned and operated, fifteen were "government tractors", and the remainder were loaned by farmers to the county committee. On 1 May 1917 the practice of borrowing machines ceased.

The "government tractors" scheme was at first operated by the Food Production Department since so few members of the county committees had sufficient expertise to supervise these new machines. But gradually the committees came to assume greater responsibility, especially as the number of machines increased and prejudice against them declined. Each county committee appointed a machinery sub-committee with a full-time officer and assistants to draw up contracts with farmers, negotiate the cost of work, and arrange the timetable for their use. Thus an officer for the East Riding[1] reported:

> I went to Malton and met the Agent of the Training Ground at Langton Wold. We staked off 50 acres for ploughing; it is sound Wold land, and has laid a long time in grass and is partly covered with whins and thorns, which will require to be stubbed up before it can be ploughed; if possible the rough grass should also be burnt off.

The Department remained responsible for the maintenance and repair of the tractors, and the supervision of drivers and ploughmen. Local agricultural engineers were appointed as the Department's representatives, providing fuel, oil, grease, and spare parts. In spite of efforts to ensure close liaison and efficiency there were many complaints, and in August 1917 the Lancashire machinery sub-committee threatened to resign. It claimed "there were too many officials, too many motor-cars, too many conflicting orders, too little work done, and too much money spent on unnecessary organisation."

The greatest difficulties were encountered in securing an adequate number of machines, and the Oxfordshire committee observed "that at no time have there been anything approaching a sufficient number,"[2] while the Herefordshire committee warned that farmers would be unable to reclaim their quota of grasslands unless a further 100 tractors were sent to the county. Fortunately, the number of

[1] East Riding R.O., printed report of proceedings, 1917–19.
[2] Oxfords. R.O., CCC 452, 453, 455, CWAM 1, CWAL 1.

"government tractors" in England and Wales rose to about 3,240 by the end of spring, and 3,925 by October 1918. The first machines in Northamptonshire were sent to the Towcester district where the scope for increased food production was greatest.[1] They were most useful on heavy soils where ploughing was possible on comparatively few days in the year. Tractors did not grow tired like horses, and there were attempts to continue ploughing after dusk when, according to the Food Production Department, a three-furrow plough could break up 0·5 acres per hour "with a fair-sized moon." Drivers were given special permission to use unshielded lights but night-time ploughing soon ceased. "The shadows cast by the headlights were very deceptive, and the quality of the ploughing work was very poor," and the Herefordshire committee introduced two shifts of 8 hours per day instead.

The Department estimated that 800,000 acres were ploughed and cultivated in the 1917–18 season by the "government tractors." The tractors remained at work for as long as each could plough an average of 4 acres per week, and the Huntingdonshire committee confined its machines to the lighter soils of the fenlands during winter. Middlesex used the machines to clear scrub and reclaim the site of a proposed reservoir at Laleham during wet weather.

There were, however, many complaints of "unsatisfactory work", and the Shropshire committee complained that of the time available for work in the week ending 11 January 1918 the machines were ploughing for 24 per cent of the time, and were idle for 35 per cent due to bad weather, and 29 per cent of the time due to repair work. Many machines were used on unsuitable land, and in Herefordshire the machinery officer reported "all the good tillage has been done with horses and we are simply doing the bad pieces." The Department reminded farmers that tractors were still "in an experimental stage," and whilst they were ideal for breaking up pasture which had been laid down in the previous fifty years they should not be used to plough up older pasture land or "very high backed land." Gradually the committees became more selective, and the machinery officer in Shropshire refused to allow any field under 6 acres or of irregular shape to be broken up by tractors. At Swaffham Priors in Cambridgeshire tractors ploughed the fields but horse-teams were employed on the headlands.[2]

There was a great debate as to the merits of different types of tractors. Various trials were arranged, and by the end of the war Fordsons were the most popular tractor since they were easier to manœuvre and maintain. At first, however, the committees were given little choice as to what machines were supplied, and Lindsey received thirty-nine Titans, fifteen Parrets, ten Emersons, nine Moguls, and four Fordsons. The Wiltshire committee complained that twenty-three of its thirty machines proved unsuitable for heavy land.[3] Most counties wanted only two or three types in order to reduce the problems of maintenance and obtaining spare parts, and by late 1918 the Department had succeeded in reducing the number of types in use to six.

[1] Northants. R.O., Overstone MSS, Box X 4210. [2] Cambs. R.O., 424/01.
[3] Wilts. R.O., minute books, 1915–20.

