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CHANGE IN AGRICULTURE: THE RELEVANCE OF AGRICULTURAL ECONOMICS*

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The strength of the agricultural economics discipline in Australia —as in overseas countries—is that it has remained, as it developed, basically an 'applied' or problem oriented discipline. If agricultural economics is to remain relevant, however, it is essential that we re-examine from time to time the nature of the problems that we are attempting to solve or, at least, to throw light upon.

The agricultural sector of the 1970s and 1980s will appear rather different to that of the 1960s and earlier decades. The broad elements of the problems currently facing the sector and the nature of the changes taking place are well known and I do not propose to discuss them here in any detail.[1]

My purpose is to talk primarily, and quite selectively, about certain areas to which in my view we, as economists, will need to give increased attention in the future. I shall be considering broadly three elements of this change: the decline in the relative size of the agricultural sector; the growth of the associated off-farm agricultural sector and the question of inter-sector resource flows; and a range of issues which I have termed 'institutional' factors—extending the usual meaning of that term to cover such matters as the problem of land valuations and the usually vaguely defined concept of the family farm.

All, of course, can—some with greater difficulty, perhaps—be related to that popular term, farm adjustment, a term greatly in danger of becoming a slogan with little meaning, perhaps an 'empty economic box', or of being regarded as a panacea for all of agriculture's real or imagined difficulties.

* Presidential Address to the annual conference of the Australian Agricultural Economics Society held at Adelaide University, February 1971.

[1] For example, Gruen, F. H., 'The Cost-Price Squeeze and Australian Agriculture', *Australian Journal of Agricultural Economics*, Vol. 6, No. 1, pp. 1-20, 1962; Makeham, J. P. and Bird, J. G. (Eds.), *Problems of Change in Australian Agriculture*, Department of University Extension, University of New England, 1968; Harris, S. F., 'Farm Adjustment and the Role of Government', *Australian Journal of Agricultural Economics*, Vol. 14, No. 2, pp. 107-121, 1970; Bureau of Agricultural Economics, *Debt Reconstruction and Farm Adjustment*, Canberra, Feb., 1971.

The decline which, on practically any criterion, has taken place in the magnitude of the agricultural sector relative to that of the rest of the economy does pose a number of challenges to the agricultural economist; this is, of course, apart from questions about the future demand for his services. Often this decline is referred to as a decline in relative importance and I shall depart temporarily from my theme to comment on this.

If we are thinking purely in terms of shares of net national products, or income shares or the like it seems to me important to separate the two elements of this decline: the first relates to the declines in these shares which have taken place because the sector has become more efficient and, while releasing resources to the rest of the economy has not increased the real cost of its products; for some the real price has probably declined. In this sense, the relative decline in the sector seems to increase its importance to economic growth—otherwise we would have to say that if it used twice its current level of resources to produce the same output it would be more important.

Only in the second case, where the decline has taken place because of substitutes, produced outside the sector or imported, can we validly speak of declining importance. There have been elements of this type of change—artificial fibres have reduced the importance in an economic growth sense of the production of agricultural fibres; for oils and fats (including butter) the position varies according to whether the materials for margarine production come from within or outside the sector.

In the case of foreign exchange receipts our relative dependence on the agricultural sector has undoubtedly declined. In the 1950s, a fall in wool income of the magnitude of that of the last two years would have given rise to balance of payment crises. Even though the difference has been substantially made up by minerals which, at least in the past, have been subject to significant price variability, there does not seem likely to be any early reversal of the current trend.

As a consequence of the substantially greater relative growth of the non-farm sector, instruments of general economic policies, notably wage decisions and monetary policies, are increasingly less able or less willing to take specific account of the circumstances of the agricultural sector. This is given particular point by the Arbitration Commission's recent total wage decision with its particular difficulties for the rural sector.

For agricultural economists, it reinstates inflation, and policies concerned with the restraint of inflation, back into our field. Previously we could, and to some extent did, leave these aside while the relatively favourable rate—by international standards—of general price increases of between 2 and 3 per cent per year continued.

Moreover, it raises issues about the extent and nature of compensatory policies. Minerals booms notwithstanding it is difficult to argue that the current and prospective rates of price and cost increases reflect in any real sense either the real change in the relative costs and prices of resources, or even a realistic community judgement as to what they should be. A widely, if not generally, held view following Gruen is that some compensatory action is warranted for the rural sector based

on a 'second-best' argument related to tariffs and exchange rates.[2] Is it self-evident, however, what either the levels, or the most appropriate form, of such compensatory assistance should be; and should more consideration be given to alternative forms of compensatory action in the context both of the constitutional and other legislative or non-legislative constraints within which policy makers operate?

Undoubtedly some self-correction would occur if high rates of inflation continued for long enough; either the need for devaluation would arise if severe strains were placed on the balance of payments; or eventually agricultural prices would rise substantially as production fell. But by this stage severe disruptive effects would almost certainly have been experienced, disruptive effects not limited to the rural sector. How much inflation, in other words, is it reasonable for the rural sector to accept in a situation of fixed rather than freely floating exchange rates?

A related issue is the extent of productivity growth in the rural sector. Available research results indicate that the rural sector has achieved a total productivity growth rate approaching 2 per cent per annum in the post-war period.[3] While it must be acknowledged that the margin for error is large, this does not seem high compared with recent productivity growth rates in say, the U.S.; although it is perhaps higher than the long term U.S. growth rate and, in terms of productivity per man, Australia appears to remain ahead of the U.S.[4] If we look simply at the potential productivity in the rural sector it is not difficult to suggest that it could be improved but, while welcoming Alan Powell's recent work, I would still think that we have only a limited basis for comparison with the performance of other sectors of the economy.[5]

The economics of agriculture is far more extensively documented than that of the non-farm sector. We accept, for much of the economy, that something less than an optimum rate of growth is probably inevitable, but perhaps we are less able to judge the reasonableness of the growth rates in agriculture because of our limited knowledge of the situation in the non-rural sector.

Quite apart from the need to have some balance in our view of the respective trends in the performance of the rural and non-rural sector, our interests as a profession should extend further than they have in the past into the off-farm sector.

The general question of inter-sector resource flows and the inter-relationships between the farm and non-farm sectors is one on which we have much less information than we should like. However, the relative decline in the contribution of agriculture to GNP as revealed

[2] See Gruen, F. H., 'Is There a Case for Agricultural Subsidies? A Reply to Dr Davidson', *Farm Policy*, Vol. 9, No. 1, June, 1969, pp. 14-20; Ibid, 'Stabilization and All-Round Protection in Australian Agriculture', in Douglas, D. (Ed.), *National Rural Policy*, Sydney University Extension Board, Sydney, 1971.

[3] Young, R., 'Productivity Growth in Australian Rural Industries', *Quarterly Review of Agricultural Economics*, Vol. XXIV, No. 4, 1971, to be published.

[4] McHerr, W. D., 'Technological Change in the Agriculture of the United States and Australia', *Journal of Farm Economics*, Vol. 48, No. 2, pp. 264-271, 1966; Hayani, Y., 'Resource Endowments and Technological Change in Agriculture: U.S. and Japanese Experiences in International Perspective', *American Journal of Agricultural Economics*, Vol. 51, No. 5, pp. 1293-1303, 1969.

[5] Powell, A. A., 'Productivity Change in Agriculture: An Overall View', *Economic Papers*, No. 31, June-Dec., pp. 18-34, 1969.

by national account statistics is not only the outcome of a relative decline in the value added by farm enterprises, but also the result of a rapid growth of other sectors. While it appears that the growth rate in the value added by the rural sector has been reduced by a greater inter-relationship with non-rural industries, and may have been reduced by the use of a number of purchased services hitherto provided from farm resources, it is reasonable to point out that many of these service and processing industries have been dependent for their growth on the rural sector. It is therefore necessary, in discussing the relative importance of the rural sector, to take cognizance of the inter-sector relationships and the significance of the inter-dependence between certain sectors of the economy and the farming sector.

Not only do we need to have a greater understanding of the changes in these inter-sector relationships in terms of aggregates, though a more analytical understanding of these relationships is important; nor is it sufficient to know more about the impact of the changes in farm incomes on the rest of the economy. Very importantly we need to know more about these kinds of interactions at the regional and local level. The case study approach in particular regions, or districts among particular groups of farmers seems to me an essential way in which to undertand more fully the impact of inter-sector relationships, as well as to understand the nature of the ties with the rural communities on which they depend and which are dependent upon them.

The current problems of agriculture are having quite severe, though less well documented, direct effects on the associated rural towns and communities; moreover, the resolution of the problems of the rural sector may to some extent bring new problems to the industries servicing agriculture in particular regions and to those in the communities associated with agriculture. The numbers involved in the infrastructure of agriculture are, of course, substantially greater than those directly engaged in agricultural production. Agricultural economists, to my mind, could make a valuable contribution in analysing these problems more extensively and in greater depth.

The immediate burden of agricultural adjustment tends to fall on the labour component of agricultural resources. Yet our knowledge of rural labour remains very incomplete and, as Schapper has said, with few exceptions, has not attracted the attention of rural sociologists and economists.[6]

Quite apart from the general importance of this information, it becomes directly relevant if we want to talk about the need for, or the form of, retraining measures for those wishing to leave the farm sector. The age structure of the farm population is a relevant, though inadequately documented, factor here as well as probably having significance with respect to our considerations of supply responses.

Population changes in particular regions are taking place and are likely to continue. Yet we have limited systematic knowledge of the nature of intra- and inter-sector mobility of labour, of the kinds of

6. Schapper, H. P., 'Rural Labour', Chap. 9 in Williams, D. B. (Ed.), *Agriculture in the Australian Economy*, Sydney University Press, 1967.

movement involved and of the associated special problems and motivations, despite work such as that by Nalson and Williams.[7]

If the structural adjustment envisaged by many takes place in agriculture, one type of change we can expect in particular communities is a smaller number of more profitable producers replacing a larger number of less profitable producers. This will have implications for the associated towns, for example, of a qualitative as well as a quantitative nature. These are important in themselves, because they affect the availability and costs of community services, but they also have a direct impact on the economics of agriculture, either by way of direct increases or decreases in costs, or by changing the incentives or disincentives to labour (including management) in these areas.[8]

Although more research effort is being directed to the off-farm stages of agricultural production and distribution,[9] the efficiency of the marketing process could bear much more attention from agricultural economists. Wool is one commodity that has been subjected to increased research attention in this field—and the potential gains thrown up have been considerable.[10] It is not necessarily true that comparable gains would be expected elsewhere, but it is useful to bear in mind that, if wool is excluded, some two-thirds of the rural sector's production is sold on the home market. Although much of this production presently has its price determined largely on the international market, the returns from the domestic market, and consequently the efficiency of these marketing processes, will be a major determinant of the prosperity of much of the rural sector in the future. While I would not wish to belittle some very good work already done in this field, the efficiency of the whole series of processes of transportation, handling, processing, selling and distribution between the farm gate and the conumer warrant greatly increased attention by agricultural economists.

With the changes taking place in the organization of these associated industries and, even when competitive, the inadequacy of price as a good indicator of a competitive situation, we should be concerned with the efficiency of prices both as indicators of relative bargaining strengths and as effective signals to the farmer of the consumers' preferences.

Swings in consumer preferences, as well as more discrimination in terms of quality, uniformity of the product, etc., can be expected in the future and these need to be reflected adequately in the prices paid to farmers; it is not clear that this is always the case at present.

We should therefore be concerned with the efficiency and the likely changes in the nature of the decision making processes; in the degree

[7] Studies of the kind carried out in Britain by Nalson on farm labour mobility would provide useful information in this context. Cf. Nalson, J. S., *The Mobility of Farm Families*, Manchester University Press, 1968, and in subsequent work in Western Australia; see also Williams, D. B., 'Change in Rural Areas: Let's Talk About People' Proceedings, Symposium on Self Perpetuating Inertia in Australian Agriculture, Sydney, October, 1970.

[8] See Neutze, G. M., 'Depressed Agricultural Areas and Location Economics', *Australian Journal of Agricultural Economics*, Vol. 6, No. 1, pp. 41-49, 1962.

[9] For example, the work at Queensland University on the location economics of abattoirs and of wool-selling complexes; the B.A.E.'s work on objective measurement of wool and wool marketing generally, and on meatworks.

[10] For example, B.A.E., 'The Role of Objective Measurement in Wool Marketing', *Quarterly Review of Agricultural Economics*, Vol. XXIII, No. 4, pp. 243-249, 1970.

of integration; and in the economic and financial control in, and exercised by, these industries as well as in those supplying inputs and services to the farm sector.

The broiler industry is an obvious example of a high degree of control exercised by firms outside the farm sector on farm operations. The manner in which such control is exercised in this and other industries, whether through provision of credit or the assumption of part at least of the risk, as well as the impact of such control, will require closer attention in the future.

Direct control is not our only interest. Changes which lead to reductions in competition among input supply firms, as in the fertilizer industry, are important to the farmer as are changes leading to the integration of processors with suppliers of competitive products, as in the case of wool processors integrating with artificial fibre manufacturers.

Many of these fields of study will take us beyond our normal theoretical framework based on marginal analysis—and perhaps we should be prepared to go beyond marginal analysis when the issues we are considering tend to have more than marginal implications. To take an example from a different field altogether, in considering the effects of subsidies we tend to talk in terms of the increased incentive to production they provide and of the incentive to the marginal or sub-marginal producer to remain in production. But it is possible that by providing not only an incentive to production increases, but additional investible funds on a scale related directly to existing production levels, they may have a significant structural effect as well which may or may not be unfavourable; the dairy industry would seem to be an industry where the structural effect would be substantial. Moreover, is it all that clear that the subsidy to the marginal producer does more than offset the decline in his average return that has resulted from the increased production the subsidy overall has induced? While a view of the structural, as distinct from the marginal (or perhaps the dynamic rather than the static equilibrium) aspect of subsidies and of other influences on resource use in agriculture, may not change our overall conclusions with respect to the efficiency of price subsidies, it may enable us to see them in a better perspective.

We should, in any case, take into account more explicitly some of the institutional elements of the economic process in agriculture. Of growing interest, in view of the marketing difficulties being experienced in a number of industries, is the question of production quotas and their transferability. There is a need to take into account the role that uncertainty will inevitably play in any market for quotas; this will be influenced, for example, by the difficulty of estimating the marginal value product of a quota. The producer must find it difficult to estimate the worth to him of an additional tractor or an additional hired employee —where the price is largely set for him in the market and capacity to pay will at times be as important as his estimate of the net benefits to him. In the case of a simple market situation for quotas it is worth considering the extent to which the most optimistic, or the one most in error, would be the successful bidder for any transferable quota. This uncertainty, of course, is not absent in the present situation where the quota is tied to the land and may or may not be transferred with the sale of the land.

Despite this, these two areas have not been researched as extensively as many others of relevance to the rural sector. Yet a full understanding of these aspects will become of greater importance in the future.

Both of these issues are related, to a degree, to the capital aspects of agriculture and the capital problem of agriculture is increasingly asserting its importance and complexity and requiring increased attention.

One area where the institutional problems, as well as the capital problems, are most evident in agriculture is with respect to land values. We have become accustomed, over the last quarter of a century, to generally rising land values. We are, of course, familiar with the multiplicity of influences on land values such as: the embodiment of new technology in the land, and hence its increased productivity; the effects of improved product returns, including government transfer payments; the reduction of risk due to stabilization arrangements or legislative action; the investment in land as a hedge against inflation, both as a means of capital gains and, assisted by taxation concessions, a means of avoiding taxation; the regional location; the amenity or social values of land ownership, both for those wishing to enter the industry[11] and those wishing to enlarge their holdings or to place sons on farms of their own. Interest rates may also have had some effect, though one might expect some downward influence of the generally rising trend in interest rates on land prices over the postwar period.[12]

The upward trend in land values has had implications for the capital needs and the credit base of agriculture. Increasing land values have required more capital simply to finance property transfer.[13] To some extent there is likely to be some easing of the sector's capital needs in this respect since the upward movement in capital values has slowed down; in fact it seems likely to show a downward trend in some areas. Even so, the transfer value of land will in many cases be above the value at which it was last transferred. This change in the trend of land values will, of course, have its effect on the equity available on which to base further capital raisings.

The question of land values becomes of particular importance in the consideration of measures to facilitate the adjustment of farm size. When we are considering the possibilities for farm amalgamation or farm build-up we tend to relate them to the productivity value of land. Yet the productivity value of land is itself an elusive concept; it will differ according to the characteristics of the purchaser and the nature of the particular sale. It is clear, moreover, that in attempting to calculate the productivity value of land, the result is very sensitive to changes in assumptions about future product prices as well as the return to capital and to labour regarded as acceptable.

Thus, even if the prospective purchasers calculate carefully the

[11] It is worth recalling that Bellerby drew attention to the excessively high mobility of labour into farming: Bellerby, J. R., *Agriculture and Industry: Relative Income*, Macmillan, London, 1956.

[12] See Sturmey, S. G., 'The Sale Value of Farm Land and the Long Term Rate of Interest, England and Wales, 1918 to 1950', *Farm Economist*, Vol. VIII, No. 1, pp. 19-26, 1955.

[13] See *Capital Adjustment in Agriculture*, Agricultural Adjustment Unit, University of Newcastle upon Tyne, Bulletin No. 7, pp. 38-39, 1968.

maximum they can afford to pay for additional land in terms of the additional income it affords them, there is likely to be considerable variation in the values placed on the land. In a situation where the most optimistic valuation, other things being equal, will set the actual price paid for the land, as indeed will errors in the valuation, it seems evident that market values will tend to be high rather than low in relation to its realized productivity value. This has tended, certainly, to show up in some comparisons made for me in the Bureau of survey valuations and calculated residual returns to land by size classifications, although some exceptions occurred, particularly in the larger farm size groups.[14] It is worth noting, however, that Colin Clark has reported some New Zealand work suggesting that this need not be so.[15]

Nevertheless, many factors of a more general nature, including non-economic factors, which enter into the determination of the market value of land simply add to the likely discrepancy between the income generating capacity of the land and the market value. The difficulties that these factors pose for specific policies for encouraging or facilitating the build-up of farm size need to be looked at in greater depth than has been possible so far; and they need to be examined in the context of particular situations and circumstances.

Although the question of farm financing generally, as well as in the specific context of farm adjustment, has received increased attention of late[16] the issues involved will remain critical ones in the farm adjustment process.

Our discussions of the question of structural adjustment in the rural sector have been substantially in terms of broad principles—both in the context of the need and in relation to measures considered desirable. We do not have much in the way of case study material which discusses the specific barriers to adjustment in the existing situation and throws out ideas on how these can be overcome in a practical context. Largely because the needs have been evident longest in the dairy industry there is probably more of this kind of information available for that industry than for others.[17]

A further inadequately documented field has been the whole basis of the organization of the farm family as a productive unit. The farming community, however, is concerned at the possible implications of the trend in farming towards an increased size of enterprise with its increased demand for capital, and that these needs will become more difficult to meet under family farming types of farm organization. Consequently, they fear the development on an increasing scale of

[14] For a brief summary of the limitations of such residual calculations, see Clark, Colin, 'The Value of Agricultural Land', *Journal of Agricultural Economics*, Vol. XX, No. 1, p. 15, 1969. A more detailed discussion can be found in Heady, E. O., *Economics of Agricultural Production and Resource Use*, Prentice Hall, pp. 402-414, 1952.

[15] New Zealand Meat and Wool Board Economic Service bulletin, No. 12, 1963, cited in Clark *op. cit.*, pp. 15-17.

[16] Lewis, J. N., 'Problems of Institutional Change in Australian Agriculture', in Makeham and Bird (Eds.), *op. cit.*; B.A.E., *Debt Reconstruction and Farm Adjustment, op. cit.*

[17] See, for example, Bird, J. G., 'Policy Implications of Adjustment Research for the Dairy Industry in the North Coast Area, N.S.W.', in Makeham and Bird (Eds.), *op. cit.*, and the references cited.

company farming. Nor is the farmer's traditional concern with his bargaining power in relation to those handling, distributing or processing his product likely to be in any way diminished in these circumstances.

From one point of view it would perhaps be argued that whichever is the most efficient will be the one which eventuates; if family farming is most efficient it will survive; if it is not then the nation will gain by the emergence of company farming. While there is an element of truth in this I do not think that we can regard it as sufficient to argue in this way. In the first place, it is not always true, or if it is true it may only be so after a considerable lag or with substantial intervening disruption, that the optimum solution arises under normal market conditions. Secondly, it is quite possible that this is an area in which society will want to make a judgement on grounds other than purely economic ones and as economists we should be equipped to advise on the optimum economic means of achieving that social objective. In any case, even if society is prepared to leave it to the economic mechanism, is it all that clear that the two systems are operating on an equal basis at present? Do the tax laws, the land tenure laws and the like apply with equal impact on both family farms and companies?[18]

Indeed the anatomy of the family farm firm as a form of productive organization is nowhere near as well documented as one would wish. We know that the fact that the family farm is both a producing and a consuming unit complicates analyses of farm financing and farm capital; we refer broadly to the problems of the inter-generation transfer of the assets of the unincorporated enterprise, the predominant form of farm productive-unit, and we can point to this as posing specific forms of capital problems and capital needs; we talk about the apparent conflict between society's desire to avoid, through death duties, large individual accumulations of wealth and the farmer's need for control of increasing quanta of enterprise assets for efficient farm operation; we talk broadly of the capital resources shift from agriculture, through the education and upbringing of farmers' sons and daughters, where the labour adjustment process is operating effectively, as well as through inheritance arrangements; we can point to the conflict between the capital requirements for enterprise ownership and enterprise operation.

But we have not looked as extensively as perhaps we might at the way in which these and other elements manifest themselves in practice. We need to look at these in the practical context of particular groups of farms over a period to see the way in which their impact on the farm operating unit has affected resource allocation decisions.[19] This involves, as Sundquist has suggested, questions of enterprise tenure, legal forms of enterprise ownership and control, degrees of vertical and horizontal integration and the basis of financing of the enterprise.[20]

[18] For the wide range of possible differences in the impact of tax and legal rules in the U.S., see Hann, Neil E., 'Do Legal and Tax Rules Favour Large Scale Agricultural Firms?', *American Journal of Agricultural Economics*, Vol. 51, No. 5, pp. 1381-1392, 1969.

[19] A pioneering study is that of N. J. Thomson, *Death Duties and the South Australian Woolgrower*, E.D.P. 2, University of Adelaide, Department of Economics, July, 1971.

[20] Sundquist, W. B., 'Changing Structure of Agriculture and Resulting Statistical Needs', *American Journal of Agricultural Economics*, Vol. 52, No. 2, pp. 315-320, 1970.

We have moved a long way in helping the farm decision maker with respect to his production and farm management and in dealing with the particular form of risk which characterizes the farm enterprise. But although we stress that farming should be regarded as a business rather than simply as a way of life, we have not developed as far in helping the farmer in the financial management sense even though increased skill in financial management will be crucial to the success of the farm operator in the future. We are in a less satisfactory position, for example, to advise farmers on the most effective form of dealing with probate duties. It is not clear that any single method is preferable, but it is a form of study that would seem to lend itself to an examination using operations research techniques.

We have also done less than we might by way of considering alternative means of overcoming the likely conflict between the capital needs for farm asset ownership and enterprise control. We talk vaguely about alternatives to the company farming solution to this problem, such as land leasing, leasing of equipment, financing of inputs by input suppliers or by the marketing agencies; we may also be aware of co-operative arrangements ranging from a partnership type of organization to something more extensive. Yet we have not really examined closely the operative efficiency of these arrangements. Sharefarming, of course, has traditionally been one means of overcoming capital shortage in agriculture and of separating ownership and control. Yet is it obvious that the traditional basis of sharefarming remains as appropriate now as it may have been in earlier times given the substantial change in the basic factor mix of most types of agricultural production?

I realize that suggesting that we broaden our fields of enquiry moves us towards a contrasting of agricultural economics with the sub-discipline of urban economics rather than to a commodity oriented sub-discipline such as, say, mineral economics, and that this exposes us to two dangers.

In the first place it brings us into, some would say further into, the field of social welfare; or, in other words, it raises questions about the extent to which we should, or are required to, make value judgements. This could give rise to some difficulties, but to my mind, economists are well equipped to deal systematically and logically, as well as objectively, with the analysis of the many issues that are involved in rural economics and should be more prepared to move into the broader fields.

Secondly, it may tend to take us into what Lionel Robbins referred to as the borderlands of economics, the happy hunting grounds for lesser minds.[21] This may be true but I am not convinced either that we do not need these kinds of efforts—we currently make our own, often unsystematic hunches or guesses—or that done well, they do not provide a sufficient intellectual challenge.

While agricultural economists have expressed their concern about the welfare of those hurt by the changes taking place in agriculture, as elsewhere, I think it is true that they have also assumed that such matters fall outside our strict disciplinary limits and would be dealt with ade-

[21] Robbins, L., *An Essay on the Nature and Significance of Economic Science,* Macmillan, London, p. 83, 1949.

quately by those more directly concerned. I am not sure that we can afford to, or should, make that assumption.

Some of the research needs that this suggests will require the skills of sociologists or demographers—in collaboration with economists. Agricultural economists have a good record in seeking inter-disciplinary collaboration but perhaps we do need to seek it more consciously in these directions and develop the more extensive kinds of contacts that we are accustomed to in the fields of the physical and biological sciences.

Heady has pointed out, however, that it is research workers and educators, along with changing relative prices of capital on the one hand and of labour and land on the other, that have helped to create change and the need for adjustment to change. This suggests a need to understand more clearly the impact of this adjustment, not merely in broad general terms, but in specific terms, so that it can both be facilitated and made easier. The extreme focus on either the micro-apects of agriculture or the macro-aspects of resources and populations tends to overlook the real concerns reflected in the economic and social unit, the family, where the costs, and opportunities of change really are reflected. As Heady puts it 'The truly complex problems of change and adjustment certainly surround the family and it is here that too little attention has been devoted in both research and extension'.[22]

The continued relevance of agricultural economics will, I am convinced, depend in part at least upon the degree to which it gives increased attention to the wider issues of change and adjustment, as well as to the institutional and organizational questions of agriculture and the agricultural infrastructure in the future.

[22] Heady, E. O., *Agricultural Problems and Policies of Developed Countries*, Bondenes Forlag, Oslo, pp. 107-108, 1966.