
Agriculture in Britain as a Mature Industrial Society

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Introduction

Until now, virtually no attention has been given by agricultural policy-makers in industrial countries to any strategies beyond present agri-industrial preoccupations. More capital intensity, less labour, more chemicals, larger units, more factory farming are considered the only rational paths to producing more food. These trends are assumed by agricultural officialdom to be sustainable not only in Britain but throughout the European Community, to whose central agricultural policy Britain is financially and legally bound. But are they sustainable—or even now desirable—in the face of rising capital and oil and chemical input costs and a general trend towards structural industrial unemployment?

The answer to these questions go far beyond the concerns of economic efficiency on the farm into issues of rural strategy of the sort which are now agreed to be central to development studies but peripheral to developed country strategy. In many Third World countries the rise of the modern sector has increased the stagnation of the countryside as mass migration from the sluggish traditional sector contributed to the phenomenon of rapid urbanisation. Planners have accordingly devoted themselves to devising strategies for rural revival and the injection of modern management, machinery and science into the traditional sector.

Few have so far considered the possibility that the 'backward areas' of the advanced countries may have some of the same characteristics and needs. Rich nations no longer have dual economies as, with an abundance of capital, every economic activity has long since been modernised. In the transition to post-industrialism, however, it may be necessary to permit, or even encourage, a new dualism, with two types of policy; one for the 'modern' sector and another for industry and agriculture in 'backward' rural regions. A point of departure for testing such possibilities may present itself in Britain.

The industrial view of British agriculture

Britain launched her industrial revolution on the wealth of a prosperous agriculture. In a century of free trade and imperial-industrial expansion (1846-1947) the country naturally preferred cheap imported food.

At first this helped make British industrial goods more competitive. But in the imperial phase fol-

lowing the 1880s, it subsidised low industrial productivity. In the post-imperial period that began in 1947 with the Labour government's agricultural support system, the aim was to secure farm prices that would make agriculture more productive and at the same time more attractive to capital investments. From the late 1950s British farming was kept 'efficient' by the Treasury's insistence that the government's guarantee prices increased each year by slightly less than costs had risen in the preceding twelve months. So farmers had to grow a little more each year in order to earn the same return.

The post war British farm subsidy system brought an industrial phase in agriculture which had scarcely started in the 1920s and 1930s. (In 1920 there were only 10,000 farm tractors in Great Britain compared with about 0.5 mn. today.) (Leach, 1976:15) Larger farm units and more capital intensive and labour economising methods remain central to the British government's programme. Their reasons are orthodoxly neoclassical: this represents the best employment of British resources. By increasing the import of new materials such as fertilisers and foodgrains we may increase the output of more expensive food items such as livestock products from non-ruminants. From an accounting viewpoint this shows an increase in added value, and thus a higher proportion of the total cost of our food contributed by the home industry. (Ministry of Agriculture, Cmnd 6020).

The assumption is that we can always obtain more food by trading competitively with other nations. Suggestions that agriculture should have priority because there may be absolute world food shortages in the future and Britain may not be able to sell sufficient industrial goods or services to buy enough food or agricultural raw materials, are not yet officially considered relevant. They therefore tend to meet the response that nationally, agricultural output contributes no more than 3-4 per cent of GDP and must be considered accordingly. (South East Joint Planning Team, 1970:4.18).

The assumption is thus made that agricultural productivity can continue to be raised by modern techniques under which "the farm of the future is likely to resemble a minor industrial complex, and the old pattern of hedge, field and copse may be replaced. . . . by extensive areas of bare

croplands" (South East Joint Planning Team 1970:4.17). The present position as stated in the government White Paper *Land* (White Paper Cmnd. 5730) is that good agricultural land (although preferably not of grades 1, 2 or 3) may continue to be paved over for 'green field' development, and indeed this is happening at an impressive pace. During the remaining years of this century, the demand for space for urban land in Britain is currently estimated to be about 12,000 hectares per year, but could be as high as 23,000. In addition, projections for new afforestation call for 35,000 hectares of land a year, and some economists urge that this rate of expansion be increased, perhaps to 100,000 per year. Reservoirs, mining, recreation etc. will demand about 5,000 hectares a year more and the need for additional nature reserves could call for a further 4,000 hectares a year (Centre for Agricultural Strategy, 1976). Despite these potentially massive demands, however, the major conflicts that worry subscribers to the free trade views of agriculture are between competing claims for 'more efficient' (i.e. more market competitive) industrial farming and the demand of urban population for rural amenity.¹

