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SUBSIDIZING APPROVED FARM PRACTICES.

by

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One of the world's leading agricultural economists, T. W. Schultz, recently published an estimate of the effect of the adoption of new techniques on the efficiency of United States' agriculture. Schultz estimated the average increase in efficiency at from 0.8 per cent. to 1.35 per cent. per annum over the period 1910 to 1950, the rate of increase being even higher in recent years.¹ The statistics available do not permit a similar calculation for Australia. However, the systems of agriculture and the types of technical advances made in Australia and the United States are not dissimilar, and it is known that increases in the productivity of labour in the two countries are roughly equivalent, so that an assumption of an annual one per cent. increase in the efficiency of Australian agriculture seems reasonable. On this basis, it can be calculated that the adoption of improved techniques is currently adding about £11 million per annum to the net value of Australian rural production.

If an increase in efficiency of one per cent. per annum is *actually* being achieved, there can be little doubt that the *potential* increase physically possible is greater than one per cent. The slow and incomplete adoption of improved techniques in primary industry leaves a very large gap between potential and actual performance. The size of this gap is a problem for speculation rather than calculation. However, to put the problem into perspective, it is suggested that if the rate of adoption of improved methods could be doubled (as no doubt it could), the net value of Australian agricultural production would increase by an extra £11 million per annum.

These estimates illustrate the great importance of both agricultural research, and of measures designed to encourage the adoption of the results of that research. They point broadly to the conclusion that government investment for these purposes will yield excellent dividends.

¹ T. W. Schultz, "*The Economic Organization of Agriculture*" (McGraw-Hill Book Co. Inc.) New York, 1953, p. 107. Schultz has constructed an index of output per unit of input, using price weights at the beginning and end of the period to give this range of results. No index of agricultural inputs is available for Australia.

Government action for the latter purpose—fostering the use of new techniques—of necessity takes many forms, since there are many different reasons why new practices are not quickly adopted. Chief amongst the measures used are extension services, concessional credit schemes, farm tenure legislation fostering good farming methods, and subsidies to farmers. In this country attention has so far been focussed largely on the first three measures. This article will be concerned with some of the principles involved in subsidizing improved farm practices and the use made of such subsidies in two overseas countries, the United Kingdom and the United States.

1. TYPES OF SUBSIDY.

The principle of government action to foster improved farm practices is long established. It has been widely practised in this and other countries, where it has taken a number of forms. The most important is the financing from public funds of extension services which provide free expert advice to farmers on technical problems. Other important measures include concessional income tax deductions on items of capital expenditure and concessional credit schemes. All of these three measures have been used in Australia.

Price subsidies may also be used to reduce the cost of approved methods of farming, and direct payments can be made to farmers for the performance of certain approved practices (usually conservation practices). In Australia price subsidies have been paid on superphosphate, ammonium sulphate and nitrogenous fertilizers, but these payments were not aimed primarily at fostering improved farm practices. In the 'thirties they were part of a general programme of assistance to agriculture, and in the 'forties they were closely linked with price control and stabilization. Broadly speaking, price subsidies and direct payments to farmers have not been used in Australia as methods of fostering agricultural efficiency. It is these two types of subsidies which will be discussed here.

2. THE ROLE OF SUBSIDIES.

There are broadly two types of situation in which a case may be made out for the use of subsidies to encourage approved farm practices. First, there is the situation involving the conservation of exhaustible resources for the benefit of future generations. Second, there is the case for encouraging efficient methods which are adopted too slowly, or are not carried near to the point of maximum returns. In the second case the benefits are immediate rather than future, and consist of higher yields or reduced costs, quite apart from questions of long-term fertility. Although both types of subsidy are concerned with efficiency, they have different aims and different justifications, and will be treated separately under the headings of "Conservation Payments" and "Efficiency Subsidies".

Conservation Payments.

Governments in Australia and elsewhere have sought to modify exploitative farming in the interests of the community as a whole. The soil resources used may be non-renewable or renewable, but even in the case where fertility can be restored the basic justification is that conservation farming yields a higher output over a long term than does a pattern of exploitation and rejuvenation.

An investigation of the reasons why conservation practices which are economic from the community's viewpoint are not undertaken, will illustrate the part which might be played by subsidies in each case. One of the most important explanations is that conservation is in some instances economic for society, but not for the individual. It is in this situation that the argument for a compensatory subsidy is strongest. On the other hand, conservation may not be undertaken despite the fact that it is economic for the individual as well as society. There are three possible policies to apply in this case. First, governments may take a "laissez-faire" attitude, relying solely on the profit motive for an eventual solution. Second, they may take action to remove the inhibiting factors, through education, tenure legislation, credit concessions and other measures. Third, they may attack the problem from both sides, adding to the financial inducement through subsidies, as well as employing policies to remove the reasons for the non-adoption of desirable conservation practices.