The difficulties were exacerbated by the inexperience of drivers and mechanics, and the chronic lack of spare parts. In November 1917 six of the forty-two machines in Essex were idle for want of spares, and the fact that many parts had to be imported from the manufacturers in America caused further delay. Machines had to be "discarded owing to the impossibility of obtaining spare parts in sufficient quantities."

The long-term effects of the scheme were keenly debated. For many farmers this was their first experience of seeing tractors at work on their fields, and the East Sussex committee found farmers intensely scornful.[1] But the Northamptonshire committee noticed a change in attitude so that by 1918 many farmers bought machines wherever possible. Advocates of the scheme emphasized the exceptional circumstances in which the tractors were used. According to a member of the Department writing in 1919:

> The Government tractors carried out some astonishing performances . . . They dug themselves deep into the Midland Clay, they broke implements innumerable on the concealed rocks and boulders of the West Country, and they skidded vainly about the hillsides of Wales and the North. Fatal accidents were not unknown, but land was ploughed—at a cost—and crops were grown: it was "magnificent, but not agriculture."

Even the tractors engaged on simple ploughing operations worked under exceptional conditions. They spent much time and fuel travelling from farm to farm. Nuts and bolts worked loose and dropped off, and the frame and wheels of the machines became strained. Most observers believed these difficulties would be avoided in peacetime when every machine would be privately owned and operated.[2]

FARM IMPLEMENTS

Never before had agriculturalists obtained such a detailed, albeit still incomplete, view of their equipment. The results of a census organized by the Essex committee are given in table 1. Publicity was given to labour-saving machinery; the county lecturer for Glamorgan pointed out that 45 per cent of the farms in the county were under 20 acres, and 60 per cent under 50 acres, and their occupiers were desperately short of capital. This, rather than any basic antagonism, caused them to buy second-hand implements at prices well above their intrinsic value and yet still lower than the cost of new.[3] Many farmers depended on hiring equipment, such as charlock sprayers, but the contractors frequently lacked sufficient equipment or refused to work in the fields which were small, wet, or stoney. The Board of Agriculture, executive committees, and Agricultural Organization Society, therefore, encouraged farmers to form trading societies for the joint purchase of equipment, and

[1] East Sussex R.O., Shiffner MSS. 3256.

[2] G. T. Hutchinson, 'Government Tractor Cultivation', *Journal of the Board of Agriculture*, 25, 1918–19, pp. 1045–54.

[3] Glamorgan R.O., AC ACZ 1, various folders and files.

TABLE I

CENSUS OF AGRICULTURAL MACHINERY ON THE 9,055 HOLDINGS IN ESSEX, JULY 1917

Implements	*In good repair*	*Capable of being repaired*
Binders	3,999	330
Corn and seed drills	3,918	83
Disc harrows	742	12
Engines, portable	569	42
Horse cultivators	3,360	105
Ploughs	13,373	464
Potato sprayers	58	4
Rollers	8,054	171
Threshing machines	420	22
Traction engines	280	12
Toothed harrows	13,128	318

some co-operative ventures were successful. But progress was necessarily slow, and in order to meet the food production crisis of 1917–18 the Department was forced to intervene and provide thousands of implements for hire to farmers. Five thousand binders and reapers, for example, were provided in 1918. The Northamptonshire committee hired out 156 ploughs, forty disc harrows, sixty-three horse harrows, thirty-four disc drills, forty-one cultivators, fifty-five rollers, and eighty-six binders.

ESSENTIAL SUPPLIES

There were widespread fears of the land becoming infertile, and the Glamorgan committee encouraged colliery owners to sell all their pony manure to nearby holdings. By 1917 orders for the stable manure from military camps had outstripped supplies, and only local farms could be supplied. Farmers were encouraged to use more artificial fertilizer, and demand for basic slag rose from 280,000 tons to 500,000 tons per annum. Unfortunately supplies were disrupted by shipping losses, the rival demands for the chemicals in the armaments industry, and the enlistment of key workers in the industry. The output of superphosphate of lime fell to less than 30 per cent of peacetime production. The Board of Agriculture, therefore, tried to popularize the use of sulphate of ammonia which was relatively plentiful. The Food Production Department and committees tried to secure adequate supplies for stockists and farmers, and demand rose from about 60,000 tons before the war to 150,000 tons in the 12 months ending May 1918.

