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Presidential Address

FARMER MOTIVATION AND INCREASED ANIMAL
PRODUCTIVITY

M. F. McDONALD

Massey University, Palmerston North

This 35th Presidential Address to the Society is delivered at a time when the farming industries and most non-agricultural industries in New Zealand, not to mention the world's industries in general, are experiencing very painful economic difficulties. Some commentators have even queried whether meat and wool production has a future. Large fluctuations in the economic strength of farming have been a characteristic feature occurring during the development of the various sectors of animal production in this country. Historically the troughs of economic discomfort have not persisted for an unbearable period, nor have the peaks of prosperity lasted very long.

This year of 1975 also marks the end of a 25-year period and the start of the final quarter of the twentieth century. The time might be regarded as appropriate to consider what the next 25 years will lead to in comparison with the achievements of the third quarter of the century. I refrain from embarking on a discourse into the shape, form and structure of New Zealand animal production industries in the 1980s and the later decade as it is a subject for a symposium-in-depth, but it must be emphasized that people in this country will continue to engage themselves in the real business of farming animals only if given the expectation of a reasonable reward or equitable share of the profit. A reasonable reward for work has always been the intention of farmers as it is of those in other sectors of society, but over the last 25 years on average (although some years are notable exceptions), while that objective may have been clear, the achievement was less than expected. Proper distinction of reward for labour and management and return on capital might not always seem to be a characteristic adequately recognized by a great many concerned in farming if results from analyses of individual farm businesses over a number of years are accepted. How the farmer is to get an equitable share of the profits for his effort in producing animal products is a subject always

likely to be of major concern to the individual (and more so to the sheep and beef cattle farmer in this current year); the subject lies largely in the political sphere involving wide-ranging sociological and economic considerations. (In time of economic crisis a broad pattern of advice appears to be freely available to the politician or those who wish to shape our destinies.)

New Zealand animal production has increased substantially in the past 25 years. Based on the published figures for 1950 and estimates in 1974, livestock numbers (in millions) have moved from 35.0 to 57.1 for sheep, 2.09 to 6.14 for beef cattle, and 1.85 to 2.14 for dairy cows in milk. In contrast with the great expansion in beef cattle numbers in recent years, sheep and dairy cows in milk appear to have declined from their respective peaks of 60.9 million in 1972-73 and 2.32 million in 1969-70. Overall the total stock units have been very close to 100 million for the past six years although drought conditions in at least two recent years have caused a reduction in livestock numbers and performance.

Essentially the same raw materials are produced today as in 1950 but each labour unit now sends much more off the farm. Major changes in the type of products from some farms or classes of land have been very notable. This is probably well illustrated by the change from butterfat and pigmeat production to whole milk production on most dairy farms and should remind us that initiative, specialization and increased output on the part of the farmer must go hand in hand with the efforts of the milk tanker driver, milk processing station worker, and all the others who make their overall contribution to the product required by the consumer. Animal production is therefore more developed, more sophisticated than in the 1950s and with more output has demanded from the country more resources. Aspects of transportation, processing and marketing of animal products off the farm cannot be disregarded in relation to events happening on the farm, and vice versa. Against this background I prefer now to confine further remarks to the expectations of the farmer in the existing industry specifically to the flexibility that exists for him to respond to developing and changed circumstances and his motivation to prosper.

THE MASS OF INFORMATION ON ANIMAL PRODUCTION

During the last 25 years many subjects relevant to animal production have been discussed at these conferences. Reference to the

Proceedings in 1950 indicates a number of topics that still have a familiar ring today. In that year President I. L. Campbell described some of the secrets in endocrinology and of the possible applications to animal production. Considerable advancement in unravelling the mechanisms of endocrinology has subsequently occurred but, while spectacular control of hormones and their resultant functions has occurred with the human, the application of such knowledge in scale animal production has been relatively ineffective.