An alternative strategy

Against this conventional wisdom there is now a growing body of opinion which sees an alternative strategy for agriculture in a society apparently in transition from the present 'raw' industrial phase to a more mature (and probably slower) phase of economic growth. Indeed, if we seek greater output, further progress in the present direction may prove very expensive. It is instructive in this regard to compare agricultural input costs and output for the nine members of the European Community:² In Belgium, for example, wheat yields are about 14 per cent higher than in Britain, barley +16 per cent, oats +4 per cent, sugar beet +26 per cent, fodder beet +60 per cent, potatoes -4 per cent and livestock produce generally +13 per cent. To achieve this, feeding-stuffs per hectare of farmed land cost 25 per cent more than they do here, fertilizers and lime +209 per cent, there are 61 per cent more tractors and—interestingly—83 per cent more workers (per ha.) (EEC, 1974). The country most like the UK in its agricultural structure is West Germany, but even there, slightly higher output per hectare is achieved

at disproportionately higher input costs—and the labour force is 133 per cent higher.

From such figures as these one may conclude that whatever strategy Britain seeks to follow it is probable that we will need more workers on the land—even if we increase still further our use of capital-intensive techniques. However, if we further intensify mechanisation and chemicalisation, the cost of doing so is almost certain to exceed the value of the increased production. We could be rather more self-sufficient in food, but all food would cost considerably more.

We may be compelled then, to consider more sensitive farming techniques. Such techniques might increase output, but at a lower cost, making organic farming and other, similar approaches, worthy of closer consideration. To some extent a move in this direction has already begun. The livestock industry has rationalised the incompatibility of dairy and beef animals by a compromise using specially developed all-purpose breeds: the ubiquitous Friesian-Hereford cross is typical. The cows are good milkers and the male calves can be raised for good quality beef. The logical outcome will be the disappearance of the specialist 'dairy' and 'beef' herds as such in favour of a much more flexible general herd.

Work is now also very advanced on finding alternatives to nitrogen fertilisers. The latter are very expensive because their price is linked directly to fossil fuel prices, and because they are so mobile in the environment that it is virtually impossible to use them without massive wastage. It would help if they were applied more carefully, with doses varied from one part of a field to another to allow for different requirements. But it may be better to use inoculated cultures of free-living nitrogen-fixing bacteria, or to develop plant varieties capable of fixing nitrogen for themselves (this essentially biochemical approach carries genetic risks, but it is being developed anyway). The approach to pesticide use is becoming equally subtle—among scientists, at least, if not yet among farmers.

Two other recent developments in thinking could also point in the direction of an alternative to Britain's present large unit, capital intensive industrial strategy for agriculture. The Capital Transfer Tax (CTT) will, if retained, break up large private landholdings within a generation. It could greatly increase the number of small holdings obtainable. However, the smaller unit potential incidence of the CTT works against the larger unit strategy of the Common Agricultural Policy of the European Community, and of British farming policy generally. Moreover, unless

¹ For a detailed discussion and justification of this view see Fairbrother, 1970.

² The percentage comparisons of EEC yields are based on yields/ha of the commodities concerned, in a single year. Comparisons of input costs are highly aggregated, but they are calculated on the same basis for each country and while it is not possible to make very accurate or detailed comparisons, it is possible to gain a general impression.

related to specific measures to encourage small holdings, the likely effect of CTT is simply to transfer large landholdings from individuals to financial institutions.

The other new development is the rise of interest in organic methods of farming. Most knowledge of organic methods has so far been retained or developed by voluntary bodies and individuals. Virtually no official resources have been devoted to it, beyond a small amount of university support. Yet one of the few really rigorous comparisons that has been made in recent years between organic and conventional farmers (Lockeretz et al, 1975 and 1976) showed that, by using only the nutrients available in materials on the farm, organic farmers were able to sustain yields not much lower than those of farmers using orthodox artificial fertilizers. Even more important, they did so at substantially lower unit production costs, and with an energy consumption of about one third that of conventional farmers. Partly as a result of this study, and of the subjective findings of British organic farmers, some leading agronomists in this country foresee a gradual conversion to organic methods as being possible without major adverse effects on food output (Mellanby 1975). All the above considerations suggest an alternative strategy to that of the conventional wisdom for an advanced industrial economy.

An alternative strategy might have four major objectives. First and foremost is a genuine increase in the extent of national self-sufficiency. The long range target here would be much greater self-sufficiency in the entire chain of food production involving not only lower imports of wheat (now over 50 per cent) sugar (over 60 per cent) beef and veal (23 per cent) concentrated feed stuffs for livestock (72 per cent) but also fertilizers (over 80 per cent) and energy required to work farms and distribute farm inputs and products. A subsidiary goal which is attracting increasing interest is the aim of greater self-sufficiency at the regional level. To achieve optimum *regional* self-sufficiency within Britain economies are needed, particularly in distribution and related energy costs.

The third objective of this alternative strategy is labour absorption. This goal calls for a pattern of agriculture that is not less mechanised in terms of substituting muscle power for machines, but employs more people as a result of a shift to smaller management and operational units designed to give greater productivity *per hectare*.

A fourth objective relates to health. It seeks an improved national diet through an overall reduction in meat consumption and greater direct

consumption of protein in the form of wholemeal bread and other grains. These four goals are reviewed briefly below.

1. The target of greater self-sufficiency

To aim at something close to national self-sufficiency in food inputs is an ambitious target for a country that currently imports 45 per cent of its food. Greater self-sufficiency in food production is, however, already an official goal of the Ministry of Agriculture, though the means by which this is supposed to be achieved indicates concern only with 'first order' sufficiency (i.e. excluding consideration of reduced reliance on essential imported inputs). The reasons for a target of greater (it could not be complete) first and second order self-sufficiency (i.e. including energy and chemical imports) are multiple and interconnected.

First, of course, is the strategic concern over the prospect that an ultra industrialised country with consistently lagging productivity and foreign exchange problems may not be able to buy sufficient food and agricultural raw materials in times of world food crisis and very adverse terms of trade. The theory of comparative advantage does not admit to this as a rational problem, as it excludes non-economic (e.g. political) considerations which may affect productivity as well as the security of external supply. An extension of calculations to include future output and trade uncertainties which stem from *non-economic* causes, however, returns us to concepts which give priority in certain sections to national production, often pejoratively dismissed by free traders, as neo-mercantilism. Additional arguments for greater agricultural self-sufficiency emerge from the other goals of an alternative strategy.

2. A framework of regional re-integration

A strategy of regional self-sufficiency within the context of this target recognises that no sub-national region can achieve anything approaching self-sufficiency. But it claims major advantages involving greater food supply security due to reduced regional specialisation in the face of increasingly erratic weather and industrial relations, and escalating social and economic costs of agricultural transport. For example, each million British families currently require 3.4 mn. ton-miles of transport for meat products alone each year (Allaby, 1976:193-205).

One of the principal effects of the post-1947 subsidy for more mechanised farming was increased farm specialisation. The traditional mixed farm where every kind of livestock was supported by arable and grassland areas that grew a range of crops was all but killed off in the 1950s and

1960s. Livestock farms specialised, often by taking animals or poultry through just one stage of growth, with stock changing hands two or three times before slaughter. Arable-only farmers became dependent on chemical fertiliser, while manure accumulated on stock farms presented a disposal or pollution problem.

This 'efficient' system produced cheap and more luxurious converted-protein food until the grain shortage of 1973, the oil crisis of 1973-74 and the fertilizer crisis of 1974-75 all demonstrated that in conditions of scarce imported feedstuffs, sky-high fertilizer and rising oil costs, Britain was heavily overstocked with animals, and that arable farms were producing more than the land was able to yield safely and continuously, without the return of organic matter and fallow periods.

An alternative strategy would move back towards mixed farming and reduce intensive indoor rearing of non-ruminants. Grain now fed to poultry (conversion efficiency 13 per cent) and pigs (17 per cent) would be eaten directly by humans. As pigs and poultry provide about a third of our animal protein, the actual protein in our diet could be increased in this way by 5 or 6 per cent. Pigs and poultry would increasingly return to their marginal waste food consuming role on farms—feeding on spilled grain, scraps, roots etc. while fertilising the ground. At the same time the phasing out of the beef-only herd would remove the need for grain imports.

Elimination of the beef-only herd would release grassland as well as grain. This land could be used to support a larger dairy herd whose surplus male animals provide beef and veal. The increased dairy output would reduce the need to import butter and cheese, and its wastes could be fed to pigs and poultry to supplement their diet. Meanwhile a reduction in our sugar consumption—strongly advised to prevent a whole range of degenerative diseases—would mean that with somewhat expanded beet production, we could be close to self-sufficiency in sugar.

As regards fertilizer, Britain is capable of self-sufficiency in potash but cannot avoid importing phosphates, though some can be re-captured from sewage while a substantial further saving could be made by eliminating them from detergents. In the case of nitrogen fertilizer, greater use of organic material together with the chemical nitrogen fertiliser would save substantially on the present 50 per cent loss of artificial nitrogen fertiliser through leeching. Meanwhile more general use of nitrogen-fixing legumes (peas, beans of all kinds, and clovers) would help to save further on chemically-fixed nitrogen.

3. Less energy, more care = more employment, higher food prices

There is today widespread recognition that a large part of the chemical farming pollution problem arises from standardised and heavy-handed 'slosh-it-on' practices, which waste fertilizer and produce run-off pollution while showing diminishing returns in yield. If British agriculture is to make the most efficient use of available nutrients, the precise requirements must be provided for each small area of land. This will require a substantial increase in the farm labour force. Just what increase in employment for what reduction of pollution and cost saving is a matter for detailed research and calculation, but the employment trend of such practices seems clear. At the French level of 11.5 per cent of the working population in agriculture, Britain would need some 2 mn. instead of the present level of about 0.5 mn working on the land.

In a complete reversal of the strategy of the CAP, farms, or at least farm management units, would become smaller rather than larger, as with very intensive management the administrative costs and difficulties would mount with the size of unit. It seems unlikely, in fact, that the CAP policy of amalgamating small farms can succeed in achieving its objectives. So far the governments operating the CAP have only succeeded in eliminating the small-holding peasant farmer by squeezing him out economically (at great cost), though generally the policy of buying the small man out has failed. Besides, landless ex-peasants not only need new housing but employment in a Community where industrial unemployment appears endemic.

At the same time the need for smaller farm units in the future may arise from purely logistic considerations. The need for ease of access and personal involvement in day-by-day management decisions will tend to favour smaller scale management, provided that the quality is high enough. Social and psychic benefits may well arise from allowing more people to control the land and the production of food from it.

The process of return to smaller units may also encourage a more diversified farming pattern. Despite economic pressures, the personal preferences of farmers still affect their practices to quite a large extent. Farmers grow wheat rather than dairy farm simply on the basis of personal preference. Also, in a landscape composed of a larger number of units, it is likely that a larger number of autonomous managers will choose different specialities. Moreover, if political devolution were to encourage more regional self-

sufficiency, this diversification could be increased still further. (On the other hand it might not: farmers might all try to get rich by growing the same items mainly for export.) The landscape would also probably be richer and where this kind of richness occurs, one is also likely to find greater ecological stability. This may be a rather minor consideration in Britain, but it could be a major one elsewhere in Europe or in tropical areas, if it reduces the impact of crop diseases or pest infestations by reducing the size of the target crops.

The new agricultural worker required to replenish the workforce of smaller, more labour-consuming farms would have to be recruited from the industrially unemployed. He or she would require substantial retraining; and would need to be literate and competent to use more sophisticated equipment and techniques than most that are employed by today's agri-industrial workers.

In order to achieve a flow of labour back to the land, the agricultural wage would have to become comparable to that for factory work while working conditions, though inevitably quite different, would have to be comparable in amenity to those of the industrial production-line worker. All this would mean further rises in food prices which in turn would mean that food subsidies would have to be increased.

Higher levels of employment in agriculture are not likely to be achieved under the present pattern of farming. As Kenneth Mellanby has pointed out recently (Mellanby, 1977), completely arable farms could probably never again employ large numbers of workers. In the first place a large part of the 19th and early 20th century farm labour force was engaged exclusively in the care and maintenance of horses. Cost and inconvenience rule out the return of the horse as an important draught animal. Also, as work on arable-only farms is seasonal, farmers could not afford to keep their labour force confined to tasks such as hedging and ditching. On the other hand, many arable farmers who would like to keep stock again, believing that this would benefit their soil, but cannot afford to do so, would be encouraged by the 'post-industrial' strategy advocated here. Abandonment of the 'feed-lot' beef herd and a strategy of more dairy herds, could, indeed, help to raise the employment potential by diversification. Beyond this, however, is the possibility of returning to a mixture of seasonal agricultural work with rural industrial employment.

An increase in rural employment would relieve pressure on urban housing and revive the build-

ing industry in rural areas, with infilling development in existing villages and small towns. Stockmen would still have to live on farms, but the bulk of agricultural workers would probably be accommodated in towns and villages, shopping facilities and amenities would expand with the influx and a new stimulus would be given to locate small, agriculture-related industries in formerly stagnant small communities.

The introduction of policies to encourage such trends in agriculture could help to trigger a process of decentralisation which would involve far more than the agricultural sector. It would represent a step towards what Stapledon (1972, ch II) in the 1930s called "industrialising the rural", the aim being to achieve an organic re-integration of urban and rural life-styles lost in the era of urban industrialism.

Rural industrialism became a major focus of interest amid the apparently endemic US unemployment of the 1930s—only to be eclipsed by the industrial expansion which accompanied rearmament and the war economy. By the early 1930s, American decentralists and proponents of 'small is beautiful'—Mumford, Woods and Stuart Chase in particular, were being joined by prominent establishment figures who believed that the stalling of the nation's industrial machine and its apparent overcapacity was due to the massive size of the new mass production plants. After a few years of the depression, Henry Ford himself pronounced that 500 to 1,000 men in a single factory was enough. He also believed in industrial dispersion: "The belief that our industrial country has to concentrate its industry is not well-founded", he wrote. Certainly smaller businesses did relatively well in the United States in the depressed 1930s.

The stimulus behind American decentralism at the time was agricultural depression and over-production, alongside massive unemployment in highly centralised and integrated industry. "The fundamental social objective of rural industry", wrote Woods, "is to reduce the worker's dependence on wages by providing the means to raise food and affect other economies resulting from a rural environment, aimed to alleviate, through part-time factory employment, the predicament of those living in agriculturally handicapped areas" (Woods, 1939:231). By the mid-1930s 300 leaders from the fields of agriculture, industry and science had produced a *Declaration of Dependence on the Soil and the Right to Self-Maintenance* and started the Farm Chemurgie Movement. They planned to produce alcohol in great quantities from grains, molasses or potatoes

so as to supplement the nation's oil supply, while Ford planned his soy bean car, declaring that 'much of an automobile can be grown on a farm, much of it could be made from the by-products of agriculture' (Woods, 1939) Ford built a series of small plants in rural communities where the bulk of the workforce was part-time small-holding farmers.

