Optimising the return from the research dollar

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(presented by Garry toucher)

Australian Agricultural Scientists and Farmers share a proud history of putting science into practice. This history needs to be repeated if our farm sector is to successfully meet the challenge posed by an increasingly hostile world trading scene. Yet in many ways, our research and development effort is at the cross-roads. Yesterday's production problems have often been replaced in importance by shortcomings further along the marketing chain. This suggests that the future of our research and development effort will be measured by its ability to solve the big issues - to focus on those areas where the scope to reduce costs is greatest. For that reason I very much appreciate the opportunity to contribute to this discussion because farmers have major responsibilities to apply the new technological advances.

Australia's farm sector has the capacity and potential to enter a new phase of dynamic growth. Realising this potential depends fundamentally on improving our international competitiveness. This requires continuous productivity increases to offset the declining terms of trade which constantly stifle farm profitability. Research into ways to increase productivity, either by raising output or reducing costs, and the adoption of new technology provide the major hope for both individual farmers and whole industries who are trying to stay ahead of the cost-price squeeze, to remain competitive.

Increased industry and government support for agricultural research will be necessary to achieve this technological advance. It is also one of the more positive policy initiatives available to boost economic growth. Oddly enough, this view is being blatantly contradicted in some major policy forums and through certain government action. The proposed commitment of the national technology strategy "... to move the Australian economy away from high bulk, low value-added exports towards high value-added goods and services with high unit value and low volume ..." is an increasingly popular view based on a frightingly superficial and misguided analysis.

Policies introduced to support this view which positively discriminate against primary exports must be strongly rejected for two reasons. Firstly, there is a significant level of new technology already within the high bulk, low value-added goods such as grain, livestock and minerals. Any movement away from production of these goods will simultaneously close off an important market for new technology. Many of those fanatic disciples of the 'Hi-Tech' -led recovery fail to realise agriculture is in the forefront of 'Hi-Tech'. Laser levelling, ovum transplants in dairy cattle, developments with genetic engineering, use of satellite technology and computer-programmed pest management in crops are just a few examples. Secondly, any move away from the production of primary products would be foolish when market price signals suggest Australia should be producing these goods. Income would be lost to all Australians.

For these reasons, Federal Government pressure on the CSIRO to progressively shift research resources from agriculture to manufacturing is flying in the face of basic principles of comparative advantage. A move to shift resources away from agriculture is short-sighted, irresponsible and resented by those hundreds of thousands of Australians who contribute to the development of a massive agricultural resource which has even more to offer if given the opportunity.

These developments underline the need for our R & D effort to be as cost effective as possible. Central to cost effective research is the proper formulation of priorities, and the allocation of funds accordingly. No amount of able administration or 'Good Science' will replace the lost opportunities if funds are directed to lower priority areas. Many farmers are working with small profits so it is even more important to give priority to the most productive areas.

Increased farm productivity no longer necessarily provides the principle avenue for staying ahead of the farm cost squeeze. During a recent address to the Australian Institute of Agricultural Science, CSIRO Executive member, Dr Keith Boardman, noting that there is a potential to double farm output with current technology, suggested that "the scope to reduce costs is greatest in many rural industries by developments which are beyond the farm gate". The increased impact of inefficiencies beyond the farm gate on the profitability of farming itself must be reflected more fully in the focus of the research and development effort.

Throughout many of our research organisations the opportunity exists to establish more effective mechanisms for setting priorities, and in turn to allocate funds in line with these priorities. I am not suggesting a need for a greater proliferation of consultative committees between scientific organisations and the industry. Rather, I believe there are opportunities for more effective industry input into setting priorities. For example, the 1982 Balderstone Committee examined the extensive range of advisory committees established at the National and State levels by CSIRO to advise on research priorities. Similar committees are commonly found throughout many State Departments of Agriculture. However, the Balderstone Committee formed the opinion that "these committees, as currently structured, do not significantly influence research priorities in the CSIRO ...the chiefs of CSIRO Divisions still appear to exert the major influence in choosing between research projects".

Victoria's 1984 C J Latrobe Scholar, Ian McCausland, Director of the Bairnsdale Regional Veterinary Laboratory, made a valuable comparison between State—funded research and development in Australia and successful R & D efforts in other countries. On the question of priority setting, his challenging observation on the Scandinavian situation was:

"The most striking difference between Australian and Scandinