



Food From Waste

A plan to enable the UK to save money, conserve resources and improve the world food situation.



Food From Waste

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Reports in this series are intended as a contribution to public debate on issues of world development and it is hoped that policy-makers and planners will take them into account. They reflect Oxfam's concern for human rights and a belief that new policies are needed to meet the challenges of a rapidly changing world.

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ONE: INTRODUCTION

- 1 Food wastage in the UK is conservatively reckoned at £600 million a year. This huge sum of money, which we throw away would be enough to buy the whole of the six million tons of grain which the developing countries were desperately seeking at the height of the world food crisis three years ago.
- 2 The scandal of food waste lies in the general misuse of resources and the loss of the money spent to buy it. Our bill for imported grain has risen from £597 million in 1974 to £748 million in 1976¹ and if we reduce our farmers' dependency on limited world grain supplies for animal feed we would be taking an essential first step towards making grain, or the land on which it is grown, more available for human consumption in areas of need.
- 3 This report contains proposals and cost estimates for a food waste recycling scheme which could be introduced in many parts of the United Kingdom. The scheme offers substantial economic and social benefits and the report recommends that central government provide financial assistance to local authorities, farmers or firms in meeting the capital costs involved, as in most cases these costs would render it impossible for the average farmer to undertake such a project to feed his own livestock. The Department of the Environment has indicated its support in principle for the scheme, and individual farmers have told us they would welcome it. We believe a number of voluntary organisations (Friends of the Earth, Oxfam, etc.) would be ready to generate public support. Similarly, the National Farmers Union (NFU), who published a paper on this subject in November 1976, would also like to see a better use made of waste food.² We are also fully convinced that the Waste Management Advisory Council (WMAC) and its

offshoot the National Anti-Waste Programme, which have recently emphasized the need for cooperation in this field between local authorities, voluntary agencies and industry, would lend their support.

- 4 The scheme is consistent with Oxfam's involvement in the more general field of waste recycling. Our concern is to see we make the fullest and most efficient use of available resources. The recycling of food waste is only one element in the long-term policy on food and agriculture based on real nutritional needs to which Britain and other developed countries should be giving serious consideration. Such a policy is the subject of a recently published Oxfam report.³

TWO: THE RATIONALE

- 5 Approximately 12 million tons of grain are fed to British livestock each year — at least 25 per cent of it to pigs alone. Two thirds of the cereals we grow are used for animal feeding, on top of which a further 4 million tons are imported. This report focuses on the feeding of pigs, mainly because an alternative feedstuff for them could be readily produced.
- 6 There are approximately 7.9 million pigs in the UK at any given point in time. About seven million are fed largely on grain (some 80 per cent of their diet) consuming 2.5 lbs per head each day or 3 million tons per annum in total. Only the remaining 10 per cent are fed on food waste, consuming some 400,000 tons per annum according to an ‘educated guess’ by a spokesman for the Ministry of Agriculture, Fisheries and Food (MAFF).
- 7 The fact that developed countries like ourselves go out and buy feedgrains on the world market means that our animals are competing for a limited resource with hungry people. Grain-fed meat is a luxury we enjoy by outbidding the poor countries in what amounts to a global food auction, thus actually or potentially depriving many of our fellow men of their basic sustenance. But how long will we be able to go on bidding high in this kind of auction? The words of MAFF’s chief scientific adviser, Sir Charles Pereira, should be warning enough. “Britain over the next 10-15 years,” he said, “cannot rely on being able to purchase every year 10 million tons of grain and protein meals (e.g. fishmeal, oilcake) most of which is used to feed our animals.”⁴
- 8 The introduction of waste food feeding systems would not, of course, produce the immediate release of 3 million tons of grain for the needy countries of the developing world. However, given a modicum of governmental and public

support, it would be well within the bounds of possibility to have 4 million pigs fed in this way within a few years, thus saving some 1½ million tons of grain a year and substituting a feedstuff costing £12 per ton for one now costing £80 and which will continue to rise in price.⁵ Although consumption would have to be much higher, this would be more than offset by the enormous price differential (See para 14).