Among the other papers discussed at the Conference in 1950 were those on rations for supplementary feeding of dairy cows by D. S. Flux and M. R. Patchell, milk ejection problems by W. G. Whittlestone, mechanical milking by D. S. M. Phillips, the level of nutrition of pregnant and lactating sheep by I. L. Coop and the feeding of dairy bulls by J. P. James. There was also a symposium on the measurement of feed consumption in grazing animals with contributions by L. R. Wallace, M. R. Coup, R. J. Lancaster, J. C. Percival and the late P. D. Sears. Knowledge presented in those papers and subsequently added to has in many instances been very relevant to the development of the technology that is now or could in some instances be part of farming. Real advances have occurred in some areas of scientific endeavour. No doubt the techniques of measuring feed consumption have benefited from refinement and will be refined further, but the results of using the techniques, as in measuring grass production and utilization have been of considerable value in formulating current systems of grass and animal management.

At the same meeting the late J. H. Tetley described the epidemiology of internal parasites and it is a coincidence that the Society this year has published the findings of a Study Group set up to consider the results of the many recent anthelmintic drenching trials on internal parasites and to make recommendations as to the effectiveness of various methods of control. The reasons for the variable results often appear to be unexplained and indicate the need for better understanding of the biology of the parasites and hopefully improvement in the control programme.

In mentioning these topics that were under consideration by the Society 25 years ago, it will be evident that some problems *then* are still problems *now* or have generated related ones. The succeeding years have seen a tremendous outpouring of scientific work — more and more people are contributing to the information explosion and computer analysis has enabled so much

more to be researched. The great bulk of our scientific investigations has been directed toward the better understanding of animal production in conditions peculiar to New Zealand. As agricultural research must compete for limited national resources the selection of topics relevant to national needs must continue to be strongly advocated. Others in the Society have mentioned research plans and priorities and a technical revolution may even have started, but as President A. G. Campbell pointed out some 7 years ago, research purposely directed towards improving farmer efficiency is very relevant within the family type farming system likely to continue in New Zealand.

The mass of information that is accumulating presents ever-increasing difficulties in digestion for the scientist, adviser, teacher and student. Farmers long ago indicated they wanted information in a readily assimilated form. Growth of advisory services and media to enable farmers to get appropriate information and to make better considered decisions has been actively pursued in recent years, yet there are many indications that substantial communication gaps occur. It should not be overlooked too, that information long known will suddenly have increased significance with changed economic circumstances; a recent example is increased penalties for overfatness in lambs, and the knowledge that earlier fat deposition occurs in the ewe lamb rather than the ram and wether lamb offers on some occasions the possibility of drafting according to sex. Perhaps, too, at times it appears that the great mass of literature and meetings of various kinds may have "swamped" the potential users of research information, yet in contrast field days have increased in popularity with farmers relative to meetings with no on-farm demonstration content. One suspects this is not a passing phase since information shown at field days is usually in a readily assimilated form and should interest a high proportion of those attending, consequently it is likely to be used because the practical results are there for all to see.

While all forms of media may disseminate information and aid development of new technology, some methods are more successful in convincing farmers of the benefits in adopting the technical advance. According to a recent survey the adoption by farmers of Perendale sheep in conditions suitable for them in the North Island and Drysdale sheep in the South Island has occurred largely after contact with other farmers (innovators) who were already running these sheep. It follows that the adop-

tion of this technology must diffuse through an area stimulated by the enthusiasm and activity of those who take up the idea.

Many other instances of this process come to mind. The discussion groups, the breeder's clubs, the group breeding schemes, are all making their impact to varying extents through the generation of ideas within the community of interest and also convincing the "later adopters" of the benefit of the new technology, together with their reassurance as to minimal risk likely to be incurred when changing the production method.

It is also appropriate to examine why the farmer should be considering what at times must seem to be attempts to forever modify his methods of production.