An expected shortage of grain seed failed to materialize, but farmers experienced great difficulty in securing coal and oil. The shortage of coal was so serious in July 1918 that the committees were allowed to grant certificates for the priority delivery

of coal for steam cultivation and threshing. It was also essential that the steam pumps of the fenlands obtained adequate supplies, and the Cambridgeshire committee supported a special order of 50 tons of coal for Soham Mere Drainage Pump in order to keep the area free of flood-water. The Wiltshire committee warned of the consequences of a petrol shortage: it stressed that "owing to the decrease in the amount of labour available it is necessary to utilise machinery to a greater extent than heretofore." The Glamorgan committee organized a census of petrol-driven engines in 1916, and discovered that there were about 200 in agricultural use, ranging from 1 to 10 horse-power.

Many farmers and smallholders lacked the capital to increase food output and change the use of their land. In 1916 the Preston district committee of Lancashire recommended that the Board of Agriculture should create a number of co-operative banks to supply short-term credit. In May 1917 the Food Production Department introduced a scheme whereby the joint-stock banks offered special credit facilities in return for a government guarantee on each loan. The money was not actually advanced: instead, the banks paid the bills presented for items previously approved by the committees, and the farmers repaid the sums within 9 months at 5 per cent interest. On behalf of the Department the county committees investigated each application for a loan. At first credit was only granted for the purchase of seeds, fertilizer, and manure. Thus, the Hertfordshire committee approved a loan of £100 for the purchase of 12 quarters of seed oats and 200 sacks of soot. But in August 1917 a second scheme was introduced whereby credit could be given for any purpose which led to increased food production.

By June 1918 478 applications for credit had been made in England and Wales, and 303 had been approved for a total sum of £21,077. The number of applications varied between counties: Essex approved loans for £2,680 in 1917, whereas the Peterborough committee received no requests for assistance. Prothero complained that farmers made little use of this source of credit. Many were reluctant to reveal their financial position to the committees, and the latter gained a reputation for being very strict in approving loans.

LAND DRAINAGE

Many of the fields scheduled for ploughing up were so badly drained that there was little point in planting crops until they were under-drained. The Lindsey committee noted that even some of the pastures which had produced grain in the mid-nineteenth century were flooded: many of the drainage pipes had been installed so deep in the ground that they were useless, and they had to be replaced by more shallow drains. The Department tried to obtain the recall of all skilled drainers from the army and munitions factories, and to encourage the revival of several small brickyards for the supply of pipes and tiles.

Many water-courses and field ditches were so neglected that they flooded neighbouring farmland. Lidlington Brook in Bedfordshire had not been cleaned out for twenty years and cattle had trodden down the banks, so that over 70 acres of

the parish of Lidlington were flooded several times a year.[1] The Caistor district committee in Lindsey claimed that 3,000 acres of warpland were flooded by the Ancholme river and Caistor canal, and it asked the county committee to withhold orders for breaking up grasslands until drainage improved. There was special concern for the drainage of the fenlands. The drains were frequently choked by silt and vegetation, and the problem was exacerbated by the apathy of a small minority. The Peterborough committee complained that some of the farms were:

> owned by many different small owners and farmed by a number of small holders, many of whom, not only neglect their land, but also their ditches and drains and consequently a man who is anxious to farm well is placed at a great disadvantage owing to his neighbours holding up the water.[2]

Under the Cultivation of Lands Orders the county committees could order the owners and occupiers of water-courses to prevent the flooding of agricultural land. Thus the Kent committee issued orders for the improvement of the rivers Beult and Tiese: the occupiers had to "cut the bushes overhanging the stream and so far as possible remove all obstructions that retarded the flow of water." An inspector was appointed to ensure the work was completed by January 1919. As early as December 1915, the Liverpool district committee suggested that the Board of Agriculture should undertake drainage work where the owner or occupier lacked the resources or refused to co-operate. The Cultivation of Lands Orders of 1917 made this possible: the county committees could carry out the work if the owner failed to act within 7 days of receiving a drainage order. The cost would be later recouped from the owner.

The county committees entered into liaison with one another in the improvement of water-courses, and the Norfolk and East Suffolk committees, for example, co-operated in issuing orders and undertaking improvements on the river Waveney, which formed the county boundary. Large numbers of unskilled soldiers and prisoners-of-war were employed under the supervision of skilled civilian drainage experts. About 250 prisoners helped drain 5,000 acres of farmland in the valleys of the Birkett, Fender, and Arrow in the Wirral of Cheshire,[3] and the Department estimated that 80,000 acres of farmland in England and Wales benefited from drainage work undertaken in the months up to June 1918.