- 9 If a scheme along the lines indicated in this report were implemented and a reduction in imports achieved the British government could then allocate a proportion of the cost saving to assist the neediest developing countries. The difficulties of establishing any precise linkage of this kind are appreciated, but swill feeding would undoubtedly reduce pressure on the world grain market. Prices and hence production levels could be maintained if the UK were to transfer the grain (or equivalent thereof) saved to an international stockpile, set up to provide assistance for the poorer grain-deficit nations. In any case, the cost saving on 1½ million tons of imported grain (i.e. half the present intake by pigs) would mean a boost of £120 million to our balance of payments.

THREE: THE SCHEME

(All costs are, at this stage, hypothetical — there may be distinct variations in operation).

- 10 The three pre-requisites for this scheme are an adequate **supply** of waste, a suitable **site and machinery** for the processing plant and a **market** for the product.
- 11 **Supply:** This requires arrangements for the collection of food waste from institutional sources such as food manufacturers, factory canteens, restaurants, hospitals, etc. Expert opinion indicates strongly that the re-introduction of swill collection from individual households, as undertaken during World War II, is a non-starter: apart from likely public resistance, experience shows that where household waste is utilized, it is impossible to guarantee freedom from impurities such as glass, metal and plastic. The two large-scale operators who assisted us in our researches both rely exclusively on institutional waste, the one from food manufacturers and the other from army camps.⁶
- 12 **Site and Machinery:** The plant must be near to a centre of population (i.e. the source of supply) and also to a farming district (i.e. the market for the product). Because of the nature of the raw material and finished product, the site should preferably be away from residential areas and care would need to be taken over the anxieties of any local residents about this operation taking place near their homes.
- 13 *The two most suitable types of processing are:*
 - a) Steam Injection — in this process the waste food is boiled and emerges as swill.
 - b) Pressure Melting — in this case the waste is cooked under pressure, producing the gelatinous material known as ‘Tottenham Pudding’.

These compare as follows:

	<i>Steam Injection</i>	<i>Pressure Melting</i>
Cost per boiler	£11,000	£15,000
Storage life	2-3 days	“Some weeks”
Handling	Must be pumped	Pumping/by hand
Bulk	Expands waste about 25%	Contracts waste about 25%

The advantages of pressure melting override its greater capital cost and we have, therefore, based our calculations on this method. In addition, the Ministry of Agriculture appears to regard pressure melting as the better of the two systems (The possibility of total drying of the product is also being investigated⁷).

- 14 **Market:** It is anticipated that one processing plant could serve approximately 6,000 pigs. We estimate that each pig would consume 1.5 tons of the product each year as against ½ ton of grain in the same period. As grain is currently 6 times as expensive as the product, the cost of increased consumption would be easily absorbed by the farmer. Each farmer would need to invest about £2,500 in additional equipment, this sum could be recouped from saving on feed bills, within the first year of operation.
- 15 Capital Expenditure for such a plant, including 5 pressure melting units is estimated at £140,000 (Appendix I gives details) while annual Running Costs will be approximately £96,640 (Appendix II).
- 16 It is envisaged that 12,000 tons of food waste would need to be collected by one producing unit each year in order to produce 9,000 tons of Tottenham Pudding.* The likely financial advantage to the operator may be expressed as follows:—

<i>Annual Income from Sales</i>	<i>Annual Cost of Scheme</i>	<i>Annual Profit</i>
£115,650	£96,640	£19,010

This calculation is based on amortization over 5 years and a selling price of £12 per ton. In addition, we have included £7,650 representing the value of fat for industrial use, which is a by-product (1 ton to every 100 of Tottenham Pudding), and can be sold at £85 per ton.

* To feed 6,000 pigs.

- 17 We would emphasise that all the cost figures are rounded up. The economic prospects for the scheme may, therefore, be significantly better than outlined in para 16. In addition, the overall cost figure per ton for general refuse collection is estimated to be at least £10,⁸ although in some cases, notably that of the Greater London Council (GLC) which sends some of its waste to Oxfordshire, it may well be more. If local authorities, who are already meeting the cost of general refuse collection, entered the waste recycling scheme then they could save at least a proportion of this cost. We understand, from the NFU, that in some areas operators are actually being paid by institutions to take away food waste.