Probably the majority of cases of failure to adopt profitable conservation practices would fall within one of the following four classifications.

Capital Limitations. Lack of finance and the inability to obtain credit on reasonable terms is one possible obstacle. Even when credit is available, the profitability of investment in farm conservation may be less than the profitability of other non-conservation outlays. In the case of farms of less than economic size, exploitative farming may be inevitable. Disinvestment may occur because the farmer must supplement his income by drawing on his farm's resources in order to make a living. Concessional credit schemes and conservation payments are two important lines of attack in these situations.

F.A.O. has recently recommended the use of subsidies in the poorer agricultural areas of Southern Europe. After listing the improvements most necessary in agricultural methods, an F.A.O. report says,

These improvements will not come, however, through education alone. The majority of farmers in southern Europe are in a state of utter poverty and cannot be expected, without financial assistance, to undertake even the most modest and highly profitable investments involved in adequate use of fertilizer and selected seeds. What was said above concerning the need for financial assistance to go hand in hand with extended advisory services for small farmers is therefore true *a fortiori* for southern European agriculture. Cheap credits and subsidised prices for fertilizer and seeds are the most direct ways of giving such support. In the most destitute districts it may be necessary even to supply these commodities free of charge to the farmer in the beginning, until he is able to pay for them through the larger production as his yields rise.²

Economic Instability. Conservation is a long-term investment, and lack of confidence in the future tends to discourage such investment. Characteristically wide price fluctuations, as well as weather risks, make the problems of agricultural investment peculiar. It is not sufficient, in risk situations, that an investment appears profitable on a balance of probabilities. Theoretically, if such investment is to be undertaken the likely profits must include a premium for risks. In such cases two policies which might stimulate conservation practices are conservation payments to provide risk premiums and stabilization measures to reduce risks.

² United Nations Food and Agricultural Organization, *European Agriculture—A Statement of Problems* (Provisional Edition), Geneva, 1954, p. 48.

Lack of Knowledge. A certain amount of profitable conservation is not undertaken because of lack of knowledge. In this category would be included cases in which farmers are not aware of the extent to which they are reducing soil fertility. Perhaps more important are the cases in which farmers are not fully aware of the technical possibilities of various conservation measures in restoring or improving fertility, or are not aware of the probable profits which would result from such measures. In such cases the main weapon of policy is agricultural extension and the improvement of agricultural education, although conservation payments could play a minor role in stimulating interest and thus preparing the way for extension.

Inertia. Whilst closely related to the previous category, this particular obstacle poses a problem which cannot be quickly solved by education and extension. Whilst such policies have a gradual long-term effect, considerable social losses are suffered in the meantime. In some cases the inertia is related to custom and conservatism; in other cases a "subsistence mentality" is the obstacle, with the farmer who is earning what he regards as a satisfactory income placing a very high price on his leisure. In these situations a financial inducement offered by a government may meet with only limited success. To be effective, the assistance would probably need to take the form of actually providing the necessary labour and materials, in addition to subsidizing the cost; for example, this might involve the use of teams of men and equipment who would carry out lime-spreading, contouring and other work on the individual farm.

By far the strongest case for subsidies is for their use as a compensatory payment where the conservation practice being fostered is uneconomic for the farmer but economic for the community. This conflict of interest occurs where some of the benefits of conservation accrue to persons other than the conserver, and some of the costs of exploitation are borne by persons other than the exploiter.

There are many examples of situations in which individuals maximize their immediate profits by incurring costs which are borne by someone else. The non-adoption of soil and water conservation practices in the upper catchment areas of river systems can result in costly flooding of the lowest parts of the water sheds. In many cases, lack of conservation on one farm results in damage to neighbouring farms which does not figure in the offending farmer's profit and loss account. Under many types of tenancy agreements, exploitative farming is profitable to the tenant because the benefits of conservation would be enjoyed by him only in the later years of his lease, whilst the costs of exploitation represent a transfer of capital loss from the tenant to the landowner. In this case the major line of attack is through the enactment and enforcement of corrective tenure legislation.

Many of the situations involving conflict of interests are explicable in terms of a transfer of capital losses (soil fertility) to later generations. Very often the individual farmer is influenced by questions of inheritance or other motives to take the long-term view, but in a significant number of cases the long time period between investment in conservation and the resulting returns discourages individual action. In such

situations conservation policy is concerned with "the balancing of present uses and income from land against future uses and income so as to get the most out of it over the whole period".³

Efficiency Subsidies.

Subsidies can be used to encourage the more rapid adoption of new and more efficient methods of farming, and to stimulate the use of practices which, although well established, are not carried to the point of maximum returns. Examples are the use of improved pasture seed, the application of lime, superphosphate and trace elements, and more efficient feeding methods. The main reasons why such practices may be slowly or inadequately adopted have already been discussed in the previous section, viz., capital limitations, economic instability, lack of knowledge and inertia.