SOME OBJECTIVES OF THE FARMER

The aims that people will strive for in farming are variable; a list will include such obvious ones as satisfactory income, creation of capital asset, high level of per-animal or per-hectare output and all of these can be readily measured. Other wants associated with the way-of-life, job security, self-employment, the desire for ownership of land and a number of others are more subjective in nature, but valued nevertheless. For some people the total list will be long but for others the aims in farming are few or dominated by one or two major desires. Objectives will be modified or receive more or less emphasis with changed circumstances. The farmer will probably seek a different range of objectives and see things in a different light in 1975 from that in 1950 or even from two years ago. Exhortations to change the production methods and increase output from the individual's farm in this year may be viewed quite differently, perhaps even skeptically, from similar suggestions at an earlier time, because of the changed wants of the farmer. Changes in technology, markets, profitability of enterprises, are always before us and frequently capture most attention — changes in farmers' attitudes and desires in relation to farming are as important, probably more so, than the latest technical advance. The forces that motivate people to strive for an objective may therefore need to be different ones in time because of the aging process alone.

The definition of objectives in farming is easy and need not necessarily be too specific. Some people reach their goals easily, while others with similar intentions in mind lag well behind

for a variety of reasons. Where several objectives are sought progress will be slower than in the case of where few objectives exist. The conflict of objectives implies less output from farms than if production was the only consideration.

Farming is frequently mentioned as being more and more complex than in earlier years. Perhaps it is, yet surely one of the major reasons for obtaining information and investing effort towards improvement in technology should be to make agriculture simpler. Here I do not mean that mixed-purpose or multi-product farming is complex and that, say, seasonal dairying is simple, but rather I suggest that operations on all types of farms might be more simplified consistent with sustained levels of production. Nor is there any valid reason why simplified animal production systems cannot be associated with higher output. Complexity need not be preferred to simplicity. At times this must often seem so to the farmer in view of those many cases where we see what should be straightforward aspects of animal production made to appear exceedingly complex. Considerable satisfaction may be got out of doing something in an easier fashion — thus, same output, less work, higher efficiency. To pursue this objective of greater simplicity further, such as the jobs of milking the herd, or getting cows mated and pregnant, each will require the identification of what are the important jobs, doing the important jobs to the exclusion of the unimportant jobs or at least maintaining a proper perspective of their relative importance. Greater simplicity will only be accomplished by analysing the work situation in the light of present methods and seeing whether the method can be improved upon or dispensed with. While sometimes a single factor provides the major restriction to improvement in efficiency, it is more likely that a combination of factors require reassessment and modification to cause significant improvement.

Whatever way the simpler method is adopted and made to operate it should reduce unproductive effort. Reasons are many as to why the unproductive jobs have got into the system and probably range from tradition, or because the neighbours expect it, through to the result of advice from an "expert". Recognition that unproductive jobs exist on farms and that their extent can be reduced is probably sufficient itself without further concern for more unproductive details. Simplification of many features of our farming is fundamental to the claim that New Zealand agriculture is efficient. Some managers are able to extract much greater output than that obtained by other managers. The chal-

lence of the bigger enterprise, as in the case of milking the larger herd where the good use of labour is so important, has frequently called for on the part of the farmer a thorough investigation of the enterprise and the elimination of many of the unproductive features. Keen observation of farmers in a variety of circumstances may often allow recognition of common features among successful managers. Continual questioning of the methods in use and the organization of more simplified procedures seems relevant to success. As managerial capacity of the individual can be developed substantially, it re-emphasizes there is considerable scope for improvement in individual farm production.

The above might suggest that increased managerial efficiency is the answer to some problems of slow increase or static animal production that appear to have occurred recently. There is a great scope for management input to stir New Zealand animal production to greater levels than so far achieved, but the forces which motivate people are the basic factor at issue.

THE STRIVING FOR INCREASED EFFICIENCY OF ANIMAL PRODUCTION

Applied research probably has as its ultimate goal the improvement of overall efficiency. The term efficiency of animal production, so frequently used in discussions of farming, is influenced by a broad spectrum of variables. It involves not only the species of livestock and the breeds of dairy cattle, beef cattle, sheep and pigs and their feedstuffs measured in relation to the output of product, but there is entwined with it, considerations of marketing and the industry as a whole and eventually the resources available to the country. All factors offer the prospects of reducing inefficiencies.