FOUR: SOCIAL COSTS AND BENEFITS AND OTHER CONSIDERATIONS

- 18 Some of the social costs attached to the present system of food waste disposal by local authorities would be obviated by the recycling scheme we propose. These are difficult to quantify but the following examples deserve attention. Hazards to health can be posed by the dumping of putrescible waste. Dangers of this kind would be substantially reduced, if putrescible waste had already been hived off for recycling before dumping took place. Spoliation of land which could be used productively for other purposes is another undesirable social cost of the present system. Food waste recycling could at least reduce the amount of land being covered with unsightly and perhaps dangerous piles of rubbish.
- 19 Since the early 1950s the food waste market has been in the hands of private operators. The majority have provided a valuable service to farmers, but not all have been able to guarantee a high-quality product free from contamination, and this has perhaps tended to damp down demand. Some farmers collect and process their own, but this is only open to those farming on a sufficiently large scale to meet the capital costs involved. Many of the smaller farmers would undoubtedly welcome a regular, reliable and disease-free source of pig feed. This could come either from plants run by the local authority or alternatively grants could be made to farmers to enable them to set up systems to feed their own animals.
- 20 Enforcement of the 'Disease of Animals (Waste Food) Order 1973' has placed the processing of food waste under much more stringent control. This legislation has resulted

in many small operators being forced out of business (about 150-170 in Kent and Surrey alone, according to the MAFF Divisional Veterinary Officer for that area). With grain prices remaining high, and the sources of food waste supply to farmers diminishing, now is a particularly opportune time for local government or other groups to enter this field.

- 21 There are an estimated 1,300 private collectors swill in the UK at the present time, situated mainly in the Midlands and the South East, that is to say close both to centres of population and to agricultural areas. Any processing scheme by local governments should take care not to encroach on or endanger the livelihoods of these operators. They should be consulted in advance and encouraged to participate as sub-contractors in any local authority scheme.
- 22 The comparative nutritional value of food waste products and grain for pigs is difficult to establish precisely. There is little evidence that waste-fed pigs produce meat that is perceptibly fatter or otherwise of lower quality than that obtained from grain-fed animals. According to the National Institute for Research in Dairying, Reading, swill obtained from institutions such as hotels and restaurants is an adequate substitute for grain, provided it is correctly processed and does not contain too much greenery,⁹ while the British Nutrition Foundation says the nutritive qualities of waste-fed meat to humans are as good as those of grain-fed meat.¹⁰ The maturation period of the animal is fractionally longer, but this is more than offset in cost terms by the much greater cheapness of recycled waste as a feedstuff. Nonetheless, we should not ignore the major problem presented by consumer resistance to swill-fed meat, but within the wider programme of government-sponsored education on nutrition (as advocated in our recent publication 'One Crust of Bread') this resistance could be overcome.

FIVE: CONCLUSION AND RECOMMENDATIONS

- 23 Widespread concern about the use and abuse of national resources has been generated as a result of accelerating changes in the world economic system — for example, the precarious world food situation, the price of oil and inflation. Given the unpredictable consequences that these changes may bring, the economic importance of conserving what we have is now generally recognised at all levels of society. In this context, schemes such as that proposed in this report to reduce costly inputs (e.g. grain) for agriculture and other industries have a particular importance, both in terms of making the best use of available resources and in releasing a proportion of such inputs for use in poorer countries, where their usefulness could be much greater. We therefore urge all the bodies listed below to give serious consideration to the proposals contained in this report. Specifically we recommend:
- 24 —that **Local Authorities** carry out the necessary research to establish whether there exists a supply and demand (actual or potential) for food waste recycling in their area and, if so, to consider in detail the establishment of processing facilities on the lines set out above; either operating the plants themselves or making funds available to farmers to enable them to do so;
- 25 —that the **Government** declare officially its support for processing schemes of this kind and its readiness to assist local authorities in meeting the capital costs involved. This would be in line with current government thinking on this subject. The Waste Management Advisory Council, under the joint chairmanship of Ken Marks MP, Parliamentary Under Secretary for the Environment and Bob Cryer MP, 14