Extension has been and no doubt will continue to be the main tool in hastening the adoption of improved practices. However, it does not yield spectacular results in the short run. On overseas experience, even where an efficient and adequately staffed extension service concentrates on fostering the most simple and profitable types of innovations, an excessive period often elapses before their adoption is complete. Where the innovation involves a large capital outlay or a considerable reorganization of the method of farming the delay is much greater.

Practically no research has been undertaken in Australia on the over-all extent to which farmers "under-invest" in certain farm practices. Extension policy designed to encourage greater expenditure on such practices is based largely on the results achieved on experiment stations in comparison with the observations of extension officers on what is actually being done and achieved on farms in their areas. Departmental officers are strongly of the opinion that under-investment in a number of important farm practices is more the rule than the exception. In Australia, the quantities of protein concentrates fed to dairy cows, and the amounts of fertilizer used on crops and particularly on pastures, are two of the most important instances.

In the United States, where fertilizer is subsidized, the Department of Agriculture reported that, "State Committees studying post-war adjustments suggested that, under favourable price conditions, it would pay farmers to use about twice the quantity of plant nutrients in the form of commercial fertilizer than was used in the war year 1944."

3. METHODS OF PAYMENT.

The three most common methods of payment are price subsidies, direct cash payments, and the direct provision of free or subsidized services, materials and equipment by a government agency.

Theoretically, subsidies paid to producers or wholesalers of, say, superphosphate, which result in a reduction in the price, will stimulate the demand for superphosphate and bring the quantity used nearer to the optimum level. However, the extent to which farmers' demand for superphosphate, lime, protein concentrates and other requisites, is

³ J. D. Black and M. E. Kiefer, *Future Food and Agricultural Policy* (McGraw-Hill Book Co. Inc.), New York, 1948, p. 95.

⁴ United States Department of Agriculture, *Changes in American Farming*, Miscellaneous Publication 707, 1949, p. 25.

responsive to price, is a subject which would need investigation, prior to the implementation of a subsidy scheme. Such insights as the writer has been able to obtain into the attitudes of farmers suggest that many of those who under-invest have a "cost reducing" rather than a "profit-maximizing" attitude. If this is true, the main result of the subsidy would be to reduce fertilizer bills rather than to increase fertilizer applications. However, research rather than speculation should determine policy on this matter.

The greatest advantage of price subsidies over other forms of payment is that they involve very little administration. However, the obverse disadvantage is that they are non-discriminatory. They would probably result in increased applications to areas already adequately treated, perhaps to a point beyond the *real* optimum.

Direct payments to producers, to the extent that they are more precise in their effects, involve considerable administration and supervision. Under this system, which has been widely used in the United Kingdom and the United States, the farms to be treated can be selected, and the subsidy payments can be made conditional on the improved practice being implemented in the approved way. Usually a certain proportion of the total cost is met by the Government, in some cases as a lump sum, in others as an annual payment. The suitable method of payment depends on the type of practice being subsidized. In the case of annually recurring practices, such as liming or fertilizing, annual payments are appropriate. For long-lived capital investments such as dams, terracing and drainage, a lump sum payment can be used, provided that in the case of conservation which is uneconomic to the individual, the benefits accruing to him exceed maintenance costs.

As an alternative to cash subsidies, it might sometimes be desirable for farmers to be provided with materials, equipment and labour by a government agency, either free, or preferably at a reduced cost. In such cases the work could be done under the direct supervision of agency experts. This method has been used for structural conservation work by the U.S. Soil Conservation Service. In a similar category are farm machinery pools, which may make available, at low contract rates, heavy or specialized agricultural machinery which is beyond the means of the average farmer.

The three methods of payment listed above are all likely to be necessary in any comprehensive programme, since each is suitable only for certain practices. For example, direct cash payments could not ensure an increased feeding of protein concentrates without excessive supervision, and in this case a price subsidy would be the only suitable method. On the other hand, price subsidies on items used in other industries besides agriculture have obvious disadvantages.

4. DIFFICULTIES AND OBJECTIONS.

Most objections to subsidies relate to the costs and difficulties of administration, and the principle of requiring taxpayers to meet the costs of investments which bring considerable benefits to an allegedly favoured section of the community.

Difficulties arise in making decisions as to what practices are to be subsidized in given areas, and to what extent. Conditions of farming vary so greatly that administration must be closely localized; but even

then, practices which would justify subsidies on some farms might not be suitable on others. If decisions were to be made individually for each farm, a large staff of experts would be required. The tasks they would face would be by no means easy. Admittedly, few farms present production problems which are unique. However, where the data available is inadequate, as it often would be, the complicated problems of farm budgeting would make it difficult to avoid errors of judgment. It would also be necessary to ensure that decisions made locally were impartial.

The basic task of putting conservation objectives into quantitative terms involves many difficulties, conceptual and otherwise. The time-period selected for the calculation naturally effects the results. A conservation scheme might show "a profit" over fifty years but not over twenty years. The appraisal of costs also involves difficulties, and it must be conceded that the forecast of probable benefit-cost ratios for conservation programmes are not likely to have a high order of accuracy. Further, it must be remembered that it is not sufficient to show that a particular conservation programme is economic. Conservation appropriations compete for funds with other Government functions, and the expected net returns must be compared with returns from expenditure in other fields.

"Social benefits and costs are not readily assessable in financial terms; the final decision really rests on society's estimates of future needs for soil. The less remote the future, the better for those wanting a vigorous policy, for conservation for a remote future has never appealed very greatly to the rank and file of farmers. Australia's rapidly growing population may be the very factor, hitherto absent, required to impart a sense of national urgency into conservation policy."⁵

It is not within the scope of this article to detail the many difficulties of measurement, theoretical and practical, attached to conservation policy.⁶ It can be said, however, that the difficulties that exist do not excuse neglect of the problem.

It can be objected that the costs of administration and supervision involved in a subsidy programme might outweigh the benefits gained. A considerable amount of policing might be necessary to guard against the deliberate or unwitting misuse of public funds. This is probably true for some types of subsidy, and it might be necessary to exclude some approved practices on these grounds.

If administration and supervision were not adequate, payments might be made for the performance of operations not suited to, or needed for, the farms on which they were carried out, while sound rotation systems might be upset in order to qualify for incentive payments. Furthermore, the programme would have to take into account the effect of the subsidy on the relative market prices for soil-conserving and soil-exploiting crops.

⁵ J. G. Crawford, *The Economics of Conservation*, Bureau of Agricultural Economics, Department of Commerce and Agriculture, Canberra, 1952, p. 12.

⁶ Problems of measurement are discussed in the following references: Arthur C. Bunce, *Economics of Soil Conservation*, Iowa State College Press, Ames, Ia., 1942. Earl O. Heady and O. J. Scoville, *Principles of Conservation Economics and Policy*, Iowa State College Research Bulletin 383, Ames, Ia., 1951.

The administrative costs of a conservation programme would, of course, depend on the type of practices subsidized. In the United States, where direct cash payments to farmers have been used for a very wide range of practices, administrative costs in 1943 represented ten per cent. of the total subsidy payments. Part of these costs was deducted from subsidy payments.⁷

A number of objections requiring comment have been raised by Campbell.⁸ It is stated that one undesirable feature of subsidy programmes is the fact that voluntary expenditure which would be undertaken by individual farmers without subsidy is discouraged. This is true, except in the relatively few cases where conservation is uneconomic for the individual. However, it is suggested that such losses of government funds as will occur from this cause would be offset by increased taxation receipts from higher incomes, leaving the resultant increases in production as a net social gain.

Another point made is that where the subsidy scheme is of limited duration, the government would have no assurance that money expended to encourage soil conservation would not be lost through the bad farming practices of the present or subsequent land occupier in future years. Where the farmer's profits from conservation expenditure of a capital nature exceed maintenance costs, it seems unlikely that many farmers would knowingly incur losses by failing to maintain conservation practices. Similarly, where subsidies on annually recurring practices were terminated, the previously subsidized methods would probably not be discontinued if the farmer were satisfied that in practice they had increased his income.

Furthermore, the loss represented by the fact that some farmers discontinue the approved practice might be more than offset by the indirect "posthumous" effect of the subsidy. It is a well-known fact that the adoption of new and improved farm practices is very much a matter of "farming by example". When questioned on the factors which motivated when them in adopting new methods, many farmers have answered that they were influenced by the apparently profitable adoption of the practice on neighbouring farms. Thus, one man who adopts and later discontinues a practice may be instrumental in initiating the practice on a half-dozen other farms in his district. This point must also be considered in relation to the previously considered objection that subsidies would discourage private farm investment.

A third objection made by Campbell is that an analysis of subsidy payments under the United States Agricultural Adjustment Administration (A.A.A.) shows that high income farmers have received far more assistance than farmers in the low income brackets. It is inevitable that the larger and more efficient U.S. farms should be receiving the bulk of the subsidy appropriation, and insofar as a unit of subsidy distributed to the more efficient farms probably yields greater production responses than on less efficient farms, this can be justified on narrow

(⁷) K. O. Campbell, "Subsidies for Approved Conservation Practices", *Journal of the Australian Institute of Agricultural Science*, Vol. 12, Nos. 1-2, June, 1946, p. 13.

