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FARM POPULATION AND LAND DEVELOPMENT IN WESTERN AUSTRALIA

By J. S. Nalson, Research Economist, John Thomson Economics Centre and A. W. Hodgstrom, Rural Economist, Department of Agriculture

In a recent survey of farms and unallocated land throughout the State the authors looked at the area of land suitable for farming in Western Australia and the number of people available to farm the land in the next 10 to 15 years. A brief outline of the results of this study and some implications of these results are given in this article.

ALMOST two-thirds of the farming population in the agricultural area of Western Australia live on farms of 1,000 acres or more in size. The total area of these farms amounts to more than 90 per cent. of the agricultural land of the State and contains more than 90 per cent. of its cleared area. The farms are essentially family farms, with three-quarters of the permanent labour force made up of farmers and members of their families.

By 1974, the existing family labour force will have expanded by 22 per cent., if farmers’ sons continue to enter agriculture at the present rate, and allowing for deaths and retirements. In addition, people from outside agriculture and outside the State will also have taken up farms.

There are two sources of land for the extra farm population which could arise during the next 10 years. These are the uncleared areas on existing farms and the land suitable for farming but not yet alienated. The estimates suggest that a further 5.8 million acres will have been cleared on existing farms in 10 years time. A further 5.9 million acres is expected to be cleared on new farms allocated during the next 10 years, if the present rate of alienation continues and if the new farms are cleared at the minimum rate set down for conditional purchase leases. Thus, by 1974, there could be an increase of 49 per cent. in the area of cleared land on farms of 1,000 acres and over, compared with the present area of 23.8 million acres.

At first glance, it would appear that a 49 per cent. increase in the area of cleared land should be adequate for the needs of the expected 22 per cent. increase in farm family workers and still cater for some people from outside agriculture and outside the State. However, the adequacy of supply of the land which could be available in 10 years time does not depend solely, or even mainly, upon its absolute quantity. Rather it depends upon its productivity relative to the demands made upon it by existing and potential farmers. The magnitude of these demands will be governed by the number of people who enter Western Australian agriculture from within the present farming population and from outside it, together with the level of living these people will attempt to maintain, or improve upon.
AGRICULTURAL AREAS OF WESTERN AUSTRALIA

A. OVER 25" RAINFALL AREA
B. SHEEP AND CEREALS AREA
C. EASTERN AGRICULTURAL AREA
D. NORTHERN AGRICULTURAL AREA
E. LIGHT LAND DEVELOPMENT AREA

Approximate boundary of potential agricultural land.

THE FIVE MAJOR FARMING REGIONS MENTIONED IN THIS REPORT, AND THE APPROXIMATE BOUNDARY OF AGRICULTURAL LAND
To assess the adequacy of the supply of available land it is necessary to consider three factors:

- The physical productivity of the land which could be cleared over the next 10 years compared with that of existing cleared land.
- The effect of changes in the rate of entry into farming of farmers’ sons and people from outside the State and outside farming, on the potential number of farmers and family workers.
- The changes in labour productivity and in the size of farm businesses which may be necessary to maintain the economic viability of farms.

**Physical Productivity of Available Land**

More than 12 million acres, or about 60 per cent. of the uncleared land on and off farms, is in areas with less than 14 inches of annual rainfall. Although considered suitable for agriculture, this land needs to be farmed in large areas to compensate for low and unreliable rainfall. Rates of stocking are low on unimproved pasture, and improved pasture is not feasible. Income from stock forms a small proportion of total income. Areas on the eastern margin of present development are less productive per acre than where farming was abandoned in the depression of the 1930’s. Considerable advances in techniques have been made since then, including better crop varieties and, more especially, the use of large machinery enabling much increased areas of crop to be handled by the same labour force.

The available land in the higher rainfall regions is all of lower quality than that already alienated. Consequently, farms will need to be larger than the existing farms, if the same level of income is to be obtained. This applies to the coastal sands of the South-West; to the Esperance-Ravensthorpe area; and in particular to the West Midlands, which has about half a million acres of deep sands not considered to be usable at present. Research is being undertaken into the problems of the deep sands, however, and, once suitable pasture species can be grown, it should be possible to allocate this land for farming.

The sizes of farms into which land is currently being allocated take some account of the variation in productivity per acre in the different regions. In the areas of heaviest rainfall, new farms may be no more than 1,000 acres, but on the eastern margin of cultivation blocks are between 4,000 and 5,000 acres.

There are about 11.8 million acres of unalienated land suitable for agriculture. Of this, more than 7 million acres are in areas with a rainfall of less than 14 inches. If the present rate of alienation continues, all the available land will have been allocated in about 10 years. By then there will be an extra 3,000 farms, provided the
sizes of the blocks are similar to those into which new land is currently being divided in the different regions.

The Eastern Wheatbelt contains 51 per cent. of the unallocated land and the Light Land Development areas contain 31 per cent. But these two areas have only 27 per cent. and 6 per cent. respectively of the present total of family workers on farms of 1,000 acres and over, and only 22 per cent. and 5 per cent. respectively of farmers’ sons not yet of working age. By contrast, the Sheep and Cereals Region has only 2 per cent. of the unallocated land but has 48 per cent. of all the family workers and 49 per cent. of all the sons not yet of working age. Clearly, farmers and their sons from existing farms will need to transfer to other regions, if they wish to take advantage of the availability of new farms.

**Entry Into Farming**

The size of the future farm population depends upon:

- The size of the present population.
- The number of deaths which will occur in that population over a given time period.
- The rate of entry of existing farmers’ sons into farming.
- The rate of entry into West Australian farming by people from outside farming and outside the State.
- The rate of egress from farming of farmers and family workers part way through their careers.

Apart from any movement out of farming before the age of retirement, the further reduction in the numbers of people who are at present on farms, or obtaining a living from them, is a function of the age distribution of the farm population and its death rate. By 1974, the present number of male family workers on farms of 1,000 acres and over will have been reduced by death and retirement to 81 per cent. To arrive at the potential number of male family workers which could arise from the existing population we must add to this residual the number of farmers’ sons and partners’ sons who are at present under working age, but who may enter farming by 1974.

Currently, 90 per cent. of farmers’ sons of working age, from farms of 1,000 acres or over, are either working on their parents’ farms or farming elsewhere on their own account. If the same proportion is assumed to enter farming in the next 10 years, the number of male family workers arising from the existing population would rise to 122 per cent. of that in 1963-64. Thus, changes in the proportion of sons entering farming would have considerable effect on the size of the future population of male family workers. The population of sons from existing farms who will have attained working age by 1974 will amount to 56 per cent. of the residual population of male family workers.

Twenty-six per cent. of farmers on farms of 1,000 acres and over who started to farm during the last 15 years have originated either outside of farming or from outside the State. In the more closely settled Sheep and Cereals Region, the proportion is less than 10 per cent. But if this Region is excluded, the figure is 40 per cent. for the rest of the State.

If outsiders were to take up 40 per cent. of the 3,000 new farms which could become available in the next 10 years, the number of farm families entering these from outside agriculture or outside the State would be 1,200. In addition, there could be about 550 families from outside Western Australian agriculture entering existing farms.
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Thus, the additional farms available for members of Western Australian farm families would be 1,250. The number required to maintain the same intake of farmers sons and the same average number of family workers per farm as at present would be 2,100. Consequently for Western Australian farm people there would be a deficit of over 800 farms. Expressed another way, the land available for new farms would be used up in seven years, if present rates of entry of people into farming were to continue and the average number of family workers per farm were to remain as at present. For farms to be taken up at this rate there would be required a 70 per cent. increase in the annual amount of land alienated.

Lowering the rates of entry into farming of either farmers' sons or of outsiders would reduce the potential requirement for new farms, as would an increase in the average number of family workers per farm.

There is enough land to provide members of Western Australian farm families with new farms for about 12 years if all outsiders were excluded from taking up new land. Conversely, the rate of entry of farmers' sons into farming would have to drop from 90 per cent. to 77 per cent. if outsiders continued to enter farming in the next 10 years at the same rate as in the past 15 years and if the number of family workers per farm were not to increase.

Another solution to meet the potential shortage of farms in 10 years is for more family workers to work and share in the proceeds of existing farms. It is unlikely that this will occur merely by family workers replacing employed workers. Three quarters of the farms of more than 1,000 acres do not employ permanent workers. Consequently either the absolute level of employment (family plus non-family) would have to rise, or some farmers' sons would have to leave their parents' farms and work for other farmers. The one alternative would involve a reversal in the trends of agricultural employment and the other a marked change in the pattern of employment of sons of farmers, few of whom work for other farmers at present.

Irrespective of who obtains the new farms, in about 10 years all the land suitable for farming will have been alienated, if the present rates of allocation are maintained. Unless existing farms are subdivided the supply of farms for the rising generation will then depend directly on the rate of death and retirement from farming of the current generation, and on the degree to which the "outsiders" take over existing farms. In 10 years time, the proportion of farmers' sons entering farming will have to fall to 56 per cent., if the proportion of family workers per farm does not rise, and if "outsiders" take up to 10 per cent. of the existing farms which become available through family changes. Sooner or later, farmers must face the situation in which collectively they have more sons available for agriculture than can be absorbed without increasing the average number of family workers per farm or without sub-dividing farms.

**Costs and Prices, Sizes of Farm Business and Labour Productivity**

The availability of improved pastures and changes in stock management have made possible considerable increases in stocking rates in some areas. It can be argued that the increase in intensity of operation which is now possible could enable more people to earn an equivalent living from a given area of land and thus compensate for the falling supply of new farms which will develop over the next 10 years. This is a vain hope.

Only given the most optimistic assumptions would there be no need for new
farms for extra family workers in the next 10 years. These assumptions are that price-cost ratios for agriculture do not deteriorate; that all the extra family workers entering farming displace an equal number of employed workers; that family workers surplus to the requirements of their parents' farms in one region will work for farmers in regions where agriculture can be intensified, and that the potential increase in sheep stocking rates is fully realised.

During the past 10 years, one factor affecting the maintenance and improvement of farm incomes in Western Australia has been the increase of more than 50 per cent. in labour efficiency, as measured by sheep per man and crop acreages per man. At least 50 per cent. more new farms than are likely to be available from unalienated land would be required for all surplus family workers from existing farms in 10 years time if:

- Another 50 per cent. increase in labour efficiency occurred in regions where either sheep stocking rates or areas of crop could increase.
- The size of the non-family labour force remained the same.
- No new farms were allocated to outsiders.
- Sheep numbers on farms of over 1,000 acres increased by 176 per cent.

On more modest assumptions, about 2,200 farms would be needed for surplus family members from existing farms, if efficiency standards of 1,500-2,000 sheep per man and 650-800 acres of crop per man were achieved, and if some non-family labour were replaced by some of the surplus family members. This would leave about 800, or 27 per cent. of the new farms for outsiders.

The number of new farms available has been calculated at 3,000 on the basis of present sizes of blocks being allocated in the different regions. If a marked fall in the price of wheat occurred without compensating falls in the cost of inputs either the maximum size of block allocated on the eastern margin may need to be raised above the present limit of 5,000 acres, or it may be prudent not to allocate...
This study raises policy issues in relation to both people and land. The human issues are concerned with the future rate of entry into farming of farmers' sons and people from outside of agriculture and outside the State. The land issues are concerned with the release of new land and the research needs for optimum utilisation of cleared land on both existing and new farms.

Entry Into Farming of Farmers' Sons

It appears unlikely that Western Australian agriculture can continue for more than a few years to absorb 90 per cent. of farmers' sons, without a detrimental effect on the standard of living of farm families. Consequently, farmers and policy makers should consider now, ways of reducing the number of farmers' sons who would otherwise enter farming in the future.

Already the number of sons is more than can be catered for by the potential supply of new farms. Thus, in the short run, more sons will need to take up occupations other than farming.