Parliamentary Under Secretary for Industry, has already launched (in June 1977) the National Anti-Waste Programme;

- 26 —that the **European Community's** Agricultural Guarantee and Guidance Fund (FEOGA)* be approached for a grant to any proposed food waste recycling scheme. FEOGA makes grants of up to 25 per cent of the capital cost of selected agricultural projects subject to certain criteria, which include the endorsement of, and some contribution from, the member-state government concerned;
- 27 —that **commercial organisations** be prepared to cooperate with local authorities not able to find enough money to establish or run the scheme by themselves. Given its potential profitability, companies in the feed business especially might be interested in such a venture;
- 28 —that the **National Farmers Union** actively encourages its members who raise pigs to switch from grain to feeding on recycled waste and also where swill supplies are unavailable or inadequate, to lobby their local authority for a processing plant or for funds for farmers to set one up themselves.
- 29 —that **private operators** who already collect and process food-waste, provided they meet government health standards, be invited to integrate into any official scheme or otherwise be given assurances to protect their livelihoods;
- 30 —that **voluntary organisations** such as Oxfam, the World Development Movement and Friends of the Earth continue to assist in educating public opinion in the re-use of food waste.

Appendix I

Breakdown of Capital Expenditure

The processing plant: Production of about 170 tons a week for 6,000 pigs would be required to achieve a reasonable economy of scale. This means an outlay of £75,000 for the purchase of five pressure cookers of the type favoured by the Ministry of Agriculture for the pressure melting process.

Transport: A new 6,000 gallon capacity (24 ton) articulated Road Tank Waggon costs £25,000. The scheme, if carried out by a local authority, would operate with two such vehicles. If operated by a farmer on his own land then one vehicle could be replaced by a pipeline or similar distribution system. We have taken the higher level of commitment (i.e. for two vehicles). Total £50,000.

Site: Assuming this is rented on a long lease, the budget should include a sum to cover premiums, legal fees, etc. Say £10,000.

TOTAL:		£
	Plant	75,000
	Transport	50,000
	Site	10,000
	Contingency	5,000
		<hr/>
		£140,000
		<hr/>

Appendix II

Breakdown of Annual Running Costs

Wages are calculated on the basis that at least two drivers and three operatives will be necessary for efficient running. It is estimated that a tanker driver receives a basic £62.50 p.w. plus overtime, shift allowances, etc., and that plant operatives receive a similar sum, plus over-time, shift allowances etc. Because of the perishable nature of the product, week-end and evening work cannot be avoided and extra 'dirty' money would have to be paid. Total wage bill for the year would be approximately £23,400 (based on an average of £90 p.w. per man.)

Social security contributions, pensions, sickness benefits and holiday pay are calculated as adding a further 35% to the wages bill so that the figure here will be about £8,000.

Fuel costs for the vehicles are calculated on the basis of Derv at 78p per gallon. The vehicles will do about 10 miles to the gallon, and together run an estimated 80,000 miles per year. Expressed arithmetically,

$$\frac{78 \times 80,000}{10} = \text{£}6,240$$

Fuel for the plant itself is estimated at £6,000 p.a., giving an overall cost under this budget head of approximately £12,240 p.a.

Rental: This will vary from area to area according to land prices. We have taken the figure of £12,000 as an approximate average.

Amortization of the overall capital cost (as broken down in Appendix I) over a five-year period is

$$\frac{\text{£}140,000}{5} = \text{£}28,000$$

	£
TOTAL: Wages	23,400
Pensions etc.	8,000
Fuel	12,240
Rental	12,000
Amortization	28,000
Interest on Capital (10% declining)	13,000
	<hr/> £96,640

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- 6 Ron West of Stanway in Essex feeds 2,500 pigs on waste, from breakfast cereal factories, canneries etc; National-By-Products of Andover feed 3,000 on waste food from army camps in the vicinity.
- 7 Tilario Dryers of Statford on Avon are the UK distributors of a unit which produces a fully dried material.
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