⁸ *Ibid*, p. 13.

economic grounds.⁹ However, if the programme is to be used as an income-equalizing and efficiency-equalizing measure as well as an efficiency-increasing measure, a sliding scale of payments based on income could be devised.

The suggestion has been made in the United States that subsidies for approved practices may be used as a convenient cloak for adding to farm incomes, since the willingness of the public to provide funds for this purpose is considerably greater than the willingness to provide unconditional subsidies.

A number of economists have claimed that subsidies should be limited to socially desirable conservation works which are not profitable for the individual. Heady and Scoville use the following argument:—

“Economic criteria, do not justify subsidization of private production where returns to the individual and society do not diverge. This distinction has often been ignored in public programmes. Not only have farm practices which are clearly profitable been subsidized, but also payments have been made widely for practices which farmers would have adopted even in the absence of public subsidy. Such allocations represent inefficient use of limited funds if maximum conservation is the goal and if important areas exist where erosion control practices are not profitable to the individual or would not be adopted in the absence of subsidization. Obviously, given funds will result in greater conservation if used to bring about practices on 100 acres of soil B where erosion control does not pay the individual than if used to divide the same fund one-half to soil B and one-half to soil A where the practice is profitable and farmers have already adopted it.”¹⁰

The phrase, “if maximum conservation is the goal”, begs a number of questions. It may be that the outlay that would be necessary to induce all agricultural conservation that is “socially desirable”, far exceeds any appropriation likely to be made for this purpose. However, the marginal social returns from “maximum conservation” in this vaguely defined sense will approximate zero. At some stage before that point is reached, the case for subsidy outlays to secure immediate and striking increases in efficiency enjoyable by the present generation must be considered, even though such subsidies might be on practices not related to conservation, or conservation practices profitable to the individual without financial assistance.

The more general objection, that subsidies for approved practices are an unjustifiable redistribution of income favouring farmers, will now be considered.

5. DISTRIBUTION OF BENEFITS.

The “distribution effects” of a subsidy can involve social intangibles which make the issue more than an economic problem. So far, it has been assumed for the purposes of this article that the subsidies are paid to farmers from general revenue. At this stage it can be pointed out that there is an alternative source of finance—and that is the producers themselves. This system has been used to a limited extent by various boards in Australia, with the difference that the funds in these

⁹ To obtain the maximum increase in the value of production from the subsidy appropriation, the distribution would be such that the marginal unit of subsidy on each farm would give a net production response (in money terms) exactly equal to the response achieved by the marginal units on all other farms. This of course, would be quite impracticable, but the principle involved cannot be ignored.

¹⁰ Heady and Scoville, *op. cit.*, p. 385.

cases have been devoted to research and extension rather than to subsidies for improved farm practices.¹¹ However, retaining our original assumption, is it true that subsidies for approved farm practices represent an unjustifiable transfer of income from taxpayers generally to farmers?

It is assumed that the subsidy payments will result in increased farm output or reduced farm costs, and, at least in the first instance, increased farm incomes. Under these conditions, the initial transfer from general revenue to primary industry would be followed by—

(a) a reverse flow from farmers to the government through increased tax yields on higher farm incomes;

(b) a sharing of the benefits of increased agricultural efficiency between farmers and consumers through reduced agricultural prices.

The effect on government revenues of expenditure on income-increasing farm practices is quite complicated, but for present purposes it is sufficient to point out that the Treasury benefits substantially from increased farm incomes and the increased incomes of all those indirectly dependent on agriculture. This point can be illustrated by American experience, as reported by Bennett:

"It has been estimated by the Soil Conservation Service that in 1948, for instance, the Federal Government retrieved the entire amount spent by the Soil Conservation Service on its soil conservation work. In addition, the government made a 77 per cent. profit in increased income taxes paid on increased returns—a result of farmers applying effective soil conservation measures on their lands. Based on reports from district farmers and ranchers, that included 35½ million dollars in increased revenue tax from the use of soil conservation measures that the equivalent of 344,827 treated farms of 290 acres each—approximately 100 million acres treated—produced. Then, too, the extra income tax paid by retailers, processors, and distributors, who profited by the conservation farmers' extra production and spending—out of their approximately 245 million dollars increased income—brought the estimated total return to the federal treasury up to 69 million dollars. The 39 million dollars originally appropriated, plus some 30 million dollars more—profit on the investment."¹²

On the second point, information available on the effects of reduced farm costs and increased farm output on the level of farm prices is not conclusive. However, Heady has shown that a large part of the benefits resulting from improved techniques in agriculture accrue to the consumer rather than the farmer.¹³ Because most agricultural innovations are output-increasing, and because of the nature of the demand for most agricultural products, the main effect of technological progress is to lower prices for farm products rather than raise farm incomes. In many cases the inelasticity of demand for food results in a larger output having a somewhat lower gross value than a smaller output.

