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### SYMPOSIUM ON 'CEREALS TODAY AND TOMORROW'

#### **Cereals, the world food problem and UK self-sufficiency\***

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In the United States, 91% of the maize, 64% of the barley and 88% of the oat crop is fed to animals. If all the cereals fed to animals in that country were available for human beings, it would be sufficient to feed not only the people of India, as stated in a recent publication (Ulbricht, 1976a), but in fact the whole of India and China. I am citing this fact not to suggest that US cereals could be used for that purpose—clearly, a totally unrealistic idea—but to emphasize that the world food problem is due, not to any lack of capacity to produce food, but to much more intractable problems. These include interacting factors such as climate, population, distribution, poverty and the use we make of the resources we have.

It has been said recently that the ideas of Malthus were fundamentally correct (Wilson, 1977), in the sense that growth cannot continue indefinitely. What has misled us, and what still misleads today's anti-doomsters is that just in the last few centuries energy has become ever more abundant at ever less cost. Is then the era of cheap energy irrevocably over? Wilson believes that substitutes for present forms of energy are not at all likely to be cheap. In addition, he points to the current recession from which economies are not emerging as the old cyclical pattern predicted, and that there is unemployment coupled with inflation, i.e., the 'system' is breaking down. An increase of demand of 5% annually, which is what governments and businessmen would like to see, would mean a fourfold increase in demand in thirty years. Whatever our favourite dream about the long-term future may be, in the next few decades energy is going to be expensive and we shall not see exponential growth at 5%/year. Feeding the rapidly growing population of the developing countries and trying to maintain some social stability in the face of the

\*This paper expresses the author's personal views, and not those of his organization.

unrealisable expectations of half-educated people drugged with television and tranquillisers: these are the problems which will become ever more acute.

It is easy enough to show that, even if the wealthier nations of the world continue to eat as much meat as they do now, world agricultural production could be increased sufficiently to meet the needs of the growing population. There is unused land and, in particular, under-utilized land. The world population will double in 25 to 30 years. Could we, say, double the rice yield? That would mean increasing the yield to 5.8 tonnes/hectare, which is still far below experimental yields with present varieties; in other words, we are not even allowing for further genetic improvement. However, to supply the necessary inputs (especially nitrogen fertilizer) to achieve a doubling of the rice yield would require a ninefold increase in the use of fossil fuel energy (Oram, 1976). Is that a realistic scenario, for countries with no fertilizer plants, and no foreign exchange?

The pattern of world grain trade has changed over the years, as Table 1 shows. The biggest changes are the increasing deficit of the Iron Curtain countries and of Asia. Figures for 1976, were they available, might show a less depressing picture, as India had a good monsoon and Russia also had favourable weather that year. But, because of the drought, imports by Western Europe were certainly higher than in 1973 and it is striking that, despite greatly increased cereal yields (and acreage, in some countries) since the war, the Western European deficit has stayed so high. The reason, of course, is the increased grain feeding of animals. Already there are worries in India because of low rainfall this winter and it is obvious that too much importance cannot be attached to figures for individual years; it is longer-term trends that concern us, and these are clear from Table 1. However, aggregate figures for 'Latin America', 'Africa' and 'Asia' do not show the real extent of the problem. Sixty-one of the less developed countries had a deficit in food energy supplies in the early 1970s. It is estimated that 460 million people in the developing world are seriously undernourished (FAO, 1974).

Table 1. *The world grain trade (million tonnes) (Source: United States Department of Agriculture)*

	1934-38	1948-52	1960	1966	1973*
<b>Developed regions</b>					
Western Europe	-24	-22	-25	-27	-19
Iron curtain countries	+5		0	-4	-27
North America	+5	+23	+39	+59	+91
Australia/New Zealand	+3	+3	+6	+8	+6
<b>Less developed regions</b>					
Asia	+2	-6	-17	-34	-43
Africa	+1	0	-2	-7	-5
Latin America	+9	+1		+5	-3