A farmers' son is under the influence of the farming environment from an early age. The need for his assistance at peak periods of work usually ensures that before he leaves school he knows much more about farming than any other occupation. Parents too, are likely to encourage his interest in farming, both from a desire for an heir to property and the need for reliable assistance with the work of the farm. Efforts to guide a proportion of farmers' sons away from participation in farming as future owner-operators will therefore need the approval of many farmers. They will have to be directed through informal channels of education as well as through the schools, and they will have to indicate alternative occupations acceptable to both sons and parents.

Paradoxically, a reduction in the number of farmers' sons entering farming may be brought about by policies designed to increase the supply of reliable employed labour. If reliable hired labour were available it would be less necessary for a farmers' son to participate in farm work before he left school or to leave school at an early age. With a longer period of formal education, and more time to engage in interests other than farming, farmers' sons would be more likely to obtain the training for and interest in, other occupations. Farmers too would be more likely to sympathise with their sons' interests in other careers, if reliable hired help were available.

Informal education media, such as the Junior Farmers movement and the Farm Management Advisory Services, could play a part in bringing the issues involved before farmers and their sons. In addition, through their contact with other occupations related to farming, workers in these advisory fields should indicate to farmers and their sons the opportunities available to serve agriculture as professional agriculturalists, such as agricultural scientists, farm advisers and rural educational and social workers.

Changes will be necessary also in formal educational policy for rural children. Teaching standards and breadth of curricula in country schools need to be similar to those available in the city, if farmers' sons are to have equal opportunities for training in occupations other than farming, and further provision may have to be made for farmers' sons in those private schools which specialise in training for the professions.

For the long run, the question arises of the need for farmers to have so many sons, once there are no longer any new farms available and the opportunities diminish for increasing the total area of existing land as far east as the line used in this study for the calculation of available land. In either case this would result in fewer than 3,000 new farms.

POLICY RECOMMENDATIONS

The survey reported in this article was conducted by the John Thompson Agricultural Economics Centre, with the co-operation of the Department of Agriculture. These policy recommendations are made by the authors on the basis of their study and do not necessarily represent the policy of the Department of Agriculture or the University of Western Australia.
farms and their intensity of operation. Family limitation is entirely a personal matter but farmers, collectively, should be made aware that, if they want their sons to follow them in the occupation of farming, the fewer sons they have, the greater the chance that farms of adequate size will be available for those sons.

Entry of Outsiders Into Farming

The analyses presented in this study indicate the effect which the proportion of "outsiders" entering farming has upon the number of new farms available for Western Australian farmers. Yet there is no published record of the proportion of new farms which have been allocated to "outsiders" in recent years. Such a record is needed as a guide for future policy. There is need also for a continuous assessment of changes in the proportion of "outside" applicants and in the proportion of farms allocated to them. Restrictions on the entry of outsiders into new farms might be of advantage to Western Australian farmers, but the net effect on the State could only be gauged if details were available on the uptake of existing farms by outsiders and the prices paid.

Recent allegations of speculation in conditional purchase leaseholds have assumed that outsiders are the speculators. Because of the importance to Government of a full knowledge of the changes occurring, the Lands and Survey Department should undertake continuous investigation into land ownership, transfers and values. This information is basic for sound policy in land administration.

The Release of New Land

The maximum area of new agricultural land which can be allocated to one person is 5,000 acres, but many existing farms in the marginal areas are larger than this. The less reliable the rainfall, the larger the area of land needed to make a living comparable with that obtained by other farmers. Farmers on the eastern margin who had the larger areas of land would be able to withstand a fall in product prices better than those in the same area who had smaller farms. The survey indicates that in the Eastern Wheatbelt, farms of 8,000 acres and more have an average labour efficiency of 820 acres of crop per man compared with 650 acres of crop per man for farms between 3,000 and 8,000 acres.

In surveying land for farm settlement on the eastern margin, account should be taken of possible falls in the price of wheat. Farm sizes should be large enough for farmers to take advantage of the economies of scale. This suggests farms larger than the present maximum allocated area of 5,000 acres. If this became policy, it might be possible to release more land for settlement than has been indicated in this study. The straight line from the mouth of the Murchison River to Israelite Bay is only an approximation of the likely boundary of development. Moving the line 2.2 miles east would add a million acres of land to the total available with about the same yield potential. At 10,000 acres per farm this would provide another 100 farms and increase the potential acreage of crop by at least 250,000 acres.

