AGRICULTURAL ADJUSTMENT UNIT · UNIVERSITY OF NEWCASTLE UPON TYNE

The Changing Agricultural Labour Force

Implications for Training

C E Heath & M C Whitby

10

THE AGRICULTURAL ADJUSTMENT UNIT

THE UNIVERSITY OF NEWCASTLE UPON TYNE

In recent years the forces of change have been reshaping the whole economy and, in the process, the economic framework of our society has been subject to pressures from which the agricultural sector of the economy is not insulated. The rate of technical advance and innovation in agriculture has increased, generating inescapable economic forces. The organisation of production and marketing, as well as the social structure, come inevitably under stress.

In February 1966 the Agricultural Adjustment Unit was established within the Department of Agricultural Economics at the University of Newcastle upon Tyne. This was facilitated by a grant from the W. K. Kellogg Foundation at Battle Creek, Michigan, U.S.A. The purpose of the Unit is to collect and disseminate information concerning the changing role of agriculture in the British and Irish economies, in the belief that a better understanding of the problems and processes of change can lead to a smoother, less painful and more efficient adaptation to new conditions.

Publications

To achieve its major aim of disseminating information the Unit will be publishing a series of pamphlets, bulletins and books covering various aspects of agricultural adjustment. These publications will arise in a number of ways. They may report on special studies carried out by individuals; they may be the result of joint studies; they may be the reproduction of papers prepared in a particular context, but thought to be of more general interest.

The Unit would welcome comments on its publications and suggestions for future work. The Unit would also welcome approaches from other organisations and groups interested in the subject of agricultural adjustment. All such enquiries should be addressed to the Director of the Unit.

Unit Staff

Director:	Professor J. Ashton, M.A., B.Litt, M.S.
Head of Unit:	S. J. Rogers, B.Sc. (*Econ*)
Administrative Officer:	B. H. Davey, B.Sc. (*Agric*), M.Econ.

The Agricultural Adjustment Unit,
Department of Agricultural Economics,
The University,
Newcastle upon Tyne, NE1 7RU
Tel: Newcastle 28511 *Ext.* 794.

THE CHANGING AGRICULTURAL LABOUR FORCE

Implications for Training

Bulletin No. 10

AGRICULTURAL ADJUSTMENT UNIT
UNIVERSITY OF NEWCASTLE UPON TYNE

1970

PREFACE

The 'drift from the land' of agricultural workers which has been continuing for decades has accelerated in the last ten years. At the same time as this rapid decline in the number of workers has occurred, technical advance has changed the nature of the job which the agricultural worker is expected to perform. A much higher level of technical skill is now required from the fewer men left in the industry.

These changes have implications for all those involved in agricultural production, the workers themselves, farmers, and others, including various official bodies and educational institutions. The most immediate need is for increased training for those who are to remain in the industry, and the amount and type of such training will depend to a large extent on the future development of these patterns of change.

The Agricultural, Horticultural and Forestry Industry Training Board invited the Agricultural Adjustment Unit to carry out a study of the implications of changes in the labour force for training needs. The Unit accepted this invitation in view of the importance of the adjustment of the industry to changes both in the size of its work force and the tasks it is expected to undertake. This study was therefore undertaken in the summer of 1969 under the following terms of reference:

> 'To examine published statistics and to assess their value for quantitative measurement of training needs in order to help identify training objectives and information gaps; and to suggest means of remedying deficiencies in the information which is available.'

Since this report was submitted, important policy changes have been announced. The financial basis of operation of the Agricultural Training Board is being adapted so that collection of levies from individual farmers is no longer required. Linked with this are proposals to broaden the scope of the Board so that employers and self-employed farmers can benefit from training in skills appropriate to their status. Both of these possibilities were mentioned in the original report and the recommendations are retained in this published version.

One of the authors of this report, Mr. Whitby, has been in the United States during the preparation of this report for publication. He has therefore not been able to participate in the editing which has taken place. And final responsibility for this draft rests with the Unit.

March 1970

JOHN ASHTON

THE CHANGING AGRICULTURAL LABOUR FORCE

CONTENTS

I. SUMMARY REPORT

Over the past few years there has been a generally increasing demand for investment in human capital (i.e., education and training) which, in 1964 manifested itself in the Industrial Training Act, providing for the setting up of Boards to organise and supervise appropriate training for individual industries. It is now generally recognised that, in many cases, the gains due to increased productivity which result from appropriate training can be just as large, if not larger, than those from other forms of investment.

It is, however, difficult to assess where the investment in training should be made and how large it should be. In some industries, each individual performs a small number of precisely defined tasks, involving particular skills, and it is thus relatively easy to identify the training needed by these workers. Similarly, it is relatively simple to identify a need for retraining—when an individual moves to another job involving different skills, or when a technological change means that a different type of machine is used. Thus most of the industrial training boards have concentrated their research efforts on methods of splitting down various jobs into the basic skills involved to determine the kind of training necessary. It is implicitly assumed that every man whose job requires particular skills should be trained and a large proportion of these receive some training.

In agriculture the position is different. The majority of workers perform a number of varying jobs. There are exceptions of course, such as contract milkers, but these are still a small minority. In a situation like this it becomes difficult to determine how many workers should be trained, and for which jobs. Also the willingness of the employer to pay for his men to be trained may not always be an appropriate indicator of the possible benefits to be obtained from training the agricultural labour force since the main benefits may accrue to people who are not in a position to demand such training directly (e.g. consumers of agricultural products).

It is, therefore, necessary to estimate the need for training in agriculture from the numbers in the labour force and the kinds of skills they need. Retraining needs also present a problem since they are not readily identifiable. As technology changes, the skills possessed by an individual may gradually become obsolete and it becomes difficult to say when retraining will be necessary.

The data collected by the agricultural census includes information on the labour force, and also on types of farming and holding sizes. Some indication of current training needs can be deduced from this, although there are serious omissions which make these data insufficient for the purpose. Given the choice between presenting a review of published data or speculating more widely about the general problem of training needs, it was decided that the best contribution would be a more speculative approach, since there has been comparatively little research on this subject.

The report contains a variety of material, some descriptive, some analytical. It falls into six main sections. The first section summarises the main findings of the report. Second, in a general descriptive section the main characteristics of the agricultural labour force and the structure of the industry are outlined. The third section considers projections of the future labour force, with particular reference to training requirements. The fourth section analyses the level of recruitment to agriculture. The fifth and sixth sections draw together the information presented earlier and indicate general conclusions about training objectives and information gaps. The summary does not follow precisely the sequence of the main report. The first part presents the factual material of sections II to IV in a very brief form. The second part discusses the conclusions and implications which follow from the factual analysis. Finally some concrete recommendations are listed.

Summary

(1) Agriculture in 1968 employed a total of 367,369, hired workers in addition to farmers themselves. The agricultural work force has been declining rapidly over the past few years due mainly to an outflow of hired workers (Table II.1). Consequently the average number of (regular male) hired workers per full-time holding has fallen from 2·1 to 1·8 over the last five years.

(2) Various factors within agriculture have helped to produce this high rate of outflow. Changing relative prices have caused a substitution of capital for labour, and land has also been substituted for labour to some extent. It is likely that future changes in farm size may result in an increase in the outflow of farmers rather than workers, but it is also noteable that labour is currently being lost most rapidly from large farms which find it easier to adapt their systems.

(3) Several different forecasts of future outmigration have been made but all such exercises must be treated with caution since, in the long run, labour use is dependent to a large extent on changes in technology and Government policy, neither of which can be predicted accurately over a long period.

(4) The most rapid decline over the past few years has been in the number of workers under twenty years old (Table II.11). Despite this there are still a large number of youths in the labour force relative to the number of adult hired workers. In the past many youths have left for other employment after a few years in agriculture. Current rates of entry indicate that this is likely to continue to be the case for some time. Because the labour force is declining rapidly, the number of recruits it needs is also declining yet the number of new entrants into the industry continues at a high rate.

(5) This wastage from the labour force has important implications for setting training targets. So 'over-recruitment ratios' have been calculated on a county basis. These take into account the number of entrants who are actually needed to replace the present labour force (including farmers) if the past rate of decline in the number of workers continues. It is estimated that from 1964 to 1968 some 145,000 male workers left the hired workforce. Of these about 30,000 became farmers, 25,000 retired and the remaining 90,000 went to non-agricultural employment. This compares with estimated recruitment in the same period of 57,000: thus for every new recruit to agriculture 1·56 left in the same period for non-agricultural employment.

(6) It may be that the technical nature of agriculture is such that it needs a large number of youths. But in this case, any training given to youths who subsequently leave the industry represents a waste of resources to agriculture although not necessarily to the country as a whole.

(7) In order to consider the effects on wastage of possible future age distributions two annual rates of decline of 3 and 5½ per cent of the hired labour force have been assumed. The results of moving towards different age distributions are then assessed. The more rapidly the age structure becomes adjusted (in the sense of moving towards having an equal number of workers of every age) the greater the initial wastage of recruits (in order to eliminate those young workers not needed to maintain the main body of the work force) and therefore the more difficult it would be to decide who to train. However, once a stable age structure had been achieved, wastage of youths would be minimised.

(8) The rate of wastage of young workers from the industry affects the relative importance given to new entrant training as against retraining of established workers. However, it is also necessary to consider the factors which affect the decision of a worker to leave the industry and the possible effect the Board's own activities could have on this. Relative wage rates, employment opportunities and the prospects for promotion are important and it is possible that training could have an effect on them. Increased training, if it leads to a better career structure in the industry, or to increased job-satisfaction could have the effect of reducing the mobility of trained men. On the other hand, in so far as the skills in which men are trained are transferable to other industries, personal mobility may be increased.

(9) The distribution of the farm labour force between different sizes and types of farms is important in deciding what weight should be given to training in different kinds of skills. Data relevant to this are given in Tables II.13 to II.19. Dairy holdings (both predominantly and mainly dairy) currently

account for a quarter of the regular whole time male workers; cereals and general cropping together account for nearly one third; intensive livestock and grazing farms each have less than one-tenth, whilst horticultural holdings have one-sixth. The most general trend in types of farming over the past few years has been an increasing concentration of production on specialised farms. This has led to an increase in the relative numbers of men on these holdings. (This does not necessarily mean a great movement of men between holdings since holdings may be reclassified when they intensify production. Some holdings may even be reclassified through changes in SMD factor alone.)

(10) There are differences in the average number of men employed per holding in different types of production. Particularly noticeable is the difference between arable holdings, employing between two and three men per holding and the stock rearing holdings which employ on average only one man. (Table II.20). This has an effect on the career structures which exist in different types of production and may account to some extent for the different age structure of the work force employed on different types of holdings. Arable holdings have a more balanced age structure, with fewer young men in relation to the rest of the force, than other types of holdings. This may reflect the type of work involved or the location of production near to centres of other employment, rather than the size of employment unit.

(11) Projections of the distribution of labour between different types of farm in 1981 were made in an attempt to indicate relative needs for different skills. These are no more than indicative because of the short base period available and variations in data within that period. Relative increases in the importance of workers on specialist dairy holdings and arable farms are projected, while the number of general stockmen needed is likely to decline.

(12) These figures only relate to the number of men who might be employed on particular types of farms and are not therefore an accurate guide to the number of men who might be required with particular skills. For instance, it may be that the number of men demanded by the dairy industry will not be as great as postulated but that the men who are employed will have to be more highly specialised than at present. Also, there are no data on the allocation of specialist tasks between hired workers and farmers.

Conclusions

(1) This review has emphasised the difficulty of formulating training objectives and the lack of appropriate information. It remains to consider possible

training objectives and list the gaps in information which hinder their formulation. Objectives are discussed at three levels of decision making—the general manpower policy level, that of overall training objectives and the problem of sectoral training objectives.

(2) At the level of general manpower policy the Agricultural Training Board is only one of a number of agents seeking to influence events. It has little influence over some policy decisions which may have a considerable impact upon its operations. An example of a decision made outside the Board which could have a considerable effect on it is the intended introduction of a wages structure, which should make the operation of systematic training schemes easier. It is likely to do this by indicating to the potential trainee where the demand for particular skills is strongest thus reducing wastage of trained men. One way in which the Board could influence such changes would be by playing a more active role in careers' guidance.

(3) Another general issue which affects the long term operation of the Board is the declining number of hired workers in relation to farmers. There can be little doubt that this trend will continue into the foreseeable future, despite Government attempts to speed up the rate of decline in the number of farmers. This being so, the situation will ultimately arise, when the number of farmers might exceed the number of hired workers. Drastic institutional changes favouring the introduction, for example, of farming companies, would be needed to prevent this occurring. The Board may therefore at some stage have to turn its attention to the training of farmers as distinct from hired workers. The Board is already training a number of farmers' sons who will eventually become farmers in their own right, but the training they are receiving is intended for farm workers and does not cover managerial skills. To this extent amendment of existing legislation, to bring the self-employed work force within the ambit of the Board would have the effect of allowing men already being trained to receive a more appropriate training.

(4) Other general events which will affect the Board's operations include extension of the school leaving age to 16 which will halve the number of school leavers in the year in which it occurs. Since agriculture currently recruits more than its 'share' of school leavers, this may have a sharp impact upon recruitment in one year.

(5) There are signs of the emergence of a manpower policy for agriculture. The evidence for this is, for example, the Select Committee for agriculture's recommendation that relative earnings in agriculture should be raised from 70 to 80 per cent of industrial earnings. The Board must take note of such

pronouncements, but it may also wish to influence them. To the extent that such an increase in earnings checked the outflow of young workers from agriculture it would, of course, favour the Board's activities by reducing the wastage of trained workers. However, it is questioned whether this would in fact result from such an adjustment of earnings, since this might well result in a rise in redundancy amongst farm workers.

(6) Overall training targets are difficult to formulate on an objective basis. A useful technique available for establishing such objectives is cost/benefit analysis but this is difficult to apply here. It is nevertheless a technique which should commend itself to the Board. One problem of objective assessment is that of measuring the amount of training achieved. Some form of proficiency testing would seem appropriate here and no doubt the Board has considered the possibility of applying such a yardstick.

(7) General training objectives must take account of the length of time for which the training of the individual will last. Factors affecting the useful life of particular training, whether the training is in breadth or in depth, are the rate of technical change and the rates of wastage of workers. Thus if cowmen were trained to use one specific kind of milking machine to a very high level of proficiency, the emergence of a new type of machine could render their skill obsolescent. If, in addition there was a high turnover of cowmen, perhaps because the work was too arduous for older men, this too would affect the amount of training activity required in the dairying sector.

(8) Related to the previous problem is the question of the age at which training should be given. It is generally argued that younger people are more receptive to training than their elders, yet younger workers tend to leave agriculture in large numbers. In assessing the balance of advantage between these opposing tendencies, the effect of training on personal mobility will have to be taken into account.

(9) Once a given set of training objectives has been established for some future date, there will be a number of different ways in which this objective might be achieved. There is a choice between training new entrants to the industry or concentrating upon workers already established on farms. The relative merits of one or the other course might be assessed along the lines of the analysis in Section III.

(10) Projections of different types of farming to 1981 suggest that there will be an increase in the number of specialised holdings, particularly in the dairying and cereal sectors. These projections suggest an increase in the proportion of workers on specialist dairy farms from the current $12\frac{1}{2}$ per cent to more

than 20 per cent of the hired labour force in 1981. Similarly, workers on cereal farms increase from 8 per cent to 22 per cent of the total.

Recommended Action

The detailed analysis supports the general statements which have already been made and it also leads to a limited number of specific recommendations:

(1) The current rate of recruitment to agriculture is higher than that needed to maintain the total labour force. This leads to a wasteful exodus of young workers who take with them the skills they have acquired in the industry. Therefore:

   (*a*) The Board should investigate the possible effect of training itself on this level of migration.

   (*b*) It is probable that the introduction of a wages structure would reduce this wastage. The Board could, through a system of proficiency testing, help the operation of a wages structure.

   (*c*) The Board could further influence the rate of recruitment by encouraging the provision of quantitative guidance as to the number of careers in agriculture.

(2) By training farmers' sons the Board is already training the farmers of the future. Explicit recognition of this could lead the Board to extend its services to the self-employed. This will become increasingly important as the number of hired workers declines.

(3) The lack of data for the establishment of quantitative training objectives could be made good by the regular collection of data on the experience of those workers which the Board trains. If this is not possible then a survey of skill requirements may offer an alternative, but this will be of limited use, since it gives no information about the experience of individual workers.

(4) Technical change will continue to affect training requirements. The Board should ensure that the best possible information is available to it about changing techniques in the industry. This could come from its own officers and from research workers.

II. THE PRESENT SITUATION

Total Labour Use

In 1968 agriculture employed a total of 367,400 regular hired workers, of which 262,500 were full-time. This total represents slightly less than half the number employed by the industry in 1948 and over this 20 year period, labour use has declined, on average, by 18,700 workers each year. This decline is shown in Table II.1 where it can be seen that the annual rate of outflow has not been constant. It is now much higher than it was 20 years ago, and has accelerated considerably over the last few years. During 1963-68, the annual rate of decline of male workers was more than twice that of previous years.

The E.D.C. report on 'Agriculture's Import Saving Role'[1], suggests that it may prove necessary to try to check this rate of outflow if the import saving objectives they set are to be realised. Subsequent ministerial statements[2] indicate that the government is not prepared to go to the full extent of the E.D.C's projected import saving possibilities and the Minister of Agriculture has not committed himself to any objective on the size of the labour force. The Select Committee on Agriculture, in its report[3], suggested that there is an urgent need to halve the rate of outflow of labour from agriculture and that this should be brought about by raising the relative earnings of farm workers from their present 70 per cent of industrial earnings to 80 per cent. The basis for this recommendation appears to be the extensive discussions the Select Committee held with officials from the Farmers Unions, the E.D.C. for Agriculture and the Ministry of Agriculture. It is hard to predict what would be the effect of raising the minimum agricultural wage by such a substantial amount. This might mean that farmers would prefer to dispense with more labour, or that more workers might be willing to stay on in agriculture. Agricultural prices will have an important effect on the outcome since they will play a large part in determining the wages bill farmers can afford, and the development of labour saving technology will continue to have an important effect.

So far this discussion has concentrated on the hired workers in agriculture, since it is here that the decline has been most rapid. The self-employed (farmer and wife) part of the labour force is also estimated to have declined, but by a much smaller amount, and forecasts do not predict a large future decline. The Training Boards current terms of reference focus mainly on the hired part of the labour force. However the ratio of self-employed to hired workers in agriculture is now in the order of 1:2, and as the decline of hired workers continues the Board may have to pay increasing attention to the self-employed part of the work force. If this has no commonsense appeal, it may be noted that a recent descriptive study of U.S. Agriculture in the year 2,000[5] reached the conclusion that there would be no hired labour by then, only self-employed. It is commonly pointed out that a continued outflow of labour from agriculture will consist increasingly

TABLE II.1

CHANGES IN AGRICULTURE'S USE OF HIRED LABOUR
IN ENGLAND AND WALES 1948–68

	Regular Whole-time Workers				*Regular Part-time Seasonal/ Temporary*				*Total Hired Workers*			
	Male		*Female*		*Male*		*Female*		*Male*		*Female*	
Total 1948	506·5		66·2		110·6*		58·2		617·1		124·4	
Average Annual Change	*No.*	*% p.a. Compound*	*No.*	*% p.a. Compound*	*No.*	*% p.a. Compound*	*No.*	*% p.a. Compound*	*No.*	*% p.a. Compound*	*No.*	*% p.a. Compound*
1948–53	− 6·4	−1·3	−4·1	−7·8	−1·3	−1·2	+0·1	+0·1	−7·6	−1·3	−2·5	−2·2
1953–58	−15·1	−3·4	−2·5	−6·7	−2·5	−2·6	+1·6	+2·6	−17·6	−3·2	−0·9	−0·9
1958–63	−13·5	−3·6	−1·6	−5·5	−2·5	−2·8	−1·1	−1·7	−14·0	−3·0	−2·6	−2·8
1963–68	−17·7	−6·4	−1·1	−5·3	−5·1	−8·1	−2·0	−3·5	−24·9	−7·2	−3·1	−3·9
1948–68	−13·2	−3·6	−2·3	−6·7	−2·8	−3·5	−0·4	−0·6	−16·0	−3·6	−2·7	−2·5
Total 1968	243·1		19·4		53·7		51·1		296·8		70·6	

* Including 11·4 thousand prisoners of war.

Source: Agricultural Census.

of farmers; a trend which is already under way[4]. Attempts to accelerate the rate of amalgamation of farms have been introduced under the 1967 Agriculture Act but during the first year of operation of these schemes, they have produced no measurable increase. To the extent that these schemes prove to be effective they may ease the rate of decline of hired workers. For example, if two farms previously employing no men are amalgamated, one farmer will leave and the remaining one might employ a man to maintain the same land: labour ratio.

Productivity

Agriculture's use of labour, both hired and self-employed, is declining and its output is rising with increasing labour productivity. Labour productivity is calculated by dividing the industry's contribution to gross domestic product (G.D.P.) by its total use of labour. This may be calculated in physical terms (at constant prices) and this is the basis of comparison in documents such as the National Plan. Alternatively output per man may be measured at current prices, in which case it also reflects the extent to which an industry is supplying what the market demands and may be a more appropriate measure for inter-industry comparison. The course of output, labour use and labour productivity measured at current and constant prices is compared for three different industries in Table II.2.

Labour productivity in agriculture is important, in the training context, because it derives in very large measure from agriculture's increasing dependence upon technically sophisticated purchased inputs and on manufactured items of capital. These new inputs originate outside agriculture and it is their use which explains much of the increase in labour productivity which has occurred in agriculture. For example the rapid development of the intensive poultry industry, based on hybrid stock and disease control made possible by the pharmaceutical industry, has seen a phenomenal growth of labour productivity. Equally the revolution in cropping has been based upon machinery, fertiliser, herbicides and so on. The origins of the productivity gains in the dairy industry, where 10 years ago one man was commonly expected to cope with 30–40 cows while now he may have 80, have mostly been in the form of new designs of milking shed and milk handling equipment and to a lesser extent in grassland management techniques and better use of feedingstuffs. These examples underline the significance of new forms of capital input in contributing to labour productivity.

Capital

The growth of labour productivity has been accompanied by a substantial increase in investment in agriculture. Table II.3 shows new capital formation in agriculture and relates it to net output.

TABLE II.2

CHANGES IN OUTPUT, EMPLOYMENT AND PRODUCTIVITY BY CERTAIN U.K. INDUSTRIES 1960 TO 1967

(1965=100)

	Agriculture Forestry & Fishing	*Mining & Quarrying*	*Manufacturing*
	percentage changes		
Gross Domestic Product* at constant factor cost	+18·3	− 9·8	+19·4
Employment	−14·9†	−30·9‡	+ 2·6‡
Output per head (constant factor prices)	+39·0	+30·5	+16·4
Gross National Product* (at current prices)	+22·1	+ 3·4	+49·7
Employment	−14·9†	−30·9‡	+ 2·6‡
Output per head (current prices)	+43·5	+49·6	+45·9

Sources: * 'National Income & Expenditure' 1969. H.M.S.O.

† Index of working population derived from assumptions that working population declines constantly by 2% per annum. See Dr. K. Dexter 'Productivity in Agriculture' in 'Economic Change & Agriculture' edited by J. Ashton & S. J. Rogers.

‡ Annual Abstract of Statistics 1968. Defined as total employees in employment.

A substantial proportion of new investment each year is invested in stocks. Also buildings have become a significant item in total investment. In the bottom two lines of Table II.3 capital is expressed as a percentage of net output to give the capital formation proportion, which is growing over time and, including stocks, now amounts to some 20 per cent of net output annually. The increase in this proportion in the 1950's and its relative constancy in the 1960's demonstrates that agriculture's use of capital has grown and is continuing to grow *pari passu* with the growth of net output. At the same time a substantial part of the new capital replaces labour. This aspect of agriculture's investment performance has been studied, by Peters[6] who concludes that agriculture is an efficient user of capital, compared with other industries if labour loss is allowed for. This conclusion has been questioned more recently by Whitby[7] arguing, on the basis of alternative calculations, that the evidence does not support such firm judgements as to agricultural efficiency in the use of capital. This controversy notwithstanding, agriculture is becoming increasingly capital intensive.

TABLE II.3

CAPITAL FORMATION AND NET OUTPUT OF UNITED KINGDOM AGRICULTURE (AT CURRENT PRICES)
(£ million)

	1954	*1955*	*1956*	*1957*	*1958*	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*
New fixed assets (including replacements)*														
(*a*) Building Works	24	26	27	25	29	38	45	54	58	62	65	64	69	77
(*b*) Vehicles	17	18	17	19	21	21	24	24	20	19	20	19	19	20
(*c*) Plant and Machinery	55	60	50	72	76	81	76	69	74	86	86	86	88	91
TOTAL	96	104	94	106	126	140	145	157	152	167	171	169	176	188
STOCKS	10	25	36	19	22	34	38	38	28	33	47	50	43	48
NET OUTPUT†	654·0	703·5	707·0	755·5	725·5	756·5	798·0	839·0	871·5	847·5	921·5	922·0	959·5	999·0
CAPITAL FORMATION PROPORTION	14·7	14·8	13·3	14·0	17·4	18·5	18·2	18·7	17·4	19·7	18·6	18·3	18·3	18·8
CAPITAL FORMATION PROPORTION including stocks	16·2	18·3	18·4	16·5	20·4	23·0	22·9	23·2	20·7	23·6	23·7	23·8	22·8	23·6

Source: Capital Formation: Minutes of the Select Committee for Agriculture 10th April 1968.
Net Output: Annual Abstract of Statistics.

* After deducting receipts for assets sold off the whole 'national farm'; but without deduction for depreciation of existing assets.

† Net output figures are for years beginning June 1954, 1955 etc.

Farm Size Structure

In recent years there has been a decline in the total number of farms and a consequent increase in the average size of those that remain. There are several ways in which farm size can be measured, and while the same general trend is shown by all measures, the indicators vary in usefulness.

(*a*) *Acreage size:*

A breakdown of changes in the number of holdings and their distribution between acreage size groups is given in Table II.4.

TABLE II.4

HOLDINGS BY CROPS AND GRASS ACREAGE SIZE
ENGLAND AND WALES

	1963		*1968*		*Change 1963–68*	
	No.	*%*	*No.*	*%*	*No.*	*%*
Acreage size group						
¼–4¾	68,934	20·9	26,762*	10·6	−42,172	−61·2
5–19¾	73,392	22·2	54,108*	21·4	−19,284	−26·3
20–49¾	57,283	17·3	49,305	19·5	− 7,978	−13·9
50–99¾	55,369	16·8	49,184	19·5	− 6,185	−11·2
100–299¾	60,621	18·4	56,996	22·6	− 3,625	− 6·0
300–499¾	9,916	3·0	10,529	4·2	+ 613	+ 6·2
500–999¾	4,025	1·2	4,777	1·9	+ 752	+18·7
1000+	767	0·2	1,062	0·4	+ 295	+38·5
Total	330,307		252,723		−77,584	−23·5

Source: Agricultural Census.

* Following a large scale review in 1967/68, about 47,000 holdings with a negligible agricultural output were deleted from the records. These holdings were in the 1¼–4¾ and 5–14¾ acreage size groups, and about 75% of the decline in these two groups can be accounted for in terms of this revision.

Most of the decline which has occurred in the past few years has been in very small holdings. Amalgamations have led to an increase in the number of holdings of over 300 acres, while the decrease in the total number of holdings has been continuing at an accelerating rate. Government action under the 1967 Agriculture Act is intended to speed up the amalgamation of smaller holdings. These structural changes have been related to changes in the industry's use of manpower. In general, an addition to the land area of a farm can be regarded as a substitute for labour,

since fewer men are needed to work one large farm than several small ones. Thus a more rapid rate of amalgamation will lead to an acceleration in the rate of decline of the total labour force. A large part of this decline is however likely to be made up of farmers and their families rather than hired workers.

(*b*) *Business size:*

Farm business size measured in terms of labour requirements may be more useful in determining the labour needs of the industry than acreage size since it is based on estimates of the amount of labour needed to run each enterprise on a holding. The general trend of business size in farming has already been mentioned and is well documented[4], [8]. Data on the changing distribution of businesses are shown in Table II.5. The distribution for both years given in Table II.5 are characterised by a very small percentage of businesses in the upper size ranges, and in this sense they are very similar to the distributions by acreage size.

TABLE II.5

CHANGE IN BUSINESS SIZE STRUCTURE OF FARMS
ENGLAND AND WALES

SMD Size Group	*1963*		*1968*		*% Change 1963–68*
	No.	*% of Total*	*No.*	*% of Total*	
0– 99	100,952	31·8	70,316	27·7	−30·3
100– 274	56,481	17·8	46,579	18·3	−17·5
275– 449	44,996	14·2	37,658	14·8	−16·3
450– 599	28,994	9·1	24,608	9·7	−15·1
600– 749	21,097	6·6	17,604	6·9	−16·6
750–1,199	33,600	10·6	29,138	11·5	−13·3
1,200–2,399	22,785	7·2	19,841	7·8	−12·9
2,400–5,999	7,285	2·3	7,101	2·8	− 2·5
6,000+	1,492	0·5	1,619	0·6	+ 8·6
	317,682	100·0	254,262	100·0	−20·0

Source: Agricultural Census.

In considering the distribution of total business activity by size of holding however the situation is reversed, with the larger holdings having the major share of total activity. This may be seen from Table II.6 which shows the distribution of holdings and of standard man days by four size groups. The third column of Table II.6 also shows the number of whole-time regular male workers

by size of business, which is distributed in much the same way as total standard man-days. The main differences which arise may be explained by the relative importance of other categories of worker (farmers, women, part-time and casual workers) and to variations in labour productivity with size of business.

TABLE II.6

DISTRIBUTION OF HOLDINGS AND STANDARD LABOUR REQUIREMENTS AND REGULAR WHOLE-TIME/MALE WORKERS BY HOLDING BUSINESS SIZE ENGLAND AND WALES—1967

Size Group	*% of Holdings*	*% of Standard Man Days*	*% of total Regular Whole-time Male Workers*
Under 275	51·9	6·6	5·0
275–599	20·0	15·4	11·2
600–1,199	16·9	25·6	24·6
1,200 and over	11·2	52·4	59·2
Total	100·0	100·0	100·0

Source: Farm Classification in England and Wales 1967. M.A.F.F., H.M.S.O.

Standard man-day factors are dependent, among other things, on the amount of capital used in production, and more particularly on the technology embodied in that capital. With advances in technology, the man-days needed to produce a particular crop generally fall so that these factors are subject to frequent downward revisions. Thus if output remains constant, all holdings will be classified downward in size as factors are adjusted. Since a full-time farm is defined as one having a certain S.M.D. size, the extent of these downward revisions is reflected in changes in the number of full-time farms (Table II.7). The most marked effect of this is seen in the changes between 1965 and 1966 when the number of holdings with more than 275 S.M.D.'s fell considerably. The M.A.F.F. estimates this reduction to be of the order of 4,000 holdings in England and Wales. Some of the recent changes in man day factors are given in Table II.8.

Also, if the downward revision affects only one enterprise, the type of farming carried out on the farm may appear to change, even though no actual changes have been made. Thus, comparisons over time are only valid if the standard man-days are adjusted to reflect accurately changes in labour efficiency.

TABLE II.7

NUMBERS OF FULL AND PART TIME FARMS

	1963	*1964*	*1965*	*1966*	*1967*	*1968*
Holdings with 275 smds	160,249	157,391	156,207	149,026	147,335	137,369*
% change		−1·8	−0·8	−4·6	−1·1	−6·8
Holdings with less than 275 smds	175,435	171,413	167,573	169,027	159,288	116,895*
% change		−2·3	−2·2	+0·9	−5·8	−26·6
All holdings No.	335,684	328,804	323,780	318,053	306,623	254,264*
% change		−2·0	−1·5	−1·8	−3·6	−17·1

* A large number of 'statistically insignificant' holdings were eliminated from the Census between 1967 and 1968.

Sources: Farm Classification in England and Wales 1967. M.A.F.F., H.M.S.O.
M.A.F.F. analysis of June Census data 1968.

TABLE II.8

SELECTED CHANGES IN S.M.D. WEIGHTING FACTORS

	1961	*1968*	
Wheat, Barley, Oats	3·5	2·0	per acre
Mixed Corn, Rye	4·5	3·0	per acre
Potatoes (maincrop)	20·0	15·0	per acre
Sugar beet	17·0	10·0	per acre
Dairy cows	15·0	10·0	per animal
Dairy heifers	9·0	3·5	per animal
Other cattle	3·0	2·5	per animal
Sows and gilts in pig, Other sows for breeding, Boars	5·0	4·0	per animal
Ewes for breeding, Two-tooth ewes, Rams	0·75	0·7	per animal

Source: M.A.F.F. Census Branch.

(*c*) *The Number of Workers Employed*

Finally holdings can be classified according to the number of men employed on them. This can be important from the point of view of training because a larger

labour force per farm enables greater individual specialisation and a more balanced age structure. In terms of labour management, it is easier to organise a career structure and the replacement of workers temporarily absent on training courses, with a larger group. The data of Table II.9 shows the way in which whole-time regular male workers between 20 and 64 years old are divided amongst labour size groups and the way these data have changed from 1963 to 1968. First it is notable that two-thirds of the holdings in 1968 had no workers in this category. Further, more than half the workers present were on the 70,000 holdings with from 1 to 3 workers on them, the remaining 100,000 workers being concentrated on some 13,000 large holdings. It is interesting to note the similarity between the percentage change in number of holdings and number of men by labour size group over this period. These percentages are shown in the last two columns of Table II.9, where it can be seen that the decline in the number of men increases steadily across the labour size groups to reach a maximum of nearly one-third for the size group 10–14 men. For size groups greater than this both the number of holdings and the number of men declined much more slowly. This contrasts with the trend in business size where it is the smallest farms which are disappearing fastest. Such a development is entirely consistent with the more rapid rate of technical innovation which is possible on larger farms and the greater possibilities of substituting capital, where a larger turnover enables fixed costs per unit to be minimised. The training needs of large and small farms will be very different and changes in the structure of agriculture will have important implications for training policy. These observations relate to developments on holdings with less than 15 men. There is no obvious explanation of the different rates of development on the largest holdings. But the picture here is complicated because the number of holdings of this size is small and there is probably a considerable amount of movement into and out of these groups from year to year.

Changes within the Labour Force

Having considered some of the general forces affecting total labour use we may now examine the internal characteristics of the agricultural labour force. First there are the different categories of worker.

Self-employed workers comprise farmers and their wives; they are the part of the labour force about which least is known. Population Census data are generally unreliable as a guide to the absolute number of farmers. This is partly because definitions change between censuses and partly because of bias in the statistics. Furthermore, this source of data is of little use here because of the long interval between Censuses.

A common expedient where an estimate of the number of farmers or of the labour input of the self-employed element is required, is to take the number of

TABLE II.9

CHANGES IN DISTRIBUTION OF MEN AND HOLDINGS BY LABOUR SIZE GROUPS
1963–1968—ENGLAND AND WALES

No. of Whole-time Reg. Male Workers aged 20–64	*1963*		*1968*		*Percentage Change 1963–68 in*	
	No. of Holdings	*No. of Men*	*No. of Holdings*	*No. of Men*	*No. of Holdings*	*No. of Men*
0	230,363	0	(170,806)[1]	0	—	—
1	52,646	52,646	43,337	43,337	−17·7	−17·7
2	24,405	48,810	18,912	37,824	−22·5	−22·5
3	10,776	32,328	8,226	24,678	−23·7	−23·7
4	5,657	22,628	4,321	17,284	−23·6	−23·6
5–9	8,775	54,676	6,413	40,320	−26·9	−26·3
10–14	1,884	21,566	1,268	14,606	−32·7	−32·3
15–19	557	9,143	456	7,568	−18·1	−17·2
20+	621	21,385	525	17,507	−15·5	−18·1
Total	335,684	263,182	254,264	203,124	−24·3	−22·8

Note 1: The decline in the number of holdings from 1963–68 will be somewhat overstated by this figure because 47,000 were eliminated from the Census in 1968. These had less than 10 acres of crops and grass each and they were removed from the Census because their output was negligible.

Source: Agricultural Census.

full-time farms* as an estimate. There are some 160,000 full-time farms in England and Wales, and these are estimated to be declining at a rate of 2–3 per cent per annum (Table II.7).

The importance of family labour should be easier to estimate when the M.A.F.F. Census begins to collect data on farmers and family workers in 1970.

Employees included in the census cover some family members along with all other hired workers and the employees of agricultural contractors who are on farms on June 4th. Other data on the hired labour force is available from the M.A.F.F. report on 'The Changing Structure of the Agricultural Labour Force in England and Wales'[9], and from a brief memorandum to the Select Committee on agriculture[10]. Employees are usually categorised as full-time, part-time, seasonal or casual. The change in relative importance of these different categories is shown in Table II.10. The net outflow which has been observed has come mostly from

TABLE II.10

CATEGORIES OF HIRED WORKER IN AGRICULTURE IN ENGLAND AND WALES

	June 1960	*June 1968*	*% Change*
Whole-time Regular Workers			
—male	377,611	243,112	−35·6
—female	28,092	19,448	−30·8
—male and female	405,703	262,560	−35·3
Part-time Regular Workers			
—male	43,530	24,365	−44·0
—female	28,914	20,041	−30·7
—male and female	72,444	44,406	−38·7
Seasonal or Casual Workers			
—male	47,147	29,302	−37·8
—female	36,813	31,101	−15·5
—male and female	83,960	60,403	−28·1
Total workers			
—male	468,288	296,779	−36·6
—female	93,819	70,590	−24·8
—male and female	562,107	367,369	−34·6

Source: Agricultural Census.

* A full-time farm for this purpose is one which generates more than 275 standard man-days in a year.

regular workers and the number of seasonal and casual workers has declined comparatively slowly. For most of the remainder of this report we shall deal with regular whole-time workers only, because this is the most important category of workers as well as the most numerous and because the information relating to it is most detailed.

The Department of Employment and Productivity also provides estimates of total employment in agriculture based upon counts of insurance cards. Until 1967 when the M.A.F.F. improved its data on workers, this gave a more detailed age breakdown then was available from the Agricultural Census, but these data are highly aggregated. None of the sources mentioned gives the numbers of contract workers. In some cases contract labour would be recorded in the June Census as seasonal labour, but this would only account for a small proportion. Moreover there is no way of separating these contract workers from other seasonal workers. Thus although there is a widespread belief that contract labour is increasing in importance, there is no evidence to support this.

The age structure of the labour force is obviously an important factor in determining training requirements. The present age structure of the agricultural labour force is known in some detail, but historical series only present a small number of wide age groups. In Table II.11 the changing distribution of regular whole-time workers by age categories is shown.

Between 1960 and 1968 there has been a notable decline in the number of workers under 20 years old which has generated some comment and has led to the suggestion that agriculture is not currently recruiting enough workers. This question is analysed in Section IV below.

The more recent data from the Agricultural Census which gives detailed age categories, is shown in Table II.12 together with an estimate of the average number of workers per year in each group since the variation in the width of the different age ranges makes comparisons between groups difficult. As more age data accumulates, it will be possible to calculate the way in which the age structure of the mature part of the labour force is changing, but this cannot be done accurately from two years' statistics.

The second column of Table II.12 indicates that younger workers are well represented in comparison with older workers. If the labour force were static and all entry took place at age 15 with workers only leaving at age 65, then the number per year in each age range would be the same. In fact a number of forces operate to produce the existing distribution as seen in Table II.12. These include the high level of recruitment, the rate at which farms are amalgamated, the tendency for the age of retirement to fall, as well as the decline in total labour requirements as technology improves. It is not enough to consider a static cross-sectional picture of the labour force, but rather it is necessary to look upon the supply of labour as a flow of services made available over time: this is attempted in section IV.

TABLE II.11

CHANGES IN AGE DISTRIBUTION OF MALE WORKERS
ENGLAND AND WALES 1960–68

	1960	*1968*	*% Change*
Regular Workers			
Full-time—Under 18	34,900	18,546	−46·9
—18–19	25,529	15,092	−40·9
—20 and over	317,182	209,474	−34·0
Sub-total	377,611	243,112	−35·6
Part-time—Under 20	5,112	2,189	−57·2
—20 and over	38,418	22,176	−42·3
Sub-total	43,530	24,365	−44·0
Seasonal and Temporary			
—Under 20	4,746	4,489	− 5·4
—20 and over	42,401	24,813	−41·5
Sub-total	47,147	29,302	−37·8

Source: Agricultural Census.

TABLE II.12

AGE DISTRIBUTION OF REGULAR WHOLE-TIME MALE WORKERS
1968 IN ENGLAND AND WALES

	Number of Workers	*Number Divided by Age Range*	*% of Total in Group*
Under 18	18,546	9,273*	7·6
18–19	15,092	7,546	6·2
20–24	32,481	6,496	13·3
25–34	48,481	4,848	20·0
35–44	49,689	4,969	20·4
45–64	72,536	3,627	29·9
65 and over	6,350	1,270†	2·6
Total	243,112	—	100·0

* Width of Age Range assumed to be 2 years.

† Width of Age Range assumed to be 5 years.

Source: Agricultural Census 1968.

Note: Table II.22 gives a similar age distribution of workers classified by the different types of farms on which they are employed. This distribution is only available for 1967 however.

Types of Farming

The preceding sections have been mainly concerned with the changes which have been taking place in the labour force as a whole, and the factors which have influenced these changes. It is also interesting to look at the way in which the number of workers employed on different types of farms has been changing.

Table II.13 shows the distribution of full-time holdings by different types of

TABLE II.13

DISTRIBUTION OF HOLDINGS BY TYPE OF FARMING
ENGLAND AND WALES

	1964		*1967*		*Change 1964–67*	
	No.	*%*	*No.*	*%*	*No.*	*%*
Predominantly Dairy	29,445	19	34,784	24	+ 5,339	+18·1
Mainly Dairy	32,911	21	25,477	17	− 7,434	−22·6
All Dairy	62,356	40	60,261	41	− 2,095	− 3·4
Livestock: Cattle	3,369	2	2,845	2	− 524	−15·6
Livestock: Sheep	6,417	4	4,820	3	− 1,597	−24·9
Livestock: General	13,523	9	16,011	11	+ 2,488	+18·4
All Livestock	23,309	15	23,676	16	+ 367	+ 1·6
Predominantly Poultry	5,018	3	3,547	2	− 1,471	−29·3
Pigs and Poultry	5,211	3	5,265	4	+ 54	+ 1·0
All Intensive Livestock	10,229	6	8,812	6	− 1,417	−13·9
Cropping cereals	6,345	4	8,651	6	+ 2,306	+36·3
General cropping	18,763	12	17,200	12	− 1,563	− 8·3
All cropping	25,108	16	25,851	18	+ 743	+ 3·0
Predominantly: Veg.	1,915	1	1,958	1	+ 43	+ 2·2
Predominantly: Fruit	2,581	2	2,181	1	− 400	−18·3
General Horticulture	11,054	7	11,132	8	+ 78	+ 0·7
All Horticulture	15,550	10	15,271	10	− 279	− 1·8
Mixed	20,839	13	13,464	9	− 7,375	−35·4
Total Full-time	157,391		147,335		−10,056	− 6·4

Source: Farm Classification in England and Wales 1964 and 1967. M.A.F.F., H.M.S.O.

farming for 1964 and 1967, based on an S.M.D. classification of farms and subject to the difficulties mentioned above (page 21). The criteria on which the classification is based are given in Table II.14.

Over the past few years there has been little change in the relative importance of the major enterprise categories. Dairying and arable holdings have increased slightly while mixed farming ones have declined, but these are only minor changes. Within the broad enterprise groups, however, there seems to have been a trend towards the concentration of production on more specialised holdings.

TABLE II.14

CLASSIFICATION CRITERIA

HOLDINGS WITH 275 STANDARD MAN DAYS OR MORE

1. Specialist Dairy	75% or more in dairying.	
2. Mainly Dairy	More than 50% and less than 75% in dairying.	
3. Livestock rearing and fattening: mostly Cattle	More than 50% in livestock rearing and fattening of which	75% or more in cattle.
4. Livestock rearing and fattening: mostly Sheep		75% or more in sheep.
5. Livestock rearing and fattening: Cattle and Sheep		Other holdings with more than 50% in livestock rearing.
6. Predominantly Poultry	75% or more in pigs and poultry, of which 75% or more in poultry.	
7. Pigs and Poultry	75% or more in pigs and poultry, of which less than 75% in poultry. More than 50% and less than 75% in pigs and poultry.	
8. Cropping: mostly cereals 9. General cropping	More than 50% in cropping of which	50% or more in cereals*. Less than 50% in cereals*.
10. Predominantly veg. 11. Predominantly fruit	75% or more in horticulture of which	75% or more in horticultural vegetables. 75% or more in fruit.
12. General horticulture	75% or more in horticulture and which neither horticultural vegetables nor fruit are 75% or more. More than 50% and less than 75% in horticulture.	
13. Mixed	No more than 50% in any main enterprise.	

* This limit was 75% in 1963.

Source: Farm Classification in England and Wales 1967. M.A.F.F., H.M.S.O.

One difficulty in using this farm classification data is that changes of individual holdings between farming types cannot be identified. Provided that numbers entering a group are balanced by numbers leaving, changes will not be detected. The M.A.F.F. have recently made available data on holdings changing from one type group to another for 1967 and 1968. This is shown in Table II.15.

TABLE II.15 MOVEMENTS OF HOLDIN

JUNE 1967/JUNE 1968

	Specialist Dairy	*Mainly Dairy*	*Livestock Mostly Cattle*	*Rearing and Fattening Mostly Sheep*	*Rearing and Fattening Cattle & Sheep*	*Pre-dominantly Poultry*	*Pig Pou*
Specialist Dairy	28,772	3,268	176	18	66	7	
Mainly Dairy	4,372	17,447	189	102	311	8	
Mostly Cattle	82	133	2,401	11	405	2	
Mostly Sheep	9	117	6	4,487	516	1	
Cattle and Sheep	51	235	406	755	11,150		
Predominantly Poultry	1	1	2	2	1	2,903	1
Pigs and Poultry	21	90	31	7	26	206	3,9
Cropping Cereals	13	63	81	43	81	5	
General Cropping	11	95	35	17	55	5	
Predominantly Vegetables							
Predominantly Fruit		1					
General Horticulture	22	22	5	5	13	17	
Mixed	135	2,038	241	174	710	11	3
Holdings under 275 s.m.d.s.	1,452	605	362	295	574	313	5
Holdings new to the Census	82	46	21	25	41	91	
TOTAL	35,025	24,161	3,956	5,941	13,949	3,569	5,5

Source: M.A.F.F. analysis of June Census data.

The net changes which have taken place are the result of much bigger total movements into and out of groups. For example, between 1967 and 1968 the predominantly dairy category increased from 34,746 to 35,025 holdings. This small increase was the net result of 6,251 holdings moving into the category and 5,974 moving out. It again appears that the most important changes have been from less to more specialised enterprises. This trend is also seen clearly in the way in which the distribution of crops and stock between holdings is changing, given in Table II.16 which shows increasing size of enterprise, and Table II.17 which

TWEEN FARMING TYPES—1967 TO 1968

(NO. OF HOLDINGS)

pping reals	General Cropping	Pre-dominantly Vegetables	Pre-dominantly Fruit	General Horti-culture	Mixed	Holdings under 275 s.m.d.	Holdings which left the census	TOTAL
39	33	1	1	14	164	1,746	414	34,746
146	128		1	19	1,528	867	228	25,445
115	38	1		4	199	402	65	3,881
44	24		1	1	124	240	77	5,567
154	48	1		10	542	545	187	14,106
3	7		1	25	5	342	58	3,543
51	87	5	2	47	173	425	92	5,258
504	956	2	1	28	355	215	207	8,638
744	14,149	63	4	416	500	604	342	17,131
	60	1,424		262	4	149	54	1,954
1	4		1,848	128	2	136	57	2,178
26	322	256	164	8,711	176	1,037	267	11,090
483	536	5	2	212	7,825	412	139	13,265
185	637	151	107	1,171	269	99,745	7,102	113,493
44	65	15	17	141	28	2,482		3,153
539	17,094	1,924	2,149	11,189	11,894	109,347	9,289	263,538

gives the distribution of certain types of stock and crops by holding type. Even in the short period from 1964 to 1967, quite large changes have occurred. For instance in 1964 39 per cent of dairy cows were on specialist dairy holdings. By 1967, however, 50 per cent were on the specialist dairy holdings and only 34 per cent on mainly dairy. Similar trends towards specialisation can be seen in pigs, poultry and cereals. Beef, cows and sheep are the only enterprises which have not followed this movement.

Individual studies of particular types of production have also been carried out.

For example Colman and Leech[11] have recently published some projections of the size distribution of milk producers in England and Wales, summarised in Table II.18. A steeply declining share of production coming from smaller producers is indicated with a growing volume from larger producers.

TABLE II.16

CONCENTRATION OF ENTERPRISE IN ENGLAND AND WALES

Enterprise	*Enterprise Size Group*	*% of Total Enterprise in the Size Group*		*Average Annual Increase in Size*
		June 1960	*June 1965*	(%)
Dairy cows	50 or more cows	21	30	4·5
Beef cows	50 or more cows	15	19	2·5
Breeding ewes	500 or more ewes	16	21	2·5
Breeding pigs	50 or more sows and gilts	16	25	8·5
Wheat	100 or more acres	26	42	7·5
Barley	100 or more acres	41	50	5·5
Main crop potatoes	50 or more acres	19	27	6·0
Fowls 6 months or over	1,000 or more birds	25	46*	10·0
Broilers	20,000 or more birds	42	71	33·0

* 1963. In 1965, 62 per cent of laying fowls (separately distinguished only since 1964) were in flocks of 1,000 or more birds.

Source: The Structure of Agriculture: H.M.S.O., 1967.

Employment by Different Farming Types

The distribution of regular whole-time workers by the types of holdings on which they are employed is given in Table II.19 for England and Wales. The largest group of employers are the cropping farms which, with 73,352 men in 1968, had nearly one-third of the total. Dairying is second in importance, accounting for a quarter of the workers. In 1964 these two enterprise groups each employed the same amount of labour. Since then, the number of workers employed in cereal producing (roughly one-third of those employed on all cropping farms) has increased despite the general decline. In dairying, on the other hand, although the number of men on specialist dairy farms has fallen more slowly than the trend, the rapid decline on mainly dairy farms has more than made up for this. Horticulture has declined less rapidly than other sectors. The number of men on livestock rearing holdings also fell in line with the general trend. However, within the category, there was an increase of 70 per cent in the number employed on cattle holdings

TABLE II.17

PERCENTAGE DISTRIBUTION OF LIVESTOCK AND CROPS BY TYPE OF FARM

	Dairy Type Cows		*Beef Type Cows*		*Breeding Sheep*		*Breeding Pigs*		*Laying Hens and Pullets*		*Barley*		*Wheat*	
	1964	*1967*	*1964*	*1967*	*1964*	*1967*	*1964*	*1967*	*1964*	*1967*	*1964*	*1967*	*1964*	*1967*
Specialist Dairy	39·4	49·9	1·1	1·5	2·2	3·0	7·3	7·4	4·7	5·6	4·2	5·0	3·0	3·2
Mainly Dairy	39·6	33·6	5·3	5·1	12·6	11·7	17·2	13·2	13·9	10·7	13·8	12·9	11·3	10·9
Cattle Rearing	0·1	0·1	10·3	8·8	0·7	0·2	0·8	0·7	0·6	0·4	1·5	1·5	1·3	1·2
Sheep Rearing	1·1	0·8	7·4	5·9	28·5	25·0	0·9	0·6	0·6	0·3	1·0	0·7	0·9	0·7
General Livestock	1·0	1·3	41·7	52·6	28·0	37·0	3·4	3·6	2·2	2·0	5·1	5·6	4·0	4·3
Predominantly Poultry	0·2	0·1	0·3	0·2	0·3	0·2	2·6	1·3	40·3	46·3	0·6	0·5	0·5	0·4
Pigs and Poultry	1·2	0·8	1·0	0·8	0·8	0·6	19·4	29·0	15·6	16·3	2·3	2·8	1·8	1·7
Cereals	0·4	0·6	5·0	5·8	3·1	4·6	4·4	5·5	1·2	1·8	20·8	27·5	17·6	24·9
General Cropping	2·4	2·3	10·7	8·5	6·1	4·9	15·7	14·9	4·4	3·8	27·8	26·1	37·7	35·0
Vegetables	—	—	—	—	—	—	0·3	0·3	0·1	0·1	0·3	0·3	0·5	0·5
Fruit	0·1	—	0·2	0·1	0·3	0·3	0·5	0·4	0·2	0·2	0·2	0·2	0·4	0·4
General Horticulture	0·3	0·4	1·2	1·0	0·8	0·7	4·3	4·0	2·1	2·1	1·9	2·0	3·7	3·7
Mixed	14·1	10·1	15·8	9·8	16·7	11·7	23·2	19·1	14·1	10·4	20·5	14·9	17·3	13·3
Total Holdings	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

Source: Farm Classification in England and Wales 1964 and 1967. M.A.F.F., H.M.S.O.

TABLE II.18

DISTRIBUTION OF MILK PRODUCERS AND MILK OUTPUT IN ENGLAND AND WALES

1966–67 to 1975–76

Size	*1966–67*		*1970–71*		*1975–76*	
	% of Producers	*Share of Production*	*% of Producers*	*Share of Production*	*% of Producers*	*Share of Production*
Very small	19·3	3·6	18·6	2·8	16·9	2·0
Small	27·2	13·7	23·1	9·3	20·3	6·6
Average	22·7	19·1	21·3	14·3	19·6	10·6
(sub total)	(69·3)	(36·4)	(63·0)	(26·4)	(56·8)	(19·2)
Substantial	22·6	33·7	23·8	28·3	23·9	23·0
Large	6·9	21·2	9·5	23·5	12·1	23·9
Very large	1·2	8·8	3·7	21·8	7·2	33·9
(sub total)	(30·7)	(63·6)	(37·0)	(73·6)	(43·2)	(80·8)
Grand total	100·0	100·0	100·0	100·0	100·0	100·0

Source: Structural Change in the dairy industry in England and Wales, an application of Markov Chain Analysis.

D. Colman and D. Leech, Manchester University, Dept. of Agricultural Economics, Bulletin No. 125/M.24.

(although this represents only 2,599 men in total) while the number of workers on sheep and general livestock rearing holdings fell. The number employed on intensive livestock holdings rose over the period—pigs and poultry increasing slightly more than predominantly poultry, and by 1968 these holdings employed 6·8 per cent of the regular agricultural work-force. The number employed on mixed holdings has fallen considerably over the period.

Further data on employment by type of farming is shown in Table II.20. This shows movements of workers between farm types between 1967 and 1968. The main reason for such movement is that the holding on which the worker is employed has changed its farming system sufficiently to have been reclassified. Actual movements of individual workers between farms are not recorded. Again there is evidence of a shift of emphasis from less to more specialised holdings, implying an increasing need for skilled men.

Changes in the numbers of workers on different types of holdings have followed, to some extent, the patterns of changes in the numbers of holdings themselves. This relationship can be considered in more detail by combining the two factors and looking at changes in the number of workers per holding. Table II.21 gives the number of workers per holding in each type and Table II.22 gives the average

TABLE II.19

CHANGES IN NUMBERS OF REGULAR WHOLE-TIME WORKERS IN ENGLAND AND WALES BY TYPE OF HOLDING

	1964		1967		1968		Change 1964–67		1967–68	
	No.	%	No.	%	No.	%	No.	%	No.	%
Specialist Dairy	35,751	10·4	33,167	12·5	27,782	11·2	− 2,584	− 7·22	−5,385	−16·2
Mainly Dairy	52,157	16·5	38,640	14·6	34,947	14·1	−13,517	− 25·9	−3,693	− 9·6
		26·9		27·1		25·3				
Cattle Rearing	4,707	1·5	3,705	1·4	6,304	2·5	− 1,002	−21·3	+ 2,599	+70·1
Sheep Rearing	5,976	1·9	3,350	1·3	2,518	1·0	− 2,626	−43·9	− 832	−24·8
General Livestock	18,117	5·7	17,402	6·6	13,410	5·4	− 715	− 3·9	− 3,992	−22·9
		9·1		9·3		8·9				
Predominantly Poultry	7,639	2·4	7,444	2·8	7,600	3·1	− 195	− 2·6	+ 156	+ 2·1
Pigs and Poultry	8,237	2·6	8,687	3·3	9,065	3·7	+ 450	+ 5·5	+ 378	+ 4·4
		5·0		6·1		6·8				
Cereals	18,558	5·9	21,414	8·1	24,005	9·7	+ 2,856	+15·4	+ 2,591	+12·1
Cereal Cropping	66,160	21·0	53,584	20·3	49,347	19·9	−12,576	−19·0	− 4,237	− 7·9
		26·9		28·4		29·6				
Vegetables	4,914	1·6	5,094	1·9	3,844	1·6	+ 180	+ 3·7	− 1,250	−24·5
Fruit	6,060	1·9	5,492	2·1	4,797	1·9	− 568	− 9·4	− 695	−12·7
General Horticulture	40,887	13·0	34,480	13·0	33,852	13·7	− 6,407	−15·7	− 628	− 1·8
		16·5		17·0		17·2				
Mixed	49,288	15·6	31,972	12·1	30,263	12·2	−17,316	−35·1	− 1,709	− 5·3
Total Full-time	315,451		264,431		247,734		−51,020	−16·2	−16,697	− 6·3

Sources: Farm Classification in England and Wales 1964 and 1967. M.A.F.F., H.M.S.O. M.A.F.F. Analysis of June Census data 1968.

JUNE 1967/JUNE 1968

TABLE II.20 MOVEMENT OF WORKER

	Specialist Dairy	*Mainly Dairy*	*Livestock Rearing and Fattening*			*Pre-domina Poult*
			Mostly Cattle	*Mostly Sheep*	*Cattle and Sheep*	
Specialist Dairy	32,866	4,481	218	16	46	
Mainly Dairy	5,907	32,512	196	78	187	
Mostly Cattle	120	181	4,036	13	560	
Mostly Sheep	10	92	9	4,048	570	
Cattle and Sheep	62	227	587	724	15,016	
Predominantly Poultry	3	3	7	4	2	9,32
Pigs and Poultry	24	137	40	3	57	49
Cropping Cereals	27	138	203	78	183	
General Cropping	33	312	67	33	146	
Predominantly Vegetables						
Predominantly Fruit		1				
General Horticulture	36	60	10	6	15	
Mixed	164	4,554	477	171	1,160	
Holdings under 275 s.m.d.s.	520	297	283	125	279	46
Holdings coming into the Census	79	53	18	14	42	18
TOTAL	39,851	43,048	6,151	5,313	18,363	10,70

Source: M.A.F.F. analysis of June Census data 1968.

number of holdings employing workers. The numbers per holding in Table II.22 are obviously higher than in Table II.21, although the pattern of change which emerges is similar in both cases. Again, the general trend is a decline in the number of workers but this is not so marked as in the case of the absolute number of workers, since in most cases the number of holdings has fallen as well.

Age Distribution of Workers by Different Farming Types

The unbalanced nature of the age structure of the agricultural labour force has already been mentioned, and the extent to which this occurs varies markedly

TWEEN FARMING TYPES—1967 TO 1968

(NO. OF WORKERS)

s and ultry	*Cropping Cereals*	*General Cropping*	*Pre-dominantly Vegetables*	*Pre-dominantly Fruit*	*General Horticulture*	*Mixed*	*Holdings under 275 s.m.d.s.*
22	65	45	1	14	43	234	573
127	323	296			136	3,314	276
28	254	95	20		19	391	373
7	96	31			1	139	71
31	367	87			46	897	201
426	13	38		1	113	15	223
3,668	98	201	19	12	84	565	208
163	18,179	3,026	7	1	98	1,237	157
310	2,237	64,510	235	10	2,124	2,155	401
		242	6,418		1,622	3	122
8		39		9,566	704		148
83	99	1,456	1,199	877	46,875	848	967
828	1,167	2,403	9	42	938	25,029	222
313	168	606	152	123	1,507	190	23,534
65	92	344	26	66	356	35	329
1,079	23,158	73,419	8,086	10,712	54,666	55,052	27,805

between different enterprises. The age structure of the work force employed by different types of farms for 1967 is given in Table II.23. The most unbalanced structure occurs in dairying where there is the highest number of young workers in relation to the 45–64 age group. This may be due to the nature of the work requiring younger men, and indicates that there is a wastage of skills caused by workers moving out of this sector. If the current age structure does not change (i.e. not allowing for any change in total number, or adjustment of the overall balance between age groups) then 57 per cent of regular workers now under 45 employed on dairying farms will have left by the time they reach 45. One other

TABLE II.21

NUMBER OF REGULAR WHOLE-TIME WORKERS PER HOLDING

	No. per Holding			*Change*	
	1964	*1967*	*1968*	*1964–67*	*1967–68*
Specialist Dairy	1·11	0·98	0·94	−0·13	−0·04
Mainly Dairy	1·58	1·52	1·47	−0·06	−0·05
Cattle Raising	1·40	1·31	1·24	−0·09	−0·07
Sheep Raising	0·93	0·61	0·66	−0·32	+0·05
General Livestock	1·34	1·08	1·02	−0·26	−0·06
Predominantly Poultry	1·52	2·10	2·31	+0·58	+0·21
Pigs and poultry	1·58	1·65	1·61	+0·07	−0·04
Cereals	2·92	2·48	2·43	−0·44	−0·05
General Cropping	3·53	3·12	3·10	−0·41	−0·02
Vegetables	2·57	2·60	2·67	+0·03	+0·07
Fruit	2·35	2·52	2·63	+0·17	+0·11
General Horticulture	3·70	3·10	3·08	−0·60	−0·02
Mixed	2·36	2·37	2·36	+0·01	−0·01
Total Full-time	2·00	1·79	1·80	−0·21	+0·01

Source: Farm Classification in England and Wales 1964 and 1967. M.A.F.F. Analysis of 1968 June Census data.

explanation of this age structure may be that a high proportion of this work force is composed of farmers' sons, since family farms are common in the dairy sector. In this case there will not be such a wastage of skills since the young worker eventually becomes a farmer. This age structure contrasts strongly with that on cropping holdings. Here there are only a small number of 'extra' men in the younger age ranges. Particularly on cereal farms where the number of workers is increasing, it looks as if few men will leave the industry prematurely. This may be because cereal enterprises are generally larger and employ more men, thus making possible the development of a better career structure. The other enterprise groups fall between these extremes, showing varying degrees of imbalance. The one exception to this is the predominantly fruit type group, which is the only one which has the appropriate age profile for a declining work force. There are fewer workers in the lower age range and the size of the labour force can fall with a minimum of wastage, i.e. adjustment could take place by those retiring at 65 not being fully replaced by new recruits.

TABLE II.22

CHANGES IN NUMBERS OF REGULAR WHOLE-TIME WORKERS PER HOLDING EMPLOYING WORKERS

	No. per Holding			*Change*	
	1964	*1967*	*1968*	*1964–67*	*1967–68*
Specialist Dairy	1·82	1·75	1·71	−0·07	−0·04
Mainly Dairy	2·27	2·27	2·21	—	−0·06
Cattle Rearing	1·95	2·05	1·99	+0·10	−0·06
Sheep Rearing	1·95	1·69	1·64	−0·26	−0·50
General Livestock	1·95	1·87	1·80	−0·08	−0·07
Predominantly Poultry	3·09	3·60	3·97	+0·51	+0·33
Pigs and Poultry	2·52	2·69	2·69	+0·17	—
Cereals	3·31	2·97	2·95	−0·34	−0·02
General Cropping	4·31	4·09	4·05	−0·22	−0·06
Vegetables	4·14	4·26	4·20	+0·12	−0·06
Fruit	4·00	4·34	4·38	+0·34	+0·04
General Horticulture	5·75	5·33	5·32	−0·42	−0·01
Mixed	3·01	3·14	3·10	+0·13	−0·04
Total Full-time	2·91	2·82	2·82	−0·90	—

Source: Farm Classification in England and Wales 1964 and 1967. M.A.F.F. Analysis of 1968 June Census data.

TABLE II.23

AGE DISTRIBUTION OF REGULAR WHOLE-TIME MALE WORKERS BY TYPE OF FARM 1967

		15–19 (1)	*20–24*	*25–34*	*35–44*	*45–64*	*65+* (2)	*Total*
Specialist Dairy	No.	6,884	5,251	6,781	5,295	6,204	500	30,715
	Av. No. per year	1,721	1,050	678	529	310	100	
Mainly Dairy	No.	6,594	5,660	7,821	7,090	8,441	710	36,316
	Av. No. per year	1,649	1,132	782	709	422	142	
Cattle	No.	402	398	657	749	1,193	126	3,525
	Av. No. per year	100	80	66	75	60	25	
Sheep	No.	487	499	713	544	788	86	3,117
	Av. No. per year	122	100	71	54	39	17	
General Livestock	No.	2,419	2,315	3,390	3,194	4,084	400	16,412
	Av. No. per year	605	465	339	319	234	80	
Predominantly Poultry	No.	1,269	859	1,231	1,138	1,338	101	5,936
	Av. No. per year	317	172	123	114	67	20	
Pigs and Poultry	No.	1,607	1,224	1,783	1,455	1,838	108	8,015
	Av. No. per year	402	245	178	145	92	22	
Cereals	No.	1,932	2,252	4,039	4,763	7,219	677	20,882
	Av. No. per year	483	450	404	476	361	135	
General Cropping	No.	5,075	5,179	9,388	12,061	18,533	1,528	51,764
	Av. No. per year	1,269	1,036	939	1,206	927	306	
Vegetables	No.	624	519	818	957	1,413	140	4,471
	Av. No. per year	156	104	82	96	71	28	
Fruit	No.	381	390	726	1,035	2,217	235	4,984
	Av. No. per year	95	78	73	103	111	47	
General Horticulture	No.	3,960	3,477	4,919	5,303	10,040	897	28,596
	Av. No. per year	990	695	492	530	502	179	
Mixed	No.	4,096	3,709	5,953	6,615	9,396	685	30,454
	Av. No. per year	1,024	742	595	661	470	137	
Total Full-time	No.	35,530	31,742	48,219	50,199	73,304	6,193	245,187
	Av. No. per year	8,883	6,348	4,822	5,020	3,655	1,239	

Source: Farm Classification in England and Wales 1967. (1) Width of age range assumed to be 4 years. (2) Width of age range assumed to be 5 years.
Note: 1967 is the latest available data classified in this way. Totals for 1968 are given in Table II.12.

III. PROJECTIONS

Projections are the extension of past experience to the future in a more or less mechanical way. They differ from forecasts in that they take no account of new factors in the system which may condition events. The simplest form of projection assumes that the rate of change observed in some past period will extend, unchanged, into the future. This becomes increasingly unreal as the projection period is extended. In the section which follows projections of various characteristics of the agricultural labour force are presented. In some cases more than one rate of change is applied to recent data to indicate a range of possibilities. More appropriate information would be needed to produce realistic forecasts and this possibility is reviewed in Section VI.

Future Total Labour Use

Agriculture's use of labour is determined by forces which can be discussed under three headings:

—factors determining the demand for the industry's products (i.e. food).
—the techniques available for production.
—the supply of labour, which is the extent to which workers may be attracted to or retained in agricultural employment by a given rate of relative earnings.

Thus an increase in the demand for food would tend to generate more farm employment; improvements in technology are likely to reduce labour requirements; a reduction in the industrial pressure of demand for labour is likely to increase the number of workers available to agriculture. The first two forces together determine the demand for labour and are generally referred to as 'push' factors in relation to the outmigration of farm labour; the third is the 'pull' of off-farm opportunities.

There is little doubt about the historical balance of these forces. The slow growth of demand for food has been much more than offset by the introduction of capital intensive techniques and the growing urban labour force has absorbed the surplus of agricultural workers. It would probably be agreed that, in the past, technological advance has been the most important of these variables, although it is difficult to measure. The prospects of forecasting agricultural labour requirements are thus limited, but the rate at which the work force changes is likely to have a considerable effect on its age structure and on the need for training.

To illustrate the impact of different rates of changes on the labour force, two different rates of decline in the number of whole-time regular male workers have been assumed. These have been chosen in the light of recent experience, detailed in Table III.1. Despite fluctuations from year to year, it is clear that the rate of decline has been more rapid in the latter half of the period. The average decline of

5·7 per cent from 1961–68 is less than the 6 per cent rate projected in the N.E.D.O. report, which assumed some acceleration in the rate of decline. This high rate of decline is unlikely to continue indefinitely and it is arguable that the adjustment of the 1960's has been a 'once-for-all' acceleration and that a slower rate of change is more likely in the longer run. On this basis a 3 per cent decline has been assumed as a low rate of change and 5½ per cent as a high rate.

Age Structure

One main question in planning for training is the future age structure of the labour force. Cohort analysis* would be useful in this connection, but the Agricultural Census has only recently begun to collect data which would enable

TABLE III.1

REGULAR WHOLE-TIME MALE WORKERS IN ENGLAND AND WALES 1955–68

	Total Number	*Change on Previous Year*	
		Number	*%*
1955	438,838	—	—
1956	417,579	−21,259	−4·84
1957	411,888	− 5,691	−1·36
1958	399,476	−12,412	−3·01
1959	393,112	− 6,364	−1·59
1960	377,611	−15,501	−3·94
1961	357,444	−20,167	−5·34
1962	341,312	−16,132	−4·51
1963	331,721	− 9,591	−2·81
1964	309,855	−21,872	−6·59
1965	289,641	−20,214	−6·52
1966	271,787	−17,854	−6·16
1967	258,009	−13,778	−5·07
1968	243,112	−14,897	−5·77
Average Annual Change	55/62	−13,932	−3·60
	61/68	−16,333	−5·70
	55/68	−15,056	−4·60

Source: Agricultural Census.

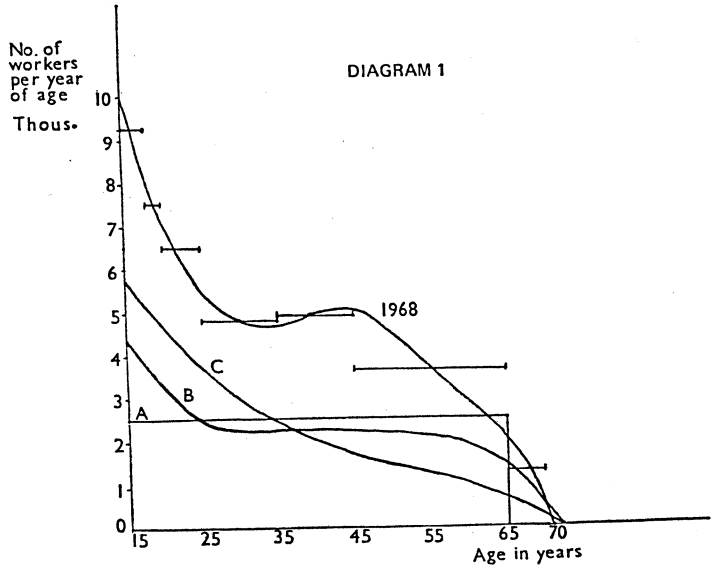
* Cohort analysis is a demographic technique which seeks to predict by studying the wastage rate from a particular group (or cohort) as it ages over time.

it to be used and it is necessary to allow data to accumulate for a year or two before meaningful results can be obtained. Even then it will be necessary to rely heavily on interpolation because some of the age groupings used in the Census are wide. At this stage it is, therefore, necessary to use the crude form of analysis shown in Diagram 1 which compares possible age distributions in 1981 with that of 1968. The distribution for 1968 is presented in the form of a smooth curve, the

DIAGRAM 1

AGE DISTRIBUTION OF LABOUR FORCE

1968 and 1981 (Projections on the basis of 5½ per cent p.a. decline)



A = projected 1981 labour, recruitment = retirement, no intermediate wastage.

B = projected 1981 labour, modest over-recruitment, wastage up to 30 years of age.

C = projected 1981 labour, considerable over-recruitment and continuous wastage.

area below represents the total number of whole-time regular male workers. The smoothing has been done by eye and the data on which the curve was based (Table II.11) is indicated by the short horizontal lines.

In the first case (diagram 1) the labour force in 1981 is assumed to be half that of 1968—this is arrived at by applying 5½ per cent compound rate of decline over 13 years. The three distributions for 1981 numbered A, B, C represent different assumptions about the age distribution of the same total labour force. Distribution

A is merely included as an extreme of stability showing recruitment equal to retirement with no wastage; it seems the least likely of the three possibilities. Distribution B shows a comparatively modest rate of over-recruitment which is mostly corrected by wastage before the age of 30, thereafter virtually complete stability is assumed. Distribution C bears the closest similarity to the 1968 distribution with considerable over-recruitment and wastage continuing throughout most age ranges. These three curves have been drawn without the 'hump' for the 35–44 age group (a consequence of heavy recruitment in the early 1950's) which is observed in 1968. By 1981 this group of workers will be 13 years older and the hump will have moved to the right to this extent. In other words the distributions shown all over-simplify by assuming that this bulge will be no longer detectable. Probably the final outcome will lie between distributions B and C; C is perhaps pessimistic in terms of over-recruitment, while B may be optimistic in terms of stability. These alternative distributions are worthy of separate consideration because differences between them affect optimum training strategy.

Stocks and Flows

The problem for decision is whether to give greater emphasis to the training of new entrants or of those already in the labour force. In other words should training be concentrated on the stock of workers already in agriculture or should attention be focussed mainly on the flow of new entrants? A major factor determining this issue is the wastage of trained workers associated with either strategy.

If a stable age structure has been reached by 1981, the training given then is not so likely to be lost to the industry. However, during the period 1967 to 1981, the movement from an unstable age structure to a stable one will involve a large number of young workers leaving the labour force. Greater immediate wastage will thus be involved in achieving a stable age structure than an unstable one. Three possible age distributions have been indicated in Diagram 1. These were based upon the $5\frac{1}{2}$ per cent rate of decline in the labour force mentioned earlier and are reproduced in diagram 2. The slower rate of decline is illustrated in diagram 3. Diagrams 2 and 3 enable measurement of total wastage over a number of years because they reflect the relationship between the flow of recruits over a number of years and the stock of workers retained in the industry in 1981.

The inflow of new entrants in 1968 is assumed to be 10,000 and this point is marked on the vertical axis which represents 1968. It is also assumed that all recruitment occurs at age 15. By 1981 recruitment will have fallen depending upon both the overall rate of decline and the transformation of the age structure. These rates are marked on a second vertical axis representing 1981. By comparing the recruitment rate in 1968 with the various rates in 1981 the way in which the rate must change from 1968 to 1981 is indicated. (By connecting the two points with

DIAGRAMS 2 & 3

IMPLICATIONS OF POSSIBLE AGE DISTRIBUTIONS IN 1981 ON WASTAGE OF NEW ENTRANTS 1968–1981

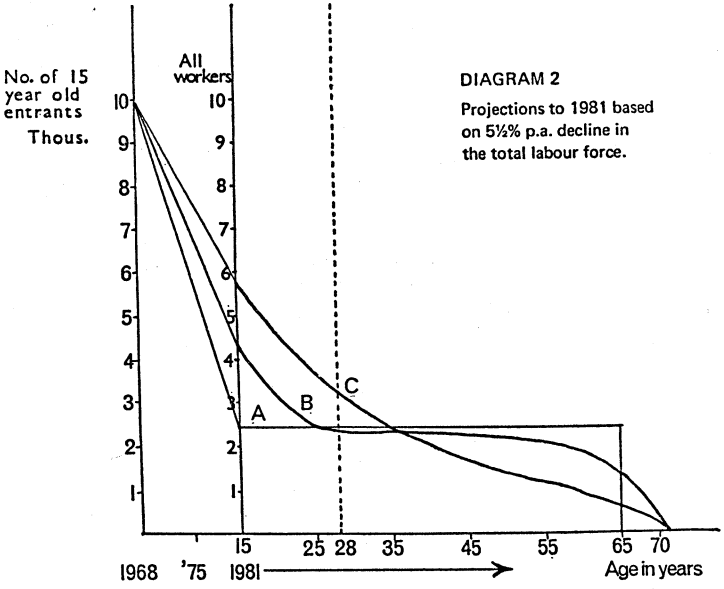


DIAGRAM 2

Projections to 1981 based on 5½% p.a. decline in the total labour force.

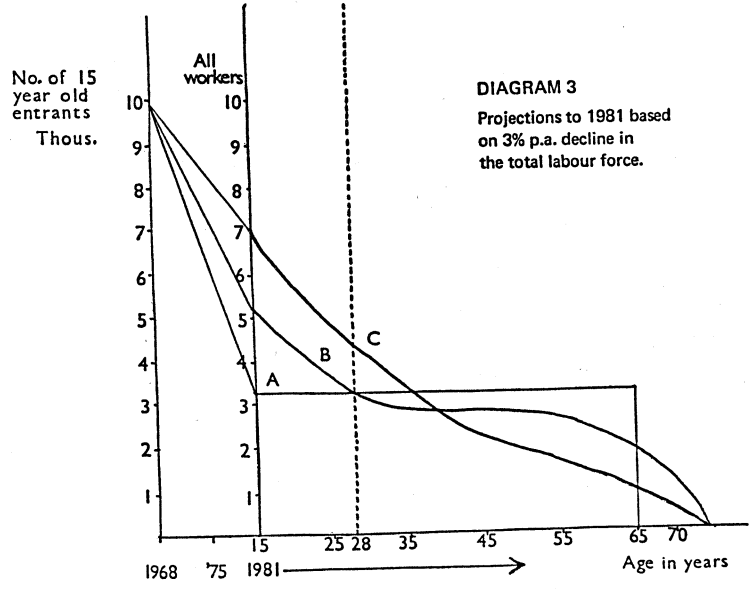


DIAGRAM 3

Projections to 1981 based on 3% p.a. decline in the total labour force.

a straight line we are assuming a constant absolute decline in the number of recruits each year. A further refinement would be to assume a constant percentage rate of decline or perhaps a rate derived from projections of the number of school-leavers. The straight line assumption is retained for the remainder of this section.) The areas beneath these lines represent the total number of recruits entering agriculture from 1968–81 on the various assumptions.

The number of these recruits retained in the industry in 1981 is measured as the area beneath each age distribution curve in 1981 falling between ages 15 and 28. Those workers over 28 in 1981 can similarly be estimated from the curve and wastage from this group, all of whom are assumed to have been in the labour force in 1968, can similarly be measured. Estimates of these numbers are set out in Table III.2 and the corresponding rates of wastage are calculated in Table III.3.

TABLE III.2

TOTAL NUMBERS IN 1968 AND NEW RECRUITS FROM 1968–81 RETAINED IN THE LABOUR FORCE IN 1981

thousands

Age Structure	*Total No. Retained from 1968–81*		*New Recruits 1968–81*			
			Total No.		*of which Retained in 1981*	
	3%	5½%	3%	5½%	3%	5½%
A	121·0	90·2	85·1	80·4	42·6	31·8
B	109·8	82·4	98·1	93·3	53·8	39·6
C	91·4	63·5	109·7	101·8	72·2	58·5

Source: Diagrams 2 and 3.

Note: The diagrams are not drawn according to a precise formula and the areas beneath the three age distribution curves in each diagram are thus only approximately equal. However, in estimating the numbers in the above table it was assumed that the total number in 1981 was the same for all three distributions in each diagram, viz. 122·8 in Diagram 2 and 163·6 in Diagram 3. These totals were then shared between the above categories in proportion to the relevant areas in the diagrams.

Total loss from the labour force (including retirement) between 1968 and 1981 increases in progression as the 1981 age structure changes from A to C. In the case of wastage of those entering the labour force between 1968 and 1981, the position

TABLE III.3

RATES OF WASTAGE OF ALL WORKERS IN 1968 AND ALL RECRUITS FROM 1968–81

	Wastage of All Workers Present in 1968		*Wastage of New Entrants 1968–81*	
With Annual Rate of Decline of	3%	5½%	3%	5½%
Age Structure in 1981				
A	50·2	62·9	49·9	60·4
B	54·8	66·1	45·2	57·6
C	62·4	74·9	34·2	42·5

Source: Diagrams 2 and 3.

Notes: The rates of wastage are expressed as a percentage of the relevant maximum possible values. That is wastage of new entrants is:

$$100 - \frac{\text{New Entrants 1968–81 still in labour force in 1981}}{\text{Total New Entrants 1968–81}} \times 100$$

and of workers present in 1968:

$$100 - \frac{\text{No. of 1968 workers still in labour force in 1981}}{\text{Total workers in 1968.}} \times 100$$

is reversed, with movement towards distribution A causing most loss, and movement towards distribution C significantly less since it is most similar to the distribution in 1968. The significance of this is in the allocation of training between new entrants and workers already in the labour force. If it seemed likely that by 1981 the number of young workers would drop considerably and that the age distribution would approximate to B, then an emphasis on new entrant training during the period of change would lead to a higher rate of training than if the age structure was not changing so much. If the overall rate of decline of the labour force was 5½ per cent, more than half of the new entrants between 1968 and 1981 would be likely to leave the industry within 13 years of joining it. Once a stable age distribution such as B had been reached, however, wastage of new entrants would be minimised.

This form of analysis could be applied with greater precision when a longer series of age data is available. It is emphasised that this example relates to only one phase of training, namely the initial development of training between now and 1981. When this development stage is complete, this type of analysis will be relevant to the question of retraining requirements.

Projections of Labour Use by Type of Farming

To give some indication of the future need for different kinds of skills, a set of projections of the future distribution of labour by type of farming has been made. But these should be regarded as only broadly indicative. This method involved projecting the proportion of holdings in each type group, based on the changes between 1964 and 1967. The proportions were projected on the basis of a constant percentage rate of change and any acceleration in the rates of increase were not taken into account. Once the percentage distributions of holdings by type of farming had been estimated, the numbers in each group could be determined. The total number of holdings in 1981 was derived by carrying forward projections of the number of holdings in 1978.* The number of full time holdings was estimated by assuming that holdings over 50 acres are equivalent to full-time holdings. The number of men per holding in each type group was projected to 1981 on the basis of 1964–67 changes. This figure was then applied to the estimated number of holdings to give the number of regular whole-time workers which might be expected in each group. The results are given in Table III.4.

The total number of regular workers in 1981 is estimated as 126,330, which is very close to the number predicted on the basis of past trends in the aggregate number of workers. The major changes are the increase in the proportion of workers on arable holdings (from 28·4 to 37·5 per cent of the total) and the decline in the number of workers on mixed farms (from 12·1 to 3·6 per cent). The intensive livestock category also show an increase. The shares of other categories are changed relatively little. Some changes are likely within these broad groups however. Specialist dairy holdings, for example, continue to increase at the expense of less specialised dairy holdings. The number of men employed per holding should continue to fall, indicating an increasing need for skilled men.

Inevitably, these results, while giving some indication of the future distribution of skills, have been affected by a few large, short-run changes during the base period. For instance, it is unlikely that the number of mainly dairy holdings and hence the number of workers on these holdings would fall as low as estimated. The predominantly poultry sector which was decreasing rapidly over the base period is a similar case. In order to turn these projections into forecasts, therefore, several qualifications are required. It would be necessary for example to consider possible changes in guaranteed prices, agricultural wages etc. and the effects these could have on the observed trends.

* By R. C. Hine in 'Farm Size Adjustment' Table 12.