The committees experienced great difficulties in this drainage work. It was a laborious procedure to issue a drainage order: the Essex committee discovered that 100 persons owned parts of Mar Dyke which was only 45 miles in length. Few members of the committees had experience of water management, and the Department gave little expert guidance at first. The Lancashire committee was allowed to appoint the county bridgemaster as a drainage expert. Work was impeded by bad weather and unexpected technical difficulties. The East Riding committee com-

[1] Beds. R.O., WAM 0–12, WAO 1–11, WAR 1–5.
[2] Hunts. R.O., minute books for Soke of Peterborough, 1917–20.
[3] Cheshire R.O., printed report and minute books, 1915–20.

plained of slow progress in improving the Market Weighton canal owing to the inexperience of the labour force and the problems caused by high tides in the Humber. Work on Bellasize drain was completed in August 1918, but soon afterward the committee had to authorize further expenditure in order to prevent landslips and the erosion of the banks of the drain.

The work was so vital that a Land Drainage Act was passed in 1918 which ensured that the powers invoked under the wartime regulations would remain in force after the war. This helped to stimulate the long-term investment that was required for large-scale drainage schemes. The Act made it easier to set up drainage boards and extend the area of those in existence. The county councils and Board of Agriculture could take the initiative, and it was hoped the boards would take over the supervision of drainage, provide the necessary expertise, and obtain finance from drainage rates. Accordingly, the Cheshire committee decided to "resuscitate" the local drainage board of the Froudsham district in order to safeguard 2,000 acres of marsh and low-lying land which had been drained by 200 prisoners working under the direction of the committee.

VERMIN CONTROL

From 1915 onwards the committees stressed the futility of land improvement and reclamation without steps being taken to reduce the number of rabbits and other pests. The Board was at first reluctant to intervene but in 1917 a Rabbits Order was introduced which gave the committees powers to reduce the rabbit population where landowners or tenants failed to take action. The Berkshire committee, for example, issued an order for the destruction of rabbits on one estate despite the opposition of the landowner who claimed his "rabbit farm" produced large quantities of rabbit meat for consumption. The Department reminded the East Sussex committee of the value of the Order in safeguarding crops on the newly reclaimed wheatlands of St Leonards Forest. Where possible the committees took steps to destroy the rabbits' breeding grounds, and a covert was cleared and broken up at Breaston, Derbyshire, in order to reduce the rabbit population in the vicinity of newly ploughed fields.[1]

Pigeon shoots were arranged, and the Rookeries Order of May 1917 authorized committees to issue orders for the shooting of rooks where the rookery owners had failed to co-operate in protecting crops. Kent received thirteen complaints of damage by rooks, but on investigation it issued only three orders for the destruction of the birds. The Lancashire committee noted that rooks "were only objectionable in cases where they were in excessive numbers," and issued only seventeen orders throughout the war.

The Norfolk committee urged the government to launch a national programme for the destruction of rats: a bumper harvest was in sight in 1918, and there were fears of serious losses in the granaries. The Ministry of Food introduced a Rats Order which allowed local authorities to intervene where landowners failed to co-

[1] Derbys. R.O., D/331.

operate. The Board of agriculture was empowered to supply rat poison to each council at cost price, and the Wiltshire council accordingly ordered a ton of poison for use in the spring of 1919.

Support was given to the formation and work of Rat and Sparrow Clubs whereby bounties were paid for the destruction of the vermin. With the encouragement of the county committee, the Hertfordshire county council paid £505 in 1917–18 on 103,512 rat tails, 40,586 fully fledged sparrows, 8,670 fledglings, and 19,216 eggs. Some committees advocated the destruction of all birds, but this attitude became less common during the war. Many observers believed this would lead to a dramatic rise in the insect pest population: the sparrow clubs would "simply prepare the way for insect plagues and devastations," and the Department reminded farmers of the valuable role played by insect-eating birds in protecting crops.