4. An alternative strategy and improved nutrition

Much has been said and written recently about dietary contributions to the degenerative diseases that have spread with affluence. Because of market considerations, the question of improved nutrition and healthier diet has never been linked to official agricultural strategy. Here again one sees in Britain how the new food consumption patterns that now accompany low economic growth are moving in the direction of a healthier diet. The June, 1977, National Food Survey shows how household consumption of sugar, meat and butter (increasingly being substituted by margarine on cost grounds) have been falling (Ministry of Agriculture, 1977). It is arguable, too, that a conversion from beef and pork to more mutton and lamb consumption advocated in this alternative strategy would favourably reduce consumption of saturated fats, and thus make a significant contribution to a reduction in the incidence of cardiac and vascular diseases.

Post industrial agriculture's Third World impact

The parallel between the sort of decentralist-self-sufficient strategy outlined above and the World Bank's and other aid agencies' strategies for developing countries scarcely requires remark. In terms of its impact on poor countries, such a strategy for a "post-industrial" country like Britain could be either helpful or damaging depending on what other policies accompanied it, especially the type of aid. British self sufficiency in food would not, however, have a significant direct impact on Third World food and agricultural input suppliers. Indeed, greater food output by the UK can go a long way before it has any effect at all on our trade with developing countries. Britain's main imports are of temperate climate grains and high-value animal products: a trade confined to rich industrial countries. Its agricultural imports from the Third World are made up mainly of sugar and vegetable oils. Other imports, such as tea, coffee, cocoa, tropical or sub-tropical fruits, etc. will obviously not be affected. UK production of vegetable oil could be increased by cropping oilseed rape. Sugar remains the chief sore point. Here a combination of reduced consumption and increased beet acreage could reduce the import requirement

for cane sugar. In this case, though, one could argue quite strongly for remaining dependent on cane, because it is biologically far more efficient than beet. Here Britain—or the EEC—could enter into much more comprehensive agreements with the cane producers in order to guarantee their market, and also improve their cushioning against the effects of the one-crop economy.

Finally, though not least significantly, a gradual switch to this sort of post-industrial strategy could produce an impressive demonstration which could be backed by more appropriate capital and technical assistance to pre-industrial economies which would naturally arise from pursuing a more parallel strategy in the rural sectors of both rich and poor nations.

Conclusion: logic vs politics

To sum up, it seems that British agriculture, despite its widespread reputation for efficiency, has been the victim of crude policies and crude technologies. These stemmed from the inevitable desire of farmers and governments to reconcile conflicting and competing demands. None of the decisions is easy. In aiming for high yields of wheat, for example, the protein content falls, so the wheat is less "strong" and less suitable for making the kind of spongy bread our baking technologists insist that we like. However, grain sold for breadmaking fetches a higher price than grain sold for other uses. Which do you choose to grow? The most valuable barley, sold for malting, has a low protein content, but is difficult to grow. If you aim for malting and miss, your low-protein barley may be unacceptable for the best quality feedgrain which requires a high protein content. The dairy cow is a milk-producing machine that requires a skeleton just large enough to accommodate the machinery and enough muscle to hold the bones together. A beef animal needs to grow large muscles quickly, and the females of the breeds are almost worthless as dairy animals. And so it goes on.

At present, the choices remain in a part-market part-planned limbo. They are uncoordinated with other, larger objectives of national social and economic policy. This paper proposes that agricultural policy evolve in future within an overall context of post-industrial national development.

The political barriers to a rational post-industrial evolution are, however, impressive. The CAP of the European Community is antithetical to almost every new direction advocated here: yet its survival, unreformed, is still held by many to be the lynch pin of the survival of the Community itself. The shift of employment from urban centres

would have to be a large one—with very great attendant problems—to make a significant impact on agricultural patterns and practices. Could rural employment be made as attractive as urban, and what would this, again, entail in a shift of resources? At the expense of what other objectives could food prices be further subsidised?

These questions—and many others—must be answered before any alternative post-industrial strategy for agriculture can be developed further. What is required is an alternative model—or series of models—which test versions of the thesis presented here. The new directions seem intuitively to be mutually supporting. The extent to which they may be so in reality, and the institutional and political implications of such a new direction, should be the focus of further work.

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