TABLE III.4

PROJECTIONS OF FULL-TIME HOLDINGS AND WORKERS OF TYPE OF FARM TO 1981

	Holdings				*Workers per Holding*		*Workers*			
	1967 *No.* ('000)	%	1981 *No.* ('000)	%	1967	1981	1967 *No.* ('000)	%	1981 *No.* ('000)	%
Specialist Dairy	34·8	23·6	48·1	36·2	0·98	0·55	33·2	12·5	26·2	20·8
Mainly Dairy	25·5	17·3	4·3	3·2	1·52	1·27	38·6	14·6	5·4	4·3
	60·3	40·9	52·4	39·4			71·8	27·1	31·6	25·1
Cattle	2·8	1·9	1·6	1·2	1·31	0·96	3·7	1·4	1·5	1·2
Sheep	4·8	3·3	0·5	0·4	0·61	0·10	3·3	1·8	0·1	0·1
General Livestock	16·0	10·9	22·7	17·1	1·08	0·39	17·4	6·6	8·9	7·0
	23·6	16·1	24·8	18·7			24·4	9·8	10·5	8·3
Predominantly Poultry	3·5	2·4	0·3	0·2	2·10	9·05	7·4	2·8	2·7	2·1
Pigs and Poultry	5·2	3·6	6·6	5·0	1·65	2·03	8·7	3·3	13·4	10·6
	8·7	6·0	6·9	5·2			16·1	6·1	16·1	12·7

TABLE III.4—*continued*

PROJECTIONS OF FULL-TIME HOLDINGS AND WORKERS OF TYPE OF FARM TO 1981

	Holdings				*Workers per Holding*		*Workers*			
	1967 *No.* ('000)	%	1981 *No.* ('000)	%	1967	1981	1967 *No.* ('000)	%	1981 *No.* ('000)	%
Cereals	8·6	5·8	27·1	20·4	2·48	1·20	21·4	8·1	32·6	25·8
General Cropping	17·2	11·7	8·4	6·3	3·12	1·76	53·6	20·3	14·8	11·7
	25·8	17·5	35·5	26·7			75·0	28·4	47·4	37·5
Vegetables	2·0	1·4	0·7	0·5	2·60	2·83	5·1	1·9	2·0	1·6
Fruit	2·2	1·5	0·3	0·2	2·52	3·67	5·5	2·1	1·1	0·9
General Horticulture	11·1	7·5	10·4	7·8	3·10	1·25	34·5	13·0	13·0	10·3
	15·3	10·4	11·4	8·5			45·1	17·0	16·1	12·8
Mixed	13·5	9·2	1·9	1·4	2·37	2·39	32·0	12·1	4·55	3·6
TOTAL	147·3		132·9				264·4		126·33	

Source: Calculated from data in Tables II.13 and II.20.

IV. THE RATE OF RECRUITMENT

This section discusses the rate of recruitment of workers to agriculture, presents detailed estimates of the appropriateness of current levels of recruitment and outlines some factors which have had a bearing on it.

In discussing the age structure of the hired labour force it was pointed out that youths are over-represented by comparison with older workers. The importance of wastage of young workers from the hired labour force as the age structure changes over time was also indicated in Section III. This problem of over-recruitment in agriculture has been familiar for a long time. For example D. K. Britton and J. H. Smith published an article in 1947[12] in which they concluded that losses due to death would generate a requirement of less than 60 thousand in the under 21 age group, whereas there were 96 thousand in that category at that time. Furthermore, this calculation did not take account of the decline in the labour force which was to occur.

It may be asked whether the excessive rate of over-recruitment matters. Most farm work requires muscle but skill or experience may be an optional extra. Many young workers join agriculture as a first job to fill in time whilst waiting, for instance, to obtain a driving licence; other situations require their occupants to be older than fifteen. There will thus inevitably be a proportion of young entrants to the labour force each year who are merely looking for stop-gap employment and many of these become farm workers. It may be argued against this that the future need will be for an increasingly professional labour force which will be more stable. If a significant proportion of young workers receive training at the expense of one industry and some of them transfer these acquired skills to another industry this is wasteful from the point of view of those paying for the training. The industry losing workers will thus either make do with fewer trained workers than it needs, because it is unable to retain them or it must train more workers than it needs and accept that part of its expenditure will be wasted.

In an attempt to quantify some of these relationships the following section starts by extracting the concepts and expressing them algebraically. By definition, the stock of agricultural workers in any one year (S_{t+1}) must be equal to the stock which existed in the previous year (S_t), adjusted for any inflows or outflows which may have taken place during the year. In the agricultural industry, most entry to the industry takes place on, or soon after leaving school, so total inflows can be represented by the recruitment of young workers (E). There are likely to be several types of outflow however. Workers will retire from the industry (R); hired workers may leave the labour force to become farmers (F_R); and finally, there will be some movement to non-agricultural employment (W).

The relationship between these variables can be written as follows:

$$S_{t+1} - S_t = E - R - F_R - W.$$

It is apparent from this that the outflow from agriculture to employment in other sectors, or wastage of agricultural workers, can be estimated if values can be placed on the other variables involved.

The stock of workers in any year is given by data on the total agricultural work force. Recruitment of young workers can also be estimated from these data. Entry in any one year is taken as a half of the number of workers in the age range 15–17. A half of this age range is taken, rather than one third, since this is more consistent with the data on school leavers given in Table IV. 3.

There are no data available on the rate of retirement or the numbers of farmers recruited from the labour force, and so further assumptions have to be made in order to estimate these.

(*i*) all retirement is assumed to take place at the age of 65. There is some wastage from the labour force from age 45 onwards, but the amount occuring at this stage is small and the assumption of a constant number of workers per year of age in the range from 20 to 65 is a reasonable approximation. This allows total retirement in any one year to be calculated as 1/45 of the number in the 'over 20' range.

(*ii*) the rate of farmer replacement is unknown, but other studies[4] have suggested a period of 25 years as the length of a farming career, implying an annual replacement rate of 4 per cent. Although accurate information is not available, it is likely that many incoming farmers, including farmers' sons, were previously recorded among full-time hired workers. However, it could be argued that not all farmers are replaced from the ranks of the full-time hired workforce, so a replacement rate of $2\frac{1}{2}$ per cent per annum is also calculated as a lower limit to the flow from this source. Since no data are available on the number of farmers this is assumed to be the same as the number of full-time holdings.

Values for these variables from 1968, and the resulting estimates of wastage to other occupations are given in Table IV.1.

An 'excess recruitment ratio' is also calculated as the ratio of those going to non-agricultural employment to the number of recruits in the same year. This shows that in 1968, for example between 1·49 and 1·71 men left the industry for every new entrant. The ratio would have to be zero for recruitment to just provide sufficient replacements for those retiring and becoming farmers to maintain a declining workforce. Table IV.1 shows that wastage to non-agricultural employment has been experienced throughout the last decade or so, although wastage was lower in relation to recruitment during the late 50's than in the 60's. Recruitment to agriculture is declining faster than either retirements or the number needed to replace farmers, and thus wastage is being reduced gradually to the level which would be expected from the decline in the total labour force. This still indicates

TABLE IV.1

WASTAGE FROM THE AGRICULTURAL SECTOR, ENGLAND AND WALES, 1956–68

Year	(1) Total Reg. Whole-time Male Workers	(2) Annual Decline of Total Workers ($S_t - S_{t+1}$)	(3) Reg. Whole-time Male Under 18	(4) Estimated Recruitment (E) (3)÷2	(5) Reg. Whole-time Male over 20	(6) Estimated Retirement (R) (5)÷45	(7) No. of Full-time Holdings (thousand)	(8) Farmer Replacement Needs (F_R) at: A:4%	(9) Farmer Replacement Needs (F_R) at: B:2½%	(10) Estimated Wastage (W)=($S_t - S_{t+1}$)+($E - R - F_R$) On Assumption A	(11) Estimated Wastage (W)=($S_t - S_{t+1}$)+($E - R - F_R$) On Assumption B	(12) Excess Recruitment Ratios (10)÷(4)	(13) Excess Recruitment Ratios (11)÷(4)
1955	438,838		39,729	19,865	365,882	8,131							
1956	417,579	21,259	36,138	18,069	355,401	7,897	208*	8,360	5,200	22,837	25,997	1·26	1·44
1957	411,888	5,691	35,268	17,634	348,341	7,740	201	8,040	5,025	7,388	10,403	0·42	0·59
1958	399,476	12,412	34,108	17,054	337,044	7,489	194*	7,760	4,850	13,966	16,876	0·82	0·99
1959	393,112	6,364	36,522	18,261	329,415	7,320	188*	7,520	4,650	9,616	12,486	0·53	0·68
1960	377,611	15,501	34,900	17,450	317,182	7,048	182*	7,280	4,550	18,351	21,081	1·05	1·21
1961	357,444	20,167	32,008	16,004	300,334	6,674	177	7,080	4,425	22,043	24,698	1·38	1·54
1962	341,312	16,132	30,703	15,352	285,930	6,353	174	6,960	4,350	17,850	20,460	1·16	1·33
1963	331,721	9,591	31,578	15,739	275,660	6,125	160	6,400	4,000	12,577	14,977	0·80	0·95
1964	309,855	21,866	29,250	14,625	259,580	5,768	157	6,280	3,925	24,086	26,441	1·65	1·81
1965	289,641	20,214	24,976	12,488	244,888	5,441	156	6,240	3,900	20,694	23,034	1·66	1·84
1966	271,787	17,854	21,729	10,865	230,717	5,127	149	5,960	3,725	17,318	19,553	1·59	1·80
1967	258,009	13,778	20,024	10,012	220,779	4,906	147	5,880	3,675	12,783	14,988	1·28	1·50
1968	243,112	15,897	18,546	9,273	209,474	4,655	137	5,480	3,425	13,784	15,839	1·49	1·71

*Estimate. Source: Agricultural Census.

TABLE IV.2

WASTAGE FROM AGRICULTURE BY COUNTY 1967/68

	(1) Tot. Reg. whole-time male workers 1968	(2) Annual decline of Total workers ($S_t - S_{t+1}$) (1967/68)	(3) Reg. whole-time males under 18 1967	(4) Estimated recruitment (E) (3) ÷ 2	(5) Reg. whole-time males over 20	(6) Estimated retirement (R) (5) + 45	(7) No. of full-time holdings 1967	(8) Farmers Replacement Needs (F_R) A. assuming 4% p.a.	(9) Farmers Replacement Needs (F_R) B. assuming 2·5% p.a.	(10) Estimated Wastage (W) = ($S_t - S_{t+1}$) + ($E - R - F_R$) On assumption A	(11) Estimated Wastage (W) = ($S_t - S_{t+1}$) + ($E - R - F_R$) On assumption B	(12) Excess recruitment ratios (10) (4) ·	(13) Excess recruitment ratios (11) (4)
Bedford	3,302	124	210	105	2,961	66	1,249	50	31	113	132	1·08	1·26
Cambridge & Isle of Ely	6,750	452	348	174	6,152	137	2,951	118	74	371	415	2·13	2·39
Essex	9,385	627	473	237	8,553	190	3,261	130	82	544	592	2·30	2·50
Gt. London (Part)	455	61	37	19	398	9	151	6	4	65	67	3·42	3·53
Hertford	3,726	282	184	92	3,358	75	1,176	47	29	252	270	2·74	2·93
Hunts. and Peterb.	2,821	172	184	92	2,505	56	1,220	49	31	159	177	1·73	1·92
Lincoln (Hol.)	5,383	301	300	150	4,857	108	2,268	91	57	252	286	1·68	1·91
Norfolk	15,522	1,075	678	339	14,398	320	5,051	202	126	892	968	2·63	2·86
Suffolk	9,942	595	508	254	9,054	201	3,314	133	83	515	565	2·03	2·22
Berkshire	3,480	163	221	111	3,109	69	1,105	44	28	161	177	1·45	1·59
Buckingham	3,159	129	201	101	2,798	62	1,582	63	40	105	128	1·04	1·27
Gt. London (Part)	798	95	51	26	682	15	300	12	8	94	98	3·62	3·77
Hampshire	6,782	327	440	220	6,040	134	2,512	100	63	313	350	1·42	1·59
Isle of Wight	695	29	66	33	573	13	395	16	10	33	39	1·00	1·18
Kent	10,656	606	570	285	9,687	215	3,722	149	93	527	583	1·85	2·05
Oxford	3,057	150	189	95	2,716	60	1,393	56	35	129	150	1·36	1·58
Surrey	3,760	116	240	120	3,302	73	1,133	45	28	118	135	0·98	1·13
Sussex (Dart.)	3,976	355	223	112	3,571	79	1,841	74	46	314	342	2·80	3·05
Sussex (West)	4,412	111	243	122	3,978	88	1,313	53	33	92	112	0·75	0·92
Derby	3,266	215	480	240	2,503	56	3,052	122	76	277	323	1·15	1·35
Leicester	3,062	291	334	167	2,517	56	2,264	91	57	311	345	1·86	2·07
Lincoln (Kest.)	3,729	253	222	111	3,319	74	1,435	57	36	233	254	2·10	2·29
Lincoln (Lind.)	8,324	577	515	258	7,390	164	3,316	133	83	538	588	2·09	2·28
Northampton	3,168	279	247	124	2,780	62	1,749	70	44	271	297	2·19	2·40
Nottingham	4,139	1	402	201	3,452	77	1,954	78	49	47	76	0·23	0·38
Rutland	500	40	46	23	433	10	268	11	7	42	46	1·83	2·00

Chesire	5,567	537	698	349	4,457	99	3,994	160	100	627	687	1·80	1·97
Hereford	3,741	245	292	146	3,253	72	2,500	100	63	219	256	1·50	1·75
Shropshire	6,352	434	552	276	5,463	121	4,085	163	102	426	487	1·54	1·76
Stafford	4,390	399	517	259	3,592	80	3,687	147	92	431	486	1·66	1·88
Warwick	3,512	219	350	175	2,946	65	2,270	91	57	238	272	1·36	1·55
Worcester	4,110	265	325	163	3,580	80	2,414	97	60	251	288	1·54	1·77
Cornwall	5,071	312	513	257	4,154	92	5,432	217	136	260	341	1·01	1·33
Devon	8,129	507	813	407	6,770	150	8,375	335	209	429	555	1·05	1·36
Dorset	4,523	173	308	154	3,998	89	2,307	92	58	146	180	0·95	1·17
Gloucester	5,130	241	476	238	4,405	98	3,005	120	75	261	306	1·10	1·29
Somerset	7,199	409	692	346	6,043	134	5,489	220	137	401	484	1·16	1·40
Wiltshire	5,881	349	372	186	5,160	115	2,628	105	66	315	354	1·69	1·90
Cumberland	3,492	199	479	240	2,714	60	3,404	136	85	243	294	1·01	1·23
Durham	3,023	197	489	245	2,250	50	2,157	86	54	306	338	1·25	1·38
Northumberland	4,329	176	329	165	3,739	83	2,374	95	59	163	199	0·99	1·21
Westmoreland	1,276	92	158	79	1,018	23	1,591	64	40	84	108	1·06	1·37
Yorks. N. Rid.	6,519	307	565	283	5,505	122	4,987	199	125	269	343	0·95	1·21
Lancashire	7,441	623	1,189	595	5,629	125	6,713	269	168	824	925	1·38	1·55
Yorks. E. Rid.	6,295	491	480	240	5,462	121	3,115	125	78	485	532	2·02	2·22
Yorks, W. Rid.	8,646	508	1,162	581	6,731	150	6,656	266	166	673	773	1·16	1·33
Anglesey	615	46	80	40	509	11	787	31	20	44	55	1·10	1·38
Brecon	694	49	64	32	566	13	1,238	50	31	18	37	0·56	1·16
Caernarven	858	74	77	39	715	16	1,090	44	27	53	70	1·36	1·79
Cardigan	1,282	53	127	64	1,065	24	1,905	76	48	17	45	0·27	0·70
Carmarthen	1,611	13	188	94	1,251	28	3,172	127	79	–49	–1	–0·52	–0·01
Denbigh	1,462	126	189	95	1,156	26	2,016	81	50	114	145	1.20	1·53
Flint	1,023	78	124	62	808	18	1,019	41	25	81	97	1·31	1·56
Glamorgan	1,259	81	204	102	947	21	1,507	60	38	102	124	1·00	1·22
Merioneth	490	14	32	16	415	9	877	35	22	–14	–1	–0·88	–0·06
Monmouth	1,180	29	170	35	919	20	1,407	56	35	38	59	0·45	0·69
Montgomery	1,337	103	153	77	1,099	24	2,024	81	51	75	105	0·97	1·36
Pembroke	1,777	67	182	91	1,427	32	2,166	87	54	39	72	0·43	0·79
Radnor	649	56	63	32	541	12	969	39	24	37	52	1·16	1·63

Source: Agricultural Census.

excess recruitment however and, from past experience, there is little cause to expect a shortage of recruits from agriculture.

Similar calculations of the numbers moving to non-agricultural employment have been made on a county basis for 1967–68 and are shown in Table IV.2. The excess recruitment ratio varies considerably between counties although only two have negative ratios indicating no wastage at all. For the majority of counties (34 an assumption A and 33 an assumption B) the ratio fell between 1 and 2, indicating that 1–2 workers left for non-agricultural employment for each new entrant.

This definition of excess-recruitment, may be inappropriate in a situation where total labour use is declining over a long period. Perhaps the 'appropriate level of recruitment' then would be that which provides just enough workers to replace losses from the mature work force at some future date. In order to give precision to such a concept it would be necessary to know how many jobs there would be at the chosen future date.

The E.D.C. for agriculture predicts a decline of 150 thousand workers over the five years from 1967–72 from the U.K. This includes a net decline of 113 thousand whole-time workers in England and Wales leaving 160 thousand whole-time regular male workers in 1972. The young workers, aged 15 recruited in 1967, will be ready to join the mature work-force, at age 20 in 1972. But the replacement need for 160 thousand workers will be 2–4 thousand (as calculated above) whereas the volume of recruitment in 1967 was 9,000.

The extent to which excess recruitment occurs because it is providing stop-gap employment for boys leaving school can be gauged from Table IV.3. If this were the main explanation of over-recruitment then it would be reasonable to expect that the proportion of school leavers entering agricultural employment would be constant, or would bear a stable relationship to agriculture's share of the total work-force (or rural population). These two series are compared in Table IV.3. Comparison of the first two columns of this table shows that a declining proportion of school-leavers is entering employment, indicating an increasing tendency for children to go on to further education rather than joining the labour force directly. The total number of school-leavers reached a peak in 1963, indicating the end of the post-war 'baby boom'. The third column shows that the number entering agriculture and horticulture has declined more steeply than total school-leavers entering employment; agriculture's 'share' of school-leavers declined from more than 7 per cent to less than 5 per cent over the decade. Comparison of the number of entrants with the figures for the total workforce given in column 4 shows that despite this decline in the numbers recruited agriculture has consistently recruited more school-leavers than its 'share' of total employment would suggest. This appears to support the 'stop-gap' explanation of excess recruitment.

TABLE IV.3

BOY SCHOOL LEAVERS ENTERING AGRICULTURE AND HORTICULTURE—ENGLAND AND WALES

Year	(1) *Total Number of School leavers aged 15–17 (thousands)*	(2) *Total Number of School leavers aged 15–17 entering employment*	(3) *Numbers entering Agriculture and Horticulture*	(4) *Percentage of school leavers aged 15–17 entering Agriculture and Horticulture (3) as % of (2)*	(5) *Agricultural * Employment as % of Total*
1959	275·4	262,415	19,229	7·3	3·2
1960	288·5	254,095	18,101	7·1	3·0
1961	277·1	269,531	16,214	6·0	2·9
1962	302·9	299,796	17,940	6·0	2·7
1963	323·4	271,370	18,388	6·8	2·6
1964	269·8	280,325	14,233	5·1	2·4
1965	301·6	259,238	14,293	5·5	2·3
1966	281·8	240,350	11,664	4·9	2·1
1967	268·3	224,889	11,463	5·1	2·0
1968	266·6†	227,342	11,033	4·9	—

Note: The series in column (1) is not consistent with that in column (2) because of differences in source.

* Agriculture in Great Britain.

† Estimate.

Sources: (1) D.E.S. Statistics of Education, 1967. Vol. 1.
(2) & (3) D.E.P.
(5) Annual Abstract of Statistics and Agricultural Statistics.

It is also likely that a number of youngsters choose farm work, for whatever reason, as their first job and then find that they must seek employment which is more highly paid in their early twenties. Earnings of youths in agriculture are compared with those in manual employment in Table IV.4. It is notable that agricultural youths are roughly as highly paid as other youths whilst adult workers in agriculture are substantially worse off—nevertheless the relative earnings position of agricultural youths has worsened over the period. Since adults have, roughly speaking, maintained their position in relation to manual workers outside agriculture, the shift in relative position arises mainly because of an improvement in the situation of non-agricultural youths.

This analysis has focussed on relative earnings as one explanatory variable. An event which will shift the basis of the present relationships will be the introduction of a wages structure—a possibility which has been under discussion for several years. By rewarding skill and experience, the wages structure may shift the balance of relative wages in favour of mature workers at the expense of youths. Thus, a wages structure may, by improving identifiable career prospects in the industry, reduce the dependence of agriculture on young workers and also reduce the rate of wastage of those it does recruit.

Another event which will affect the situation is the raising of the school leaving age. The date at which this is to occur has recently been advanced, yet again, to 1974. The projections of the Department of Education and Science, relying upon the demographic forecasts of the Registrar-General, indicate that this will have the effect, in one year, of halving the number of school leavers[13]. This will have an obvious impact upon agricultural recruitment since agriculture takes a relatively high proportion of the total number of school leavers. Raising the school leaving age may also have the longer-term effect of increasing the number of young people choosing further education after leaving school, an acceleration of the development which is already under way.

It seems unlikely that prospective changes in the agricultural labour market will make a very great difference to the present level of over-recruitment in agriculture. The introduction of a wages structure will probably only affect relative earnings of youths and mature workers slowly as the system becomes operative. The raising of the school-leaving age will have a sharp effect in one year but the industry will probably adapt to this fairly quickly. Thus, in choosing training objectives, allowance must be made for a substantial proportion of new entrants subsequently to leave.

> 'The subsequent history of those surplus young workers, and their reasons for leaving agriculture, are subjects for further study. Much available experience and training would appear to be going to waste so far as the agricultural industry is concerned.'

These conclusions, reached by Britton and Smith in 1947, have become more relevant with the introduction of training schemes than they were then. There is an added incentive to seek a solution to this problem from the fact that the industry is now paying for formal training of these young workers.

Finally training itself might affect the rate of wastage of young workers. No work has been done on the effect of training on the mobility of hired workers but it could act in one of two ways. The acquisition of skills could mean that the worker would find more satisfaction from his work and thus be encouraged to stay. This would be reinforced if a trained man could command a higher salary in agriculture, as might be possible if the proposed wages structure was introduced. On the other hand, training may enable the worker to acquire skills which could be useful in

TABLE IV.4

RELATIVE EARNINGS IN AGRICULTURE AND INDUSTRY

Year	Weekly Earnings				Relative Earnings			
	In Agriculture		In Industry		Agr. Youths / Agr. Adults	Agr. Youths / Ind. Youths	Ind. Youths / Ind. Adults	Agr. Adults / Ind. Adults
	Youths	Adults	Youths	Adults				
	(1)	(2)	(3)	(4)	(1) as % (2)	(1) as % (3)	(3) as % (4)	(2) as % (4)
	s. d.	s. d.	s. d.	s. d.				
1959	119 7	199 7	118 11	271 1	49·9	100·6	43·9	73·6
1960	125 2	209 3	126 3	290 8	59·8	99·1	43·4	72·0
1961	131 9	219 7	137 6	306 10	60·0	95·8	44·8	71·6
1962	139 1	229 11	143 2	317 3	60·5	97·2	45·1	72·5
1963	144 7	245 5	146 4	334 11	58·9	98·8	43·7	73·3
1964	152 0	255 9	161 1	362 2	59·4	94·4	44·5	70·6
1965	164 10	276 1	176 1	391 9	59·7	93·1	45·0	70·5
1966	175 4	291 0	193 0	406 1	60·3	90·8	47·5	71·7
1967	180 3	299 3	201 8	427 6	60·2	89·4	47·2	70·0

Sources: For Agriculture the M.A.F.F. Wages and Employment Enquiry.
For Industry the series relating to Manual Workers published in the Annual Abstract of Statistics.

other industries and may increase the likelihood of movement out of the industry. The effect of training on mobility of hired workers is worthy of research effort.

The case of farmers' sons is a little different from that of other hired workers. Once they have made the decision to enter agriculture they will be less likely to leave, since they might have the prospect of becoming farmers. Increased training is unlikely to have a significant effect on their decisions and they may therefore be the part of the labour force which would benefit most from training, particularly if they were given training relevant to their future role as farmers.

V. TRAINING OBJECTIVES

It is possible to separate three levels of decision making at which training objectives may be considered. There is first of all general manpower policy, where a training board has limited influence, but which will nevertheless affect its activities; secondly there is training policy, where a board is virtually autonomous and this may be considered either at the aggregate level or at the sectoral level. The extent to which the foregoing analysis contributes to formulation of objectives at each level may now be assessed.

Manpower Policy

Manpower policy is diffuse since many different official bodies contribute to its formulation. The effect of the introduction of a wages structure on training requirements has already been mentioned, as has the raising of the school leaving age. Other developments include the changing structure of agriculture. Training activities are also influenced by change in the total size and in the structure of the labour force. As hired workers become less important numerically than self-employed, there will be increasing pressure to extend the training of the self-employed part of the labour force. Moreover since it is very difficult to distinguish between education and training, both processes may be involved. Many farmers' sons will, in fact, be trained as farm workers before they become farmers, so that the training of farmers-to-be is already happening. Early recognition of this would enable attention to be focussed upon aspects of farm management, such as labour management, which may well be critical if technical skills are to be fully used.

It is difficult to formulate quantitative proposals about training without some means of identifying the trained individual. A start has been made in this direction in defining training as distinct from technical education[14]. A further step would be the introduction of some form of proficiency testing which would enable identification of the individual trained. Such a scheme would suffer the normal limitations of examination systems, in that it would only measure performance on a particular day as opposed to the ability to perform continually at a given level of skill. Certificates of proficiency would become obsolete as skill requirements changed. It would be possible for the individual to collect a large number of such certificates and earnings could be directly related to the number of relevant certificates held by the individual employee. The introduction of such a system would require the co-operation of parties to the Agricultural Wages Board, and it would be complicated to introduce. It does seem, however, that the Training Board may have a part to play, through proficiency testing, in the operation of a wages structure. At the same time this would contribute to an evaluation of the Boards' own performance.

It has been shown earlier that wastage occurs in association with a substantial rate of over-recruitment. Fewer workers would have to be trained if this wastage did not occur. Wastage could be reduced by the provision of quantitative careers guidance material aimed at reducing the level of recruitment to agriculture. It is notable that the current Central Youth Employment Executive booklet No. 85 on Careers in Agriculture and Horticulture contains barely any statistics as to the number of workers in agriculture and the way in which these are changing. This exclusion of quantitative information may be a policy decision and, indeed, may be appropriate in many industries where recruitment might be adversely affected by lack of confidence. However, in the case of agriculture sound advice on careers cannot ignore the rapidly changing labour market. Careers booklets should contain a brief quantitative assessment of the declining total number of job opportunities in agriculture. This could be related to a review of the increasing importance of the skilled operative in the industry. If this is beyond the terms of reference of the Board then the Youth Employment Service might be invited to consider this proposal.

Training Objectives*

The main training objectives might be expressed in terms of a proportion of trained workers in the industry at some future date. The evidence presented so far suggests one or two general propositions. Judging from past trends the smaller the number of workers the more important it will be that some of them should be trained. This follows from the fact that most of the labour moving out of agriculture is replaced by capital in one form or another. However, simple measurement of the amount of capital per man is only broadly indicative of the way in which training requirements are changing and does not indicate the absolute level of training required. Perhaps this major overall objective could be set in the light of information feedback from the industry. A decision as to the proportion of trained workers needed might be made from the expressed demands of farmers.

The case for training expenditure rests on the economic return from having a more highly trained labour force. In practice this is difficult to measure, as it involves assessment of the effect of training upon agricultural efficiency, the long run benefits of which would partly be enjoyed by consumers who would be able to purchase their food requirements more cheaply. One partial measure of these benefits would be the effect of training upon the earnings of the individual receiving it. Although this is to take a narrow view of the benefits of training, these benefits are measurable. This proposition implies that the case for expansion

* This section, and indeed, most of this report makes no distinction between training organised by the Training Board and that provided by Local Authorities. This distinction is undoubtedly important to the Board in planning its operations but it is essentially an organisational rather than an economic issue.

of training can only be based on the demand indicated by the industry. Forward projections of this demand will be more realistically done starting from firm knowledge of the present level of demand. Given a decision, as to the general level of training activity, there are a number of strategic decisions to be taken. These include:

—how long will training last?
—at what age should training be given?
—how should training develop from the present situation to the chosen objective?

Several factors will affect the useful life of a particular training activity for the individual worker. The length of time spent on the job for which he has been trained, the rate at which techniques are changing in that particular enterprise and hence the rate at which the demand for workers of that type is changing, will affect the useful life of an acquired skill. Most of the data reviewed in this report gives little guidance on this aspect of training. In particular there is no data on the extent to which workers move from job to job, requiring acquisition of new skills.

The problem of over-recruitment suggests that wastage of trained workers would be minimised by spreading an individual's training over a number of years and perhaps by reserving more expensive forms of training for workers who have been in the industry for some time. This clearly poses problems. Once a worker has been trained it is clearly desirable that his services should be retained. as long as his skills are relevant. Yet there is little that can be done in this respect. One possibility is to select those for training on the basis of their expected length of career in agriculture. Another would be to become involved directly in careers guidance.

Sectoral Training Targets

It has already been pointed out that the biggest employer among the type groups is arable farming, accounting for nearly one-third of all regular whole-time workers. This proportion is likely to increase further in future which indicates an expanding need for training in the skills necessary to this type of farming. Two other factors emphasise this need. Within the arable group there is a trend towards specialised cereal production which seems likely to continue and this may well increase the demand for skilled men. Secondly the number of men employed per holding has been falling over the past few years. To the extent that this continues, it must mean that the remaining men need to be more skilled, since use of machinery is continually increasing.

The next largest employer is the dairying sector which accounts for about a quarter of the hired regular labour force. This proportion has remained static over the past few years while there has been a big increase of the more specialised

holdings. In this case a swing from mainly to predominantly dairying seems likely to continue, creating a need for highly skilled men capable of carrying a high degree of responsibility. Dairying and arable production seems to be the two types of farming requiring the most training effort, with arable farming being the bigger employer of the two. One important difference between them which could affect training targets is that dairying has a very high proportion of youths in relation to adult workers. There may therefore be a high rate of wastage of trained men if emphasis is placed on new entrant training. Arable farming has a far more balanced age structure suggesting that new entrant training would involve less wastage.

Both intensive and extensive livestock rearing employ a relatively small number of men at present. Technical developments in the former, particularly in the poultry industry mean that a high level of skill will be required and the level of employment in this sector has been increasing slightly over recent years. The number of extensive livestock rearing holdings has been falling in recent years and so has the number of men they employ.

Horticultural holdings employ 17 per cent of agriculture's labour force. This has been declining slightly in recent years, although the position is complicated by horticulture's extensive employment of women and seasonal workers. This sector is also more diverse in its production than other farming types and employs much highly complex and very specialised machinery and plant. More detailed research would therefore be needed to assess training requirements for horticulture.

VI. INFORMATION NEEDS

Many gaps in knowledge have been indicated at various points in this report. This section seeks to emphasise the main areas where research is needed. A brief survey of the published literature on agricultural manpower is included as Appendix I: it is notable that only 3 of the 27 titles listed bear any relation to training. Information needs are discussed under two headings depending on whether they relate to overall training policy or to policy implementation.

Training Policy

The main issue under this heading is how much training is needed in agriculture. To establish the existence of a level of demand for training it is necessary to measure the impact of training on productivity and incomes. This task is by no means easy. There are three possible direct beneficiaries of training, the farmer, the consumer (or the tax payer) and the farm worker. An attempt to establish how benefits from training were distributed amongst these groups would be essential in determining the appropriate rate of expenditure by each on training. This problem might be tackled by use of cost-benefit analysis, which may have some value to the Training Board in providing a quantitative basis for discussion as to the total amount to be spent on training and the politically more sensitive issue of providing the funds. The information needed to apply this technique rigorously is formidable. Detailed earnings data and information on the effect of training on the supply of farm products would be the main gaps in present knowledge. If a serious attempt is to be made to apply cost-benefit analysis then the recommendation that the Board should collect its own data is re-inforced. This would be an essentially long-term project.

Training Implementation

The main shortcomings of the data stem from the fact that no officially collected information identifies the individual worker in relation to the business unit. This basic problem could be surmounted to some extent by careful interpretation of the more detailed analysis available, but even here the scope is limited. The M.A.F.F. June Census collects a large volume of data relating to holdings and the workers on them but it is difficult to use this to measure the behaviour of individuals in terms of movements within agriculture and between agriculture and other industries. Sections III and IV have shown how data might be used to build up a broad picture of labour movements, but even for this purpose the data are inadequate and, for more detailed planning, would be of limited use.

There are many ways in which the analysis of existing data could be extended. It would be possible to extract more detailed classifications of workers by size of

labour group and type of farm, which would give a more accurate picture of the present need for skilled operatives. Age data could be associated with such an analysis to give an indication of the extent to which workers can expect promotion on the farm they are working on, without having to move to another employer. The analysis would include in this case, 13 farming type groups classified by 6 labour size groups, sub-divided on the basis of number of youths. The data could also be presented at the county level. It would be possible to obtain special analysis of particular enterprises recorded in the Census. The acreage of a crop or number of a particular class of livestock, cross-classified against labour size groups would provide a useful indication of the potential demand for training in particular enterprises. Such an analysis might prove extremely valuable to the Board where it needed to estimate quantitatively the strength of demand for training in a new context, for example where a new technique was spreading rapidly through a particular enterprise.