TABLE II

ESTIMATED PRODUCTION OF CEREALS AND POTATOES IN ENGLAND AND WALES, AS INDICATED BY OFFICIAL STATISTICS

(,000 tons)

	Wheat	*Barley*	*Oats*	*Potatoes*
1885	2,093	1,702	1,316	2,395
1895	997	1,465	1,315	2,746
1905	1,572	1,201	1,425	2,783
1914	1,634	1,184	1,340	2,953
1915	1,880	866	1,452	2,858
1916	1,498	989	1,452	2,505
1917	1,567	1,051	1,471	3,341
1918	2,339	1,168	2,010	4,209
1919	1,763	1,052	1,566	2,733

II

THE RESULTS OF THE CAMPAIGN

The downward trend in cereal output in 1916 was reversed in 1917–18. The area of tillage rose from 8,407,000 acres in 1916 to 10,263,000 acres in 1918. Such counties as Lancashire and the East Riding exceeded their ploughing quotas by a substantial margin, and the proportion of farmland under pasture in Northamptonshire declined from 69 per cent to 61 per cent, representing an area of 40,000 acres broken up for cultivation. Table II indicates the rise in the estimated production of wheat, barley, oats, and potatoes during 1917–18, and compares output with earlier returns since 1885. The Food Production Department noted that no other European country had even maintained its pre-war output.

The Surrey committee regarded the winter of 1917–18 as "the high tide" of the farmers' fortunes, although on the basis of a case study made between 1913–14 and

1919–20 C. S. Orwin and S. J. Upfold described 1918–19 as the time of peak profits.[1] The demand for food was so high that farmers received the maximum prices permitted by the Food Controller. Although the high income was to some extent offset by increases in the cost of labour, equipment, farm stock, feed-stuffs, and fertilizers, the farm tenant gained considerably from the fact that landlords found it very difficult under the limitations of the Corn Production Act to increase farm rents.

A great deal of interest was centred on the yields of newly broken grasslands. The Department published a report in 1917 which claimed four successes for each failure recorded, and in 1918 several counties employed district valuers to estimate the output of the reclaimed land. Thus, a sample survey of the Bridge district of Kent indicated that 2,031 acres of new arable land had produced an average of 33 bushels per acre, "a highly satisfactory result." The best results were obtained from grasslands broken up in spring and early summer, left as a summer fallow, and planted in the autumn.

The county committees frequently attributed the failure of crops to the poor way in which the farmers had prepared the land. Some simply broadcast the seed over fields which had been badly prepared and harrowed. The executive officer in Lancashire remarked "had such land been properly worked by means of cultivators and harrows, more promising crops would have been obtained." Beside cases of negligence, the committees encountered examples of ignorance and inexperience, which compelled them to provide a rudimentary advisory service. One commentator remarked: "many of those who ploughed up grassland . . . had had no previous experience in dealing with arable land at all. Others though skilful in managing arable land had had little or no experience in breaking up old turf."[2]

From May 1918 onwards, there were many reports of extensive damage caused by wireworm and leather-jackets. Heavy losses were recorded in south Hertfordshire which the county committee attributed to the fact that men, horses, and implements had arrived too late for autumn ploughing, and most of the land had been planted in March. Although the seed germinated well, the crops were "absolutely ruined by leather-jackets, wireworms and other slugs," and about 190 acres had to be resown with barley.

Farmers could claim compensation for losses sustained in reclaiming land by making application to the Defence of the Realm (Losses) Commission. After August 1918 claims were settled by arbitration under Section 8 of the Agricultural Holdings Act of 1908. By the middle of 1921 claims had been lodged for about 122,000 acres in England and Wales which, after investigation, were reduced to 75,000 acres, or about 4 per cent of the land broken up for cultivation. The Oxfordshire committee issued 1,256 orders in 1917–18, but received only eighty-two claims for compensation.

[1] C. S. Orwin and S. J. Upfold, 'Farming Equipment and Finance', *J.R.A.S.E.*, 82, 1921, pp. 131–57.
[2] C. Brynner Jones, 'The Breaking up of Permanent Grass in 1918', *J.R.A.S.E.*, 79, 1918, pp. 24–44.

CONCLUSIONS

The radical changes in the objectives, organization, and output of agriculture between 1914 and 1919 were without precedent. During 1915 farmers had increased food production in response to the rise in prices, but by 1916 they were unable to maintain output without investing in large-scale land improvements and reclamation. Because most were reluctant to incur the financial risk of such schemes the government, spurred on by the threat of famine in late 1917, invoked powers whereby the Food Production Department, through county agricultural executive committees, could issue orders for the compulsory improvement and reclamation of land for higher food production. Whilst these powers in themselves would have halted the downward trend, there would have been a limited response without two further steps being taken, namely the introduction of guaranteed prices for wheat and oats over a period of six years, the length of a normal crop rotation, and the provision of guidance and material assistance to farmers by the county committees.