¹¹ The N.S.W. Milk Board has subsidized research and veterinary services to farmers, whilst the Australian Meat Board has made large contributions to research.

¹² H. H. Bennett (Chief, Soil Conservation Service, U.S.D.A.), chapter II, "Use and Conservation of Our Farm Lands", in Timmons and Murray, *Land Problems and Policies*, Iowa State College Press, Ames, 1950, pp. 97-98.

¹³ E. O. Heady, "Basic Economic and Welfare Aspects of Farm Technological Advance", *Journal of Farm Economics*, vol. 31, May, 1949, pp. 293-316.

However, there are important exceptions, such as the case where an export industry contributes only a small proportion of the world trade in a commodity, so that an increase in supply from that country will not lead to a greatly reduced price. Secondly, in the case of innovations which primarily reduce total costs rather than increase output, farmers retain a large part of the benefits. Some types of farm mechanization come into this category.

Generally speaking, only the farmers who are first to adopt new output-increasing techniques benefit to any large extent. But many producers have been able to adopt combinations of farm improvements yielding a larger output at lower total costs, and have thus been able to increase their net profits, even though real prices might have fallen. Furthermore, income per farmer can be maintained in the face of increasing output provided that the market is expanding and there are attractive employment opportunities for displaced farmers.

In Australia, where local prices for a number of important farm products are fixed largely on the basis of "average cost of production", the benefits from increased agricultural efficiency are reflected automatically in lower prices. A price subsidy on, say, protein concentrates would have a two-fold effect on the cost formula for butter production or fresh milk production—the direct immediate effect of reducing the feed cost component in the formula, and the indirect and delayed effect of lowering the average cost of production through the higher output of producers who improved their feeding rations.

Insofar as lowered prices for foodstuffs might affect the basic wage through any cognizance Arbitration Courts might take of the "cost-of-living" "C" Series Index, the farmer would benefit through an eventual reduction in the price of farm cost items.

6. THE CASE FOR SUBSIDIES.

Most of the arguments favouring the case for subsidies on approved farm practices have already been stated or implied. A summary of the case is presented under the following four points:—

(1) The immense potentialities of increased agricultural efficiency indicate that government expenditure aimed at encouraging the adoption of new techniques will yield profitable returns.

(2) Consideration of the reasons why improved methods are not quickly adopted points to the conclusion that subsidies would form a useful supplement to the other forms of public action, including extension services, concessional credit, corrective tenure legislation and stabilization measures.

(3) The net cost to the treasury will be small, and a profit may actually be made, whilst consumers will share largely in the benefits of the programme.

(4) In the case of a conflict of social and individual interests, where socially desirable conservation practices are not profitable to the individual, the use of subsidies can ensure a higher long-term output from

the conserved resources, thus protecting the interests of future generations. Pigou justifies this policy in the following terms:

"There is wide agreement that the State should protect the interests of the future in some degree against the effects of our irrational discounting, and of our preference for ourselves over our descendants."¹⁴

In weighing up the desirability of a subsidy programme it must be recognized that the cost of the subsidy payments *per se* is not a *real* cost, but merely a redistribution of income, which is later offset. The only real costs to be taken into account are the costs of administration. If the possibility of an inequitable distribution of benefits can be eliminated, as has been argued, the criterion of the social desirability of a subsidy programme is a comparison of administrative costs against the fruits of the programme resulting from the direct and indirect gains in agricultural efficiency. If it is assumed that administrative costs will amount to 10 per cent. of the subsidy appropriation, and if the practices are subsidized to the extent of 50 per cent. of cost, then any return higher than 5 per cent. on the total investment represents a net social gain. There can be little doubt that returns of this order can be obtained.¹⁵

Agriculture has often been subsidized, usually in the form of home consumption prices or direct subsidy payments added to the price paid to the producer. In Australia the main beneficiaries have been the dairying, wheat, poultry and dried vine fruits industries. It is suggested that a better form of public aid is to increase farmers' earning power. Subsidies on approved farm practices would attack the causes of inefficient farming rather than ameliorate the effects.

The typical pattern of adoption of new techniques in agriculture takes the form of what has been called "the 'S' curve,"¹⁶ In the first phase immediately following the introduction of the new technique—a fairly long one—a few farmers "pioneer" the innovation. The second period sees the rapid adoption of the new practices by a large number of farmers in a short space of time. The third phase—again a long one—covers the period during which the few remaining farmers (the least progressive group) gradually adopt the, by now, widespread innovation. This pattern suggests a particular role for well-timed *temporary* subsidies. If it can be shown that their use would greatly reduce the crucial first phase, then the problem of the time lag between the discovery and the general adoption of improved techniques is partially solved.