+ indicates net exports

- indicates net imports

\* estimated

The average annual yield increase for the developing countries was 1.9% in the 1960s, and the total increase in food production (from yield and acreage increase) was 2.8% p.a. However, demand for food (from combined growth of population and income) was 3.5% p.a. in those countries (National Academy of Sciences, 1975). Another way of showing the same trend is to compare the degree of self-sufficiency of developing countries in 1961–63 with 1970–72; almost two-thirds of all developing countries showed a fall in self-sufficiency over the period (O'Hagan, 1976). The National Academy of Sciences study concluded that increased acreage was unlikely to account for more than 1% annual production increases, and that it could well be less. Unfortunately, in the countries with the largest grain deficits not much expansion can be expected from increasing crop acreage because (a) there isn't much land and (b) water is a limiting input. Further development would therefore require high capital investment.

Recent more detailed analyses of data have concentrated on the food-deficit less developed countries (LDCs). In these countries, which are the critical ones, grain production increased by 2.5% p.a. in 1960–74 but only by 1.7% p.a. in 1967–74. If growth in production occurs at 2.5% p.a. to 1985, there will be a deficit of about 100 million tonnes of grain in those countries (IFPRI, 1976, confirming earlier estimates by FAO). By 1985, the population of the LDCs will be over 2500 million, of whom 2200 million will be living in food-deficit countries if the production performance since 1960 continues at the same rate of increase.

Turning to the UK, we have to remember that, apart from the Netherlands, we use more grain for livestock production than any other country in the EEC, in proportion to its animal population. In the past, our grain feeding-stuffs have been much cheaper than in the rest of Europe, but this is no longer so. In any case, the long-term trend in world grain prices must be upwards, in real terms. Hence that part of our livestock industry which is dependent on cereal feeds is in a vulnerable position.

In view of all this, it is hard to disagree with the following: 'Even if the current economic gloom is exaggerated, prudence requires us to be ready for a future in which there will be no cheap food producers, not even British ones; and when it will be important to know how best to use our soil, climate, capital and skills' (Donald, 1975). A Cabinet paper concluded: 'The main scope for increased food production in the long term lies in the developing countries and, in view of the limit to potentially cultivable land, most of the increase must come from improving yields. Energy availability is likely to provide the long term limits, but in physical terms the world could meet its needs for the next 30–40 years. . . . However, because of economic, social and political problems leading to maldistribution and less than optimal production, even this situation is unlikely to be realised. The necessary capital and expertise is not being provided in the developing countries, and increasing production costs may lead to a slowing down in the increase in food production' (Cabinet Office, 1976). A possibility which has not received sufficient attention is to develop new systems of food production in semi-arid areas based on indigenous plants and animals, with much lower water requirements (Crawford &

Crawford, 1971). One reason why the resources are not being provided is that developing countries, seeking to emulate the West, have concentrated on industrialization and urban development, and have neglected agriculture and rural communities (Lipton, 1975).

There is therefore a serious possibility that the era of cheap food is over for good, and that the UK will find food imports, including cereals, increasingly costly or perhaps not always available. We may therefore be forced to use our agricultural resources more efficiently in order to be able to feed ourselves at an acceptable cost, or to feed ourselves at all. Although, from the point of view of the world food situation, it would be desirable if the rich countries reduced their consumption of fatty grain-fed livestock products, only economic pressure is likely to bring this about.

Some of the richer countries are becoming concerned about overnutrition which, on a world scale, is approaching the problem of undernutrition in significance. The results are the same: reduced life expectancy, increased susceptibility to disease (although the diseases are different of course) and reduced productivity. Only Norway and Sweden have moved in the direction of systematic health-oriented nutrition policies. Elsewhere, the market reigns supreme, and, whether purchases are dominated by poverty or by 'fancy', the result is not ideal from a health point of view.

The so-called 'diseases of civilisation', such as coronary heart disease, diabetes, diverticulitis and cancer of the colon, are probably multifactorial in origin, but diet seems to be implicated, even though absolutely rigorous scientific evidence is lacking (it is difficult to see how, in free-living populations of human beings, it could ever be obtained). It appears that the diet of affluent western man is unhealthy for three main reasons: (1) its content of saturated fat is too high (Crawford, Gall, Woodford & Casperd, 1970); (2) it contains too much refined carbohydrate, and sugar in particular ('empty energy'); (3) it is lacking in 'roughage', i.e. dietary fibre, especially cereal fibre (Burkitt & Trowell, 1975).