An ecological study of the area to the east and west of the present limit of development should be undertaken to relate size and type of natural vegetation on the unalienated land with that in uncleared areas where crop yields are known. Given a more flexible policy on farm size, it would then be appropriate to determine, for different areas along the line, the minimum sizes of farm necessary to withstand likely changes in the price of wheat.

Only one third of the land still available for eventual release is situated in areas with a rainfall of more than 14 inches. It is these areas which have the greatest potential for increases in stocking rates and therefore for intensive sheep farming. There is a continuing demand from within and without Western Australian agriculture for new farms and their supply is likely to run out in less than 10 years. Yet the release of an extra one million acres in the Esperance Region, equivalent to 500 farms, or 20 per cent. of the new land available in higher rainfall areas, is dependent on the policies of a private company. Agreements by Government cannot be repudiated, but at least a review of their terms should be considered, in order to ensure that development and release of the land to intending settlers is related to the needs of settlement, rather than to the maximisation of capital gain.
Research Needs

There is a need for increased and more concentrated agricultural research into the successful utilisation of land in the lower rainfall areas. The concentration of agricultural research upon the utilisation of third class soils in high rainfall areas has been very successful and has contributed to the rapid allocation and development of those areas. Now the emphasis should be placed on research into utilisation of the soils in the lower rainfall districts. These areas have not the potential for high yields per acre but there are millions of acres available. This suggests that research effort could be directed profitably towards methods of increasing productivity per man and per unit of capital in these areas.

A severe restriction on the area of crop which can be grown in the Eastern Wheatbelt is the amount which can be sown in the limited period when soil and climatic factors are favourable for the traditional methods of ploughing, cultivation for weed control and sowing. Greater research effort is warranted into means of minimising these operations. There should also be long term assessments of the yields which could be obtained from continuous cropping or from a shifting cultivation on a long fallow system, with and without livestock.

The experimental work carried out in the lower rainfall areas with the use of nitrogenous fertilisers has indicated that the most important factor limiting the response to nitrogen is the unreliability of the rainfall. Yet it is in these areas that there has been little success in the widespread establishment of leguminous plants as an alternative source of nitrogen. If a leguminous plant could be grown which was useless as a feed for livestock, but gave some added nitrogen to a following crop, it may be worth while developing a system of husbandry based on large areas of crop per farm at low yields alternating with a resting phase devoted to such a legume.

In view of the importance of some source of nitrogen for crop production, further experimental work with nitrogenous fertilisers would seem to be justified in these areas. Such work should focus on the interaction of time and rate of application with placement methods and type of fertiliser for different soil types, total rainfalls, rainfall distributions, effective precipitations, and opening and closing rains. The object would be to assess the feasibility of obtaining sufficient marginal increases in yield beyond those necessary to meet the cost of the added fertiliser. At present prices a net gain of half a bushel per acre would represent an extra £900 per annum to a farmer operating a 10,000 acre property with 3,000 acres cropped each year.

In ten years time the cleared area on farms of 1,000 acres and more could be nearly 36 million acres. The increase in land could require a further 7.1 million sheep if existing stocking rates were maintained. If potential stocking rates were to be realised, the required number of sheep could be more than 29 million. Natural increase in sheep numbers may keep pace with the increase in cleared area, at existing stocking rates. But it will be impossible to achieve the 176 per cent potential increase without considerable improvement in the supply of sheep. This supply could come from increased fertility, decreased lamb mortality, longer working life for ewes and wethers and importations from outside the State. Research is needed into all these sources which combine physiological, managerial and economic considerations.

Analyses of the future possibilities for the further development of Western Australian agriculture needs knowledge of technical production possibilities, and the economic factors governing their realisation on individual farms. In all of the research suggested here there is a need for close liaison and co-operation between farmers, farm advisers, agricultural scientists and agricultural economists.
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