7. THE NEED FOR RESEARCH.

Before any large-scale programme involving public funds could reasonably be considered, a great deal of research would be necessary to decide whether or not such a programme was economically justified, and what form it should take. The type of information needed has already been partly indicated.

¹⁴ A. C. Pigou, *Economics of Welfare*, Macmillan, London, 1920, p. 28.

¹⁵ An investigation of the results achieved from subsidized practices on five N.S.W. demonstration farms is reported by G. C. McFarlane, "Dairy Grant Demonstrations in New South Wales—Five Case Studies", *Review of Marketing and Agricultural Economics*, Vol. 2, Nos. 3-4, September-December, 1953, pp. 165-203.

¹⁶ See K. O. Campbell, "The Conditions of Increased Productivity in Agriculture" (Presidential Address), *Journal of the Institute of Agricultural Science*, June, 1953, p. 69.

Perhaps the first step would involve closer classification of farm lands in terms of present use and potentialities. It would be necessary to know what practices are "under invested", and to what extent; what the quantitative effects of further investment in these practices would be, and to what extent farmers would be influenced by a subsidy programme towards adopting and extending those practices. An estimate of the probable costs of administration would be one of the important determinants.

A considerable sum of money is already being devoted to improving agricultural efficiency through extension services, taxation concessions and concessional credit. It is by no means easy to measure the effects of these measures on agricultural efficiency. However, it is suggested here that investigation might reveal that a complementary subsidy programme would give greater returns than equivalent expenditure on other measures.

8. APPENDIX—THE USE OF SUBSIDIES OVERSEAS.

A number of overseas countries have used subsidies to encourage approved farm practices, including Canada, Rhodesia, the United States and the United Kingdom. A brief summary of the subsidy programmes applied in the latter two countries is set out below. The summaries are by no means comprehensive, particularly in the case of the United Kingdom.

The United Kingdom.¹⁷

A programme of assistance to agriculture was instituted in 1931, and this included farm subsidies, as well as tariffs and quotas. Under the Land Fertility Scheme of the 'thirties the Minister for Agriculture was empowered to make contributions towards the cost of liming up to a limit of three-quarters of the cost. This practice was extended under the Agricultural Lime Scheme of 1947.

Under the Agricultural Act of 1947, there was provision for the payment of grants towards the expenses of carrying out approved schemes for field drainage, ditch improvement and water supplies, to a maximum of 50 per cent. of the cost (Section 96). Provision was made for assistance in the control of pests and weeds, including a subsidy for the eradication of bracken (Sections 98 to 102).

Under Section 2 of the Agricultural (Miscellaneous Provisions) Act of 1950, farmers could apply for contributions towards the cost of all the commonly used inorganic fertilizers purchased and applied between 1st July, 1950, and 30th June, 1953, where used for improving grassland, marginal land or certain ploughed-up grassland. For the application of fertilizer to grassland, the payment was up to one-third of the cost,

¹⁷ See John F. Phillips, *The 1947 Agricultural Act*, Eyre and Spottiswoode (Publishers) Ltd., London, 1948. *Food Control in Great Britain*, International Labour Office, Studies and Reports, Series B (Economic Conditions), No. 35, Montreal, 1943. *Britain—An Official Handbook*, Central Office of Information, London, January, 1954. *At the Farmer's Service*, Ministry of Agriculture and Fisheries Annual Handbook, H.M. Stationery Office, London, 1950. *Agriculture in Britain*, British Information Services Reference Division, I.D. 945, November, 1949.

with a maximum of 25s. per acre per annum for one-half of the total acreage of grassland on the farm. In the case of ploughed up grassland, the payment was up to two-thirds of the cost, with a maximum of £3 per acre per annum for the total acreage treated. Partly as a result of subsidies on fertilizer and lime, the quantity used increased by 150 per cent. between 1939 and 1950. This assisted in achieving an increase in food production of 51 per cent. over the same period, from approximately the same acreage.¹⁸

Subsidy payments during 1952-53 administered by the Department of Agriculture and Fisheries included the following:¹⁹

| | | | |
|-----------------------|----|----|--------------|
| Attested Herds Scheme | .. | .. | £9.7 million |
| Fertilizer Subsidy | .. | .. | £11.0 „ |
| Ploughing Grants | .. | .. | £6.0 „ |
| Calf Subsidy | .. | .. | £5.4 „ |

The latter two payments, as well as subsidies on hill sheep and cattle, are used mainly as direct production incentives. In addition, subsidies on animal feedstuffs administered by the Ministry of Food totalled £29.7 million in 1952-53.

Statistics on the total estimated cost of drainage and water schemes approved for State aid up to 31st March, 1953, are set out below:—

England and Wales.

Farm Drainage (since 1940)—£24 million.
 Main Rivers (since 1930)—Over £27 million.
 Minor Arterial Drainage (since 1937)—Over £10.
 Farm Water Supply (since 1941)—Over £14 million.