The Agricultural Census also collects data on the machinery present on farms but it might prove more difficult to relate this to the other information collected through the Census. The Machinery Census is completed by a one-third sample of farms each year and the machines to which the Census refers are changed from year to year. Since this exercise is conducted separately from the main Census with the main data collected in June, it would be difficult to relate the presence of a particular machine on holdings to the amount of labour present at the same time. On the other hand there are various Horticultural Census relating to glasshouses, orchard fruit and vegetable which provide detailed coverage of these enterprises, although again there might be some difficulty in relating it to labour use and other aspects of the farm business. There has also been a special enquiry into irrigation equipment which would be relevant if training in handling this equipment was envisaged. Direct discussion with the M.A.F.F. Census Branch would undoubtedly yield further suggestions.

The Agricultural Census is useful as a source of descriptive data indicating the way in which agriculture is changing but because the unit of enumeration is the agricultural holding, the census indicates very little as to the way in which individual workers move from farm to farm. It reveals only the net changes in the various categories of worker between censuses. This lack of data relating to the career of the individual worker is the most serious gap in information from the point of view of planning training. There are two ways in which the situation could be improved, one of which involves an increase in the use of farm surveys and the other, which would yield valuable data in the long run, would involve the Training Board in establishing its own data bank.

The survey at present under consideration by the E.D.C. for Agriculture's Manpower Working Group is likely to be useful as an indicator of training needs. If successful this survey will yield an indication of the present need for skills in

agriculture. It suffers from the limitation that it is a postal survey and the response may be disappointing both numerically and qualitatively. Also distribution of the questionnaires to farmers in the first instance for redistribution to their workers may bring problems. One major limitation of such an exercise is the difficulty of repeating the survey, with an identical sample, at a later date. However such a survey would be a useful starting point in collecting information relating to training requirements.

The possibility of establishing a data bank is worthy of serious consideration. The bank could be set up by collecting a completed questionnaire from every worker undergoing a Training Board course, which would include details of his age, length of time in agriculture, previous training and, rate of earnings. This information would then be coded against the individual's name and when he attended another Training Board course it should be possible to link up the earlier history with the more recent data. Thus, information about those receiving training would accumulate automatically. It would be possible this way to build up a large volume of essential planning data. It would be necessary, to follow-up a sample of those who were initially registered in the data bank but who did not subsequently undertake further training. This could be done by post, or perhaps by field officers. It would also be appropriate to obtain some information from those who had left the industry, as to their reasons for leaving and whether the skills they acquired in agriculture were of any use in their new employment.

One of the main problems with this course of action would be that of identifying the individual worker. Some American work along these lines has used the system of social security now applied to farm workers. The analogue of this is the National Insurance Number, however, since these numbers are to be changed in 1970 it would be appropriate to begin the system in that year. (Social security records are worthy of further consideration as a source of data in their own right).

Establishment of such a system would be an effective way for the Training Board to provide itself with data for assessing the effect of its own activities upon the fortunes of the individual worker and hence on the industry as a whole. It could give a measure of the effect of training upon individual mobility and would show how training affected earnings. These two factors are the most important gaps in information uncovered in this report.

With regard to future training needs, particularly in the long run, the rate of change of technology becomes a major factor. The evolution and adoption of labour saving techniques has been particularly important in bringing about changes in skill requirements of the industry in the past two decades. It is nevertheless extremely difficult to forecast the rate at which new techniques will be made available and this is an area of uncertainty which is not easily amenable to conventional research techniques. It is comparatively easy to identify technical bottlenecks—areas where labour use is currently high—but it is much more difficult to

predict when these technical problems will be solved and, more important, how fast the new techniques provided will spread through the industry. Any attempt to forecast the technical rate of change must start from a firm base of knowledge of the technical and economic situation of the industry. It may be that such a forecasting exercise could be carried out by a small team of highly informed experts meeting intermittently to review technical progress. Perhaps the Board's own field officers could be organised to provide enough 'feed back' on technical change in the industry to give an adequate basis for policy decisions at least in the short-run. Once a new technique has been introduced its rate of spread can be predicted comparatively simply; it is the identification of new techniques that poses the problem.

NUMBERED REFERENCES IN TEXT

1. 'Agriculture's Import Saving Role'. Economic Development Committee for Agriculture. N.E.D.C. 1968.
2. Statement by the Minister of Agriculture, 16th November 1968.
3. Report from the Select Committee on Agriculture. Session 1968–69. H.M.S.O.
4. 'Farm Size Adjustment'. A.A.U. Bulletin No. 6, 1968.
5. 'Policy Directions for U.S. Agriculture'. Marion Clawson.
6. 'Capital and Labour in British Agriculture'. G. H. Peters. Farm Economist, Vol. XI, No. 6, 1967.
7. 'I.C.O.R.'s What do they mean'. M. C. Whitby. Farm Economist, Vol. XI, No. 8, 1969.
8. 'The Future Pattern of Farming'. Professor D. K. Britton. Farmer and Stock-breeder. 26th September—17th October 1967.
9. 'The Changing Structure of the Agricultural Labour Force in England and Wales', M.A.F.F. 1967.
10. Minutes of Evidence of the Select Committee on Agriculture, 10th April 1968. H.M.S.O.
11. 'Structural Change in the Dairy Industry in England and Wales'. D. Colman and D. Leech. Dept. of Agricultural Economics, University of Manchester, Bulletin 125/M24, 1969.
12. 'Farm Labour: Problems of Age Composition and Recruitment', D. K. Britton and J. H. Smith. Farm Economist, Vol. V. No. 11, 1947.
13. Department of Education and Science: Statistics of Education, Schools, 1967, Volume 1.
14. Agricultural, Horticultural and Forestry Industry Training Board, 'Report on the Relationship of the A.H. and F.T.B. with Local Education Authorities'. November 1968.
15. 'Rate of Adoption of New Techniques', D. Sheppard, N.A.A.S. Quarterly Review, Vol. XIV, Summer 1963. No. 60.

APPENDIX I

RESEARCH ON AGRICULTURE'S USE OF LABOUR

There are many different types of study which have some bearing upon the general question of agriculture's use of labour and the demand for training. These studies separate fairly clearly into five types. Those dealing with the problem from a sociological point of view; structural descriptive studies; econometric analyses; policy documents of various kinds and a limited number of studies more directly relevant to the demand for training. Research at present known to be in progress is also listed but it is emphasised that this is by no means a complete list of current research.

Sociological Studies

Hirsch[1] published a broad survey of the sociological aspects of rural depopulation in 1951. Cowie and Giles have also studied this problem during the late 50's and produced two reports of particular relevance[2], [3]. Black carried out a survey of farm labour in Yorkshire in 1967[4]. More recently Nalson[5] has published a major study on the mobility of farm families which derives from a detailed field survey in an upland area. Miss Gasson has also shed some light on the aspirations of school leavers in rural areas in her recently published survey[6]. There is some recent American work on the possible relationship between mobility and training. Micha Gisser[7] has made estimates which indicate that training raises the productivity and wages of those who receive it. His work also indicates that the better employment possibilities for more trained workers will cause more outmigration. Work under way by N. Ventris at Newcastle and G. Houston at Glasgow on the mobility of young people in agriculture is also relevant.

Descriptive Structural Studies

Smith and Britton in 1947[8] published a study of farm labour based on the Population Census and the Agricultural Census in 1947. They have been followed by a number of studies[9], [10], [11], [12] based on the same sources of data. W. J. Thomas has produced a survey which deals with problems of the agricultural labour force in an international context[13]. A recent study of labour-mobility by the Department of Agriculture for Scotland[14] has produced some useful survey data from a large sample. On the structural side a large sample survey has recently been carried out by the Agricultural Adjustment Unit and similar surveys are being undertaken by the Universities of Exeter and Nottingham.

Econometric Studies

Econometric studies have been published in this country by Cowling, Metcalf and Tyler. The Cowling/Metcalfe studies[15], [16], [17] underlie the projections discussed in the recent report from the Economic Development Committee for agriculture. Tyler's[18] work derives from production function analysis, treating the agricultural industry as a firm and analysing its use of resources in the light of relevant economic theory. Metcalfe and Cowling have analysed the labour market in agriculture in terms of supply and demand, using such variables as the level of industrial unemployment, relative wages, etc. Generally studies of this kind are limited by the quality of the data they are obliged to rely on and these particular studies are restricted in their long-run applicability for this reason.

Policy Documents

A number of different policy making bodies have an interest in agricultural manpower. The National Economic Development Office has now produced a series of reports containing projections of manpower, usually for about 5 years ahead[19], [20], [21]. The National Plan[22] contains similar projections. The Ministry of Agriculture has prepared a report on agriculture's use of labour for the Select Committee on Agriculture[23]. The Prices and Incomes Board has now reported twice on agricultural workers' pay[24], [25]. These reports are all of interest in that they contain a good deal of factual information.

Training Demand

Requirements for trained personnel in agriculture have received least attention of all in this country. One report only has focussed on this problem and this was published by Shephard during the late 1950's. He assessed the views of those in agriculture on the value of formal training and published his results in 1962[26]. Cowie and Giles also referred incidentally to the need for training and have presented some evidence[3] on the strength of training demand. One final study which is worth mentioning in this context is the O.E.C.D. report 'Training Agriculture for Tomorrow's Agriculture'[27]. This report deals in great detail with the demand for training in France and Sweden and is therefore only of methodological interest in this country. In the U.K. Lightly[18] has published the results of a survey of the subsequent careers of Farm Institute diplomates.

NUMBERED REFERENCES IN APPENDIX I

1. G. P. Hirsch. Migration from the land in England and Wales. Farm Economist, Vol. VI, No. 9, 1951.

2. W. J. G. Cowie and A. K. Giles. An Inquiry into Reasons for the Drift from the Land. Bristol University, December 1957.

3. A. K. Giles and W. J. G. Cowie. The Farm Worker: His Training, Pay and Status. February 1964.

4. M. Black. Agricultural Labour in an Expanding Economy. J.A.E. Vol. XIX, No. 1, 1968.

5. J. S. N. Nalson. Mobility of Farm Families. Manchester University Press, 1968.

6. Ruth Gasson. Occupations Chosen by the Sons of Farmers. *Journ. Agric. Economics*, Vol. XIX, No. 3, September 1968.

7. M. Gisser. 'Schooling and the Farm Problem'. *Econometrica*, Vol. 33, No. 3, 1965.

8. D. K. Britton and J. H. Smith. Farm Labour: Problems of Age Composition and Recruitment. *Farm Economist*, Vol. V, No. 11, 1947.

9. G. P. Hirsch. Labour on the Land in England and Wales. *Farm Economist*. Vol. VIII, No. 2, 1955.

10. J. R. Bellerby. The Distribution of Manpower in Agriculture and Industry 1851–1951. *Farm Economist*, Vol. IX, No. 1, 1958.

11. M. C. Whitby. Mobility and Training in Agriculture, *Westminster Bank Review*, August 1967.

12. C. E. Heath and M. C. Whitby. Labour Use and Structural Change. N.E.D.O. Symposium on Agricultural Manpower, December 1968.

13. W. J. Thomas. The Changing Structure of Agriculture's Labour Force. Proceedings of the Twelfth International Conference of Agricultural Economists, 1964.

14. F. Mackintosh. A Survey of Workers Leaving Scottish Farms. *Scottish Agricultural Economics*, Vol. XIX, 1969.

15. K. Cowling and D. Metcalf. Labour Transfer from Agriculture. A Regional Analysis. Manchester School of Economics and Social Studies, 1968.

16. D. Metcalf. The Determinants of the Earnings Gap in Agriculture, England and Wales, 1948–63. *Farm Economist*, Vol. XI, No. 2, 1966.

17. K. Cowling. Agricultural Labour Supply and the Business Cycle: Some Regional Predictions. N.E.D.O. Symposium on Agricultural Manpower, December 1968.

18. G. J. Tyler. Factors Affecting the Growth of Productivity in United Kingdom Agriculture, 1948–65. N.E.D.O. Symposium on Agricultural Manpower. December 1968.

19. National Economic Development Council. The Growth of the U.K. Economy to 1966. H.M.S.O. 1963.

20. E.D.C. for Agriculture. Manpower in the Industry. H.M.S.O. October 1967.

21. E.D.C. for Agriculture. Agriculture's Import Saving Role.

22. Department of Economic Affairs. The National Plan. H.M.S.O. September 1965.

23. M.A.F.F. The Availability of Labour in Agriculture. Memorandum to the Select Committee on Agriculture, 10th April 1968.

24. National Board for Prices and Incomes. Pay of Workers in Agriculture in England and Wales. Report No. 25, H.M.S.O. January 1967.

25. National Board for Prices and Incomes. Pay of Workers in Agriculture in England and Wales. Report No. 101, H.M.S.O. January 1969.

26. D. Sheppard. The Views of Farmers, Farm Workers and Ex-Students on the Value of Formal Training for Farmers. *Agricultural Progress*, Vol. 37, 1962.

27. O.E.C.D. Trained Manpower for Tomorrow's Agriculture. Documentation in Food and Agriculture 80, Paris 1966.

28. J. G. T. Lightley. The Role of the Farm Institute, *Agricultural Progress*, Vol. 43, 1968.

Printed by Hindson & Andrew Reid Ltd. Newcastle upon Tyne W149

LIST OF PUBLICATIONS

Bulletins

	Price	*Postage & Packing*
1. Farmers and the Common Market .. .. .. B. H. Davey and S. J. Rogers	5s 0d	6d
2. Efficiency in Agriculture and the Share of the Domestic Market .. .. J. Ashton	5s 0d	6d
3. Trends in Agriculture: A Review of Current and Future Developments .. .. B. H. Davey	5s 0d	6d
4. Elements of Agricultural Adjustment .. .. .. S. J. Rogers	5s 0d	6d
5. Farming Systems and the Common Market .. .. C. S. Barnard, H. Casey and B. H. Davey	10s 0d	1s 0d
6. Farm Size Adjustment .. .. A Workshop Report	5s 0d	6d
7. Capital Adjustment in Agriculture.. .. .. .. A Workshop Report	5s 0d	6d
8. A Discussion of Current Policies and the Future Structure of Agriculture .. .. A Symposium	10s 0d	1s 0d
9. Stability and the Beef Market .. .. A Unit Study	10s 0d	1s 0d
10. The Changing Agricultural Labour Force .. .. Implications for Training C. E. Heath and M. C. Whitby	10s 0d	1s 0d
11. A Comparison of Structural Policies in Agriculture .. S. H. Lane	10s 0d	1s 0d
12. Economic Aspects of the Dairy Manufacturing Industry A Workshop Report	10s 0d	1s 0d

Books

Economic Change and Agriculture .. .. .. Edited by J. Ashton and S. J. Rogers (Oliver and Boyd 1967)	42s 0d	4s 6d
Research, Education and Extensions in Agriculture .. Edited by J. Ashton and R. F. Lord (Oliver and Boyd 1968)	30s 0d	3s 0d

Technical Papers

	Price	*Postage & Packing*
TP1A. Organisational Possibilities in Farming and Types of Business Organisation .. .. by M. A. Gregory and I. S. Stephenson	3s 0d	6d
TP2. Life Assurance in the Farming Business .. .. by Leo Ménage	3s 0d	6d
TP3. Management Techniques for Reducing Costs or Increasing Revenues .. .. by R. W. Helme	3s 0d	6d
TP4A. Current Taxation and Some Future Possibilities .. by R. L. Herdman and I. Weir	3s 0d	6d
TP5. Insurance in Agriculture .. .. by C. T. Jameson and J. Rawlings	3s 0d	6d
TP6. Budgeting and Budgetary Control .. .. .. by J. C. Cole	3s 0d	6d
TP7A. Estate Duty and Capital Gains Tax in Agriculture .. by C. Townsend	3s 0d	6d
TP8. Modern Management .. .. by J. R. Gemmell	3s 0d	6d
TP9. Agricultural Co-operative Activities and Case Histories of Co-operatives .. .. by D. G. Bailey and E. T. Gibbons	3s 0d	6d
TP10. Human Factors in Agriculture .. .. .. by Dr. J. D. G. Troup	3s 0d	6d
TP11. The Role of Ergonomics in the Efficient Utilization of Agricultural Labour .. .. by J. Matthews	3s 0d	6d
TP12. Efficient Labour Organisation .. .. by N. W. Dilke	3s 0d	6d
TP13. Labour Relations in Farming .. .. by D. Hodsdon and J. N. Merridew	3s 0d	6d

Details of the publication programme and a subscription scheme can be obtained from the Administrative Officer of the Unit.

March 1970