Animal science to be objective limits its considerations and makes its major contribution by improving biological efficiency — an increase in the output of milk, an increase in the percentage of lambs weaned, a greater weight of carcass grown, all related to the feed available. The applied scientist's contribution has been therefore in devising procedures and measuring their effects. He may not regard his role in the same mould of the efficiency expert of industrial plants and in which the continual measurement of efficiency is often repugnant to those on the shop or office floor. Yet are there not some basic similarities between scientists and others always measuring efficiency? While farmers and their labour may demonstrate or withhold their produce in

protest to calls for more and more efficiency, so far the livestock have not "downed tools" in relation to the meddling of the agricultural efficiency expert. Animal behaviourists here have a fertile field for investigation.

The basic efficiency of animal production in this country has been described in various ways to this Society and President L. R. Wallace in 1953 has carefully set out a number of avenues available to New Zealand producers and along which their methods and energies might be directed. The principles that Wallace dwelt on at that time are in most cases well established, they have not changed, but the technology in the hands of the farmer has developed to allow greater application of these basic concepts to the livestock industries.

Some concepts have been readily taken up and become almost routine in the system of farming. An example is the early weaning and rearing of dairy calves in which some substitution of concentrate for milk and the encouragement of earlier grass feeding has substantially reduced the expensive period in the early growth of the calf characterized by double food conversion. These systems can be operated successfully when scaled up and greater output per labour unit achieved. Together with the rearing of dairy replacements on land suitable for store stock and consequently utilizing better the limited high class land for dairy production, there have been added improvements, all towards the overall purpose of more efficient use of feed.

Care is taken in commenting on farmers' attempts to improve efficiency of beef cattle production when the memory of ecstatic price rise followed by price collapse is so recent. Nevertheless, real progress has been accomplished as in the development of feeding and management methods so that the finishing process once initiated is allowed to proceed at a rapid and uninterrupted rate. "Store periods of maintenance or worse when the animals may decline in weight must wherever possible be avoided" is the policy advocated. In this year of 1975, when the prevailing low beef prices have been guaranteed by the N.Z. Meat Producers Board to rise substantially after a winter store period, the time of slaughter chosen will bear little relationship to considerations of biological efficiency! However, in more stable conditions than have recently occurred there can be little argument against the requirement to provide satisfactory feedstuffs and to manage animals consistent with more efficient growth and reduction of overheads.

Nor can there be a strong argument against utilizing for beef more of the 1.3 million calves surplus to the dairy herd and for which much of the overhead feed maintenance costs have already been covered. The dairy-beef industry has after a period of strong growth faltered not for matters of the technology so far developed, but rather economic considerations to which rearers and finishers of calves have quickly reacted.

In contrast to the above examples indicating improvements in basic efficiency, some aspects of sheep farming show little or limited attempts to reduce some major inefficiencies in production. Substantial increases in total production and per man have been notable, but in general terms output per animal has not been raised. The basic cause remains a small output of product represented by the lamb charged against the grass eaten by the lamb and also that consumed by the ewe during the whole year. The production of more lamb meat per ewe has been helped through the early effects of crossbreeding for fertility, and the longer-term effects of selection for fertility should in time yield more lambs for fattening, but the use of larger sires to ensure lambs have potential for growth and the slaughtering of leaner lambs at heavier weights has not been actively pursued or financially encouraged. There is already a lot of practical knowledge of the feeds to finish heavier lambs under New Zealand conditions and, after all, in many drafts the heaviest lambs are already at or approaching the "heavy weight" class. Suitable encouragement (through price schedule or contractual arrangement) to produce the heavier carcass would undoubtedly see some modification in methods of finishing lambs, and this would not involve many more weeks of additional feeding than at present. Lower processing overheads must also follow where heavyweight lamb carcasses are charged on a unit cost basis.

Although increased production and presumably, too, increased efficiency was the objective of a major plan of the mid-1960s and many technical advances have been adapted to our farming systems, two other points should be made.

The first is that in any industry there will be some (perhaps more than we think) who are opposed to further increased efficiency. For various reasons there is no wish to be part of the efficiency drive; it involves change; it disrupts an established way of life; it frequently creates more problems than before; one is unconvinced that more satisfaction will be achieved after change is adopted.

The second reason is that most producers, while completely accepting the concept of increased efficiency and all that it may involve relative to high output per animal and per unit of land and see these as important objectives in their farming, nevertheless would readily forgo the satisfaction of farming the higher producing, more efficient animal in return for the compensating increased price per kilogram of product. The scientist hoping to see his significant results applied may not always see it that way, but let him engage in farming for his living or even get involved at the weekend and then realizations soon tend to dominate measures of output and efficiency.

Thus there are cogent reasons for farming to move towards greater efficiency at a slower pace than might sometimes be anticipated.

The search for increased efficiency has led logically to more and more intensive systems of production and so far the ultimate may be seen in the factory-type farming in some circumstances overseas. These systems can be widespread and almost standardized for pigs and poultry where reliance is on bought-in feedstuffs and strict environmental control, yet the environmental constraints for sheep and cattle existing in various countries means that a range of systems must develop. In New Zealand there have been but isolated attempts to establish "cut and carry" types of farming. High energy costs must further retard intensification from grazing to machine-harvested feed systems. The practices used in dairy, sheep and beef cattle production will continue to move forward and slightly back from intensification with each change in the relative costs of inputs and returns. There is no doubt, however, that under the moderately intensive and also range systems likely to be practised, the biological "ceilings" for efficiency and production are much higher than current attainment. Further investigations of the constraints to the systems should raise current "ceilings".

Among constraints to the adoption of knowledge that could promote increased productivity, the farmer is central. The great mass of technical information that has been provided has at times not always promoted farmer efficiency as in obtaining the increased output he may well have had to work considerably harder too. Coupled with this is the inexorable problem of diminishing net return, so that reward for effort has decreased. With the advantage of hind-sight it is not surprising that reassess-

ment of farmer's objectives has led to consolidation and only small expansion of flocks and herds in the 1970s.

The magnitude of problems created off-the-farm can be suggested as the main reason for the apparent lack of motivation for increased production. Increased profitability is required to stimulate the business and the man — but for the individual who cannot really influence factors past the farm gate it cannot be avoided that farming more efficiently than before is required.

Economic adversity must itself strongly motivate the producer to look more closely at individual stock performance. Nearly static flock and herd sizes should tend to highlight the poor (or good) performance, whereas in a period of increasing stock numbers disappointingly low individual performance may have been all too frequently considered as normal. Breeding for improved productivity has been preached widely and for a long time, but as the benefits are slow in coming, breeding policies for economic characters must be pursued largely "in faith". There is need of continued demonstration to farmers and their reassurance of the genetic gains likely from advanced breeding methods. All too often interest may be engendered by the results from the small experimental flock but wane through lack of confirmation by large-scale trials and early practical results on farms. The results of increased milk fat production from use of AB are well established and currently rate 22 kg higher than for cows in base year 1956; there are 50% of cows in milk mated to AB but only 62% of herds use the method. The likely effects, too, can be calculated of using beef bulls with some measure of performance and rams selected for fleece weight or fertility, but the demonstration of what can be achieved in increased production of the offspring is only now becoming available. Demonstration of achievement in a variety of circumstances that will capture and hold attention will surely motivate more than the written description of what could occur. It should also be noted that, although schemes are being developed to assist the beef cattle and sheep breeder record information on performance with a view to the sale of superior genetic merit bulls and rams to raise productivity within commercial herds or flocks, the breeder or the co-operative group will only continue to be motivated to put in the necessary effort and investment provided a value for identification of commercial merit can be incorporated in the sale price of the bulls and rams. For the immediate, however, the farmer must as always rely on better feeding, health and management of his animals to extract increases in stock productivity.

When returns for the farm are analysed it will be evident in most cases that high stock numbers per man have continued to strongly affect profitability. Increased stock performance at sustained stocking rates and not reduced stocking rates appears to be a necessary requirement demanded of producers by the country. In this context, therefore, while profitability will be a major motivating force to the farmer his attitude to more and more stock numbers must inevitably be inhibitory if this is not already the situation. Investigations in animal production might with profit be directed more towards the producer so that he can see his way to raise his productivity through increased efficiency of his effort. The psychological barriers that have always existed for the producer and which now appear to be increasing in extent will likely provide greater difficulties in surmounting than some economic ones.