Scotland.

Farm Drainage and Arterial Drainage (since 1940)—
 £6.75 million.
 Farm Water Supply (since 1942)—£1.1 million.

Northern Ireland.

Farm Drainage and Arterial Drainage (since 1942)—
 £2.5 million.
 Farm Water Supply (since 1942)—£1.25 million.
 Main Rivers (since 1947)—£0.5 million.

Grants for farm drainage may be up to a maximum of 50 per cent. of the cost.

Finally, under the Marginal Producers' Scheme, grants of up to 50 per cent. of the cost may be made to occupiers of agricultural land to help them carry out on their farms operations which would be temporarily uneconomic without assistance, but which would eventually enable them to increase production. Approximately £2.5 million was provided in 1952-53 for assistance of this type.

¹⁸ *Agriculture*, monthly publication of the Department of Agriculture and Fisheries, January, 1954.

¹⁹ All statistics on the total costs of the subsidies are taken from *Britain—An Official Handbook*, *op. cit.*

The United States.

The policy of subsidizing soil-maintaining and soil-improving practices in the United States was instituted under the Soil Conservation and Domestic Allotment Act (1936), and continued under the Agricultural Adjustment Act (1938). When introduced the policy had the dual aim of conservation and production control. Up to June, 1952, 163 million acres had been treated with the assistance of the Soil Conservation Service, including 48 million acres of stubble mulching and 29 million acres of contouring.²⁰

The programme is conducted jointly by the Production and Marketing Administration of the United States Department of Agriculture (P.M.A.), the Soil Conservation Service and the Forest Service. According to a recent report published by the P.M.A., programme assistance is being shifted away from those practices which are becoming established in farmers' regular operations, and is being used to aid farmers to carry out conservation over and above what they would normally do with their own resources and on their own initiative.²¹ The programme is also being used to alter the balance of production. For instance, the 1953 programme placed limitations on assistance to those commodities not greatly needed in the defence effort.

Under the United States system, a member of the County Committee works with each farm operator in drawing up a farm plan, taking into consideration any conservation plan developed by the farmer with the assistance of any State or Federal agency. The County Committee considers the farmer's requests and the Committeeman's recommendations and makes certain funds available for specified purposes. The practices adopted must meet all the conditions of the State and National Programmes, but may include additional restrictions and requirements. The National Programme sets maximum rates of assistance, although special provision may be made for areas with peculiar local problems. Details of practices subsidized and maximum subsidies available in 1953 are set out below under the various sections of the Programme.

Section A: Protection of the soil from wind and water erosion, including terracing, permanent waterways, dams, contouring and protective pastures. Maximum subsidies are set at 50 per cent. to 70 per cent. of cost in most cases.

Section B: Protective cropping systems, including green manure and cover crops, permanent pastures, weed control and the application of fertilizer, lime and other minerals. Maximum assistance is fixed at 50 per cent. to 80 per cent. of cost.

Section C: Restoring and maintaining pastures, including fencing and watering facilities to prevent over-grazing, reseeding, and fire-breaks. The maximum payments are limited to from 50 per cent. to 80 per cent. of costs.

²⁰ *Statistical Abstract of the United States*, Bureau of the Census U.S. Department of Commerce, 1953, p. 602.

²¹ *Agricultural Conservation Programme*, National Bulletin 1953, Production and Marketing Administration, U.S. Department of Agriculture. This report contains details of the practices subsidized, and the extent of the subsidies.

Section D: Water conservation, including subsoiling and deep ploughing to reduce run-off, dams, the lining of irrigation ditches and the installation of spray irrigation. The maximum subsidy is set at 50 per cent. to 70 per cent. of cost.

Section E: Drainage to assist conservation, the maximum in this case being 50 per cent. to 80 per cent.

Section F: The establishing, restoring or maintenance of farm woodland.

Under section 7 of the Programme, there is provision for the supply of lime, phosphates, seeds and other materials and services to the farmer, the cost being deducted from the payment due to the farmer. The limit on the total payment to any one person is fixed at \$2,500.

The type of practices upon which the programme concentrates is illustrated by the following figures. In 1947, 2,730,000 farms were credited with conservation practices on which they earned \$265 million subsidy. Nearly 42 per cent. of the total payment was for practices involving the use of lime and other inorganic materials, 14 per cent. for protective and green manure crops, 14 per cent. for mechanical erosion controls, 13 per cent. for pasture and range practices, 4 per cent. for drainage and 3½ per cent. for irrigation.²²

In 1952, U.S. budget expenditure included \$341 million for "the conservation and development of agricultural land and water resources", equivalent to approximately one per cent. of gross farm income.²³

²² Timmons and Murray, *op. cit.* p. 268.

²³ *Statistical Abstract of the United States*, 1953, p. 344.