A moment's consideration shows how closely these three items are linked together, and that there is a fourth, not implicated as far as I know as a factor in causing disease, but eaten in unnecessarily large amounts, meat and other animal protein products. Human requirements for protein, especially by adults, are actually quite small (Sukhatme, 1975) and can easily be met by a combination of cereals, beans and other vegetables. If we ate less meat, milk and milk products, we would eat less saturated fat. This would release cereals, currently fed to animals, for human consumption. Now it happens that excellent, delicious bread can be made entirely from British wheat of the right varieties (such as Maris Widgeon); it is completely untrue to say that foreign hard wheats are intrinsically necessary. (They are necessary only for the industrial process for making soft, moist, prepackaged and presliced white bread.) If we looked upon sugar more as a spice than as a staple of our diet (as a nation we consume 2 lb per week for each man, woman and child) we could easily produce enough in our country and be free of dependence on imports. Finally, meat from grain-fed animals has a higher

saturated fat content than that of extensively grazed ruminants, so a livestock industry based on our productive western grasslands would also lead to healthier Britons (Crawford & Crawford, 1972).

Of course, these ideas are not new, and others have calculated dietary changes necessary to enable the UK be self-sufficient in a 'siege economy' (Cooke, 1970; Blaxter, 1975; Mellanby, 1976). My own view can be summarized thus: (1) World food prices are likely to increase in real terms; cereals may be in short supply and in any case the feeding of the undernourished in the LDCs has a higher priority than meat production in the rich countries. (2) A 'siege economy' is very unlikely; what is envisaged, therefore, is not total self-sufficiency, which would involve a radical and unpleasant change in our diet, but a modest increase in self-sufficiency. (The need for a long-term UK agricultural policy along these lines has already been stated; see Hutchinson, 1975.) (3) Such a change would mean a reduction in the consumption of animal fat and protein, sugar and refined carbohydrate, and an increase in the consumption of unrefined carbohydrate and probably of vegetables. This is desirable not only so that we are less dependent on world food supplies and save on our food imports (which, because of price changes, are now a quarter of our total imports bill) but also for health reasons.

The question then arises, whether we wait for market price movements to effect such changes (as is currently happening with meat: our consumption is declining) or whether we believe that positive action is justified (Ulbricht, 1976*b*). Some are against action on the grounds that people should not be forced to do things because we believe it good for them; that, in any case, conclusive evidence is lacking; and that people must be left freedom of choice.

This freedom of choice is a complete myth of course, as anyone who has tried to buy wholewheat bread that really is wholewheat will know (see TACC Report, 1974). Supposedly, there is no demand for wholewheat bread, but one wonders what the result would be if present advertising expenditure were reversed, i.e., if there were no advertising whatever for bleached white bread and all that money were spent on advertising the virtues of wholewheat bread. This fascinating experiment will not be conducted, because wheat offal is used very profitably in animal feeding-stuffs.

We do not allow people to go into a shop and buy heroin, or even pot. Tobacco is very highly taxed and the populace is actively discouraged from smoking, but tobacco is not banned. No one, as far as I know, is suggesting that saturated fat or sugar be banned. What I think would be justified are: (1) a graduated tax on wheat flour of different extraction rates (zero for wholewheat); (2) a tax on sugar; (3) a tax on animal feeding-stuffs and, in order not to subject our farmers to unfair competition, on imported meat; (4) a premium on British-grown hard wheat, to encourage its production (bread-making wheats give lower yields than soft wheats).

Initially, such taxes should be quite low, to enable consumers and the agriculture and food industries to adjust to them, but with the stated intention of increasing them further. In this way, we would become a little less dependent on external food

supplies in a very uncertain world. Those who wish to overeat and to consume unnecessary amounts of sugar, saturated fat and protein, would be able to continue to do so, but would have to pay a little more.

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