The committees identified shortages, and obtained from the Department the necessary horses, steam tackle, tractors, implements, and other requisites for cultivation. It was a period of innovation, with the introduction of a credit scheme, and the intervention in land drainage, and various forms of pest control. The committees encountered many practical difficulties, arising from the hostility, apathy, or inexperience of landowners and occupiers, illustrated by the controversy as to the methods of hiring horse-teams on piece-rates, or the deployment of tractors. The executive officer for Kent described the campaign as a great experiment, the cost of which was justified at the time only by the seriousness of the food situation.[1]

The food production campaign ended during the autumn of 1918, following the Corn Production (Amendment) Act of August 1918 which awarded landowners and occupiers the right of appeal to an arbitrator whenever the committees issued orders for land reclamation, the termination of a tenancy, or the requisition of land and equipment. The Herefordshire committee warned that this would "in many cases paralyse the work of the committees," and indeed most became much less zealous in invoking and enforcing orders. A study of the minute books of the committees also indicates a growing resentment during the latter part of 1918 as farmers complained of the rising cost of overheads without any compensatory increase in the maximum price of farm produce. The Surrey committee asked: "is it possible that the serious risk of starvation we have recently faced has had so little effect that the farmer is to be sacrificed even before the danger is past?"[2] The third stage in the demise of the campaign was reached after the Armistice when the committees were ordered to dispose of their horses, machinery, and equiqment through public auctions.

After considerable prevarication the Department and committees were dissolved

[1] G. H. Garrad, 'The Work of the Motor Tractor', *J.R.A.S.E.*, 79, 1918, pp. 1–24.
[2] Hunts. R.O., Surrey Committee circular in Hunts. minute book, June 1918.

in the spring of 1919, the Board of Agriculture was restructured, and new county committees were established for a peacetime role. A Royal Commission was appointed to enquire into the economic prospects of agriculture in peacetime.[1] Most observers expected a return to "normal," but the sub-committee of the Reconstruction Committee warned that "bad farming is a danger to the State," and that every effort should be made to secure "the greatest possible return of foodstuffs."[2] The new peacetime committees retained powers to enforce good husbandry and prevent arable land becoming derelict. The methods adopted in the First World War were closely studied from the early 1930's onwards. It may perhaps be significant that a piece of stationery of the Shropshire agricultural executive committee for the Second World War was found as a book-mark in the minutes of the First World War committee, marking the page which identified the 50,000 acres of grassland that were scheduled for cultivation by the harvest of 1918.

[1] E. H. Whetham, 'The Agriculture Act, 1920, and its Repeal', *Ag. Hist. Rev.*, XXII, 1974, pp. 36–49.
[2] Reconstruction Committee, *Report of the Agricultural Policy sub-committee*, Cmd. 8506 (1917), 9079 (1918).

Notes and Comments

REVIEW BACK ISSUES

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BULLETIN SIGNALÉTIQUE SCIENCES HUMAINES

Readers might wish to note that articles published in THE AGRICULTURAL HISTORY REVIEW are analysed and indexed, together with many others in a variety of fields, in the *Bulletin Signalétique Sciences Humaines*, which is published by the Centre National de la Recherche Scientifique. Details may be obtained from the Centre de Documentation Sciences Humaines, Service Abonnements, 54 boulevard Raspail BP 140, 75260 Paris Cedex 06.

COMMUNITY GARDENS PROJECT

Mr James H. McGee, mayor of the city of Dayton, Ohio, has asked us to inform readers of a community vegetable gardens project in the city which extends to 950 contiguous plots, the largest of its kind in the United States. The mayor would be interested to hear of similar projects in other countries.

ANNUAL CONFERENCE AND AGM 1976

The Annual Conference of the Society was held at Homerton College, Cambridge, on 12–14 April 1976. The Conference included papers by R. M. Smith, B. M. S. Campbell, D. P. Dymond, J. R. Wordie, Mrs S. Wade Martins, and R. Perren. Dr Dymond led an excursion to Arthur Young's estate at Bradfield Combust and the Museum of Rural Life at Stowmarket, Suffolk.

The Society's twenty-fourth AGM was held on 13 April 1976. Mr John Higgs, Mr C. A. Jewell, and Mr M. A. Havinden were re-elected President, Treasurer, and Secretary respectively. The three vacancies on the Executive Committee were filled by the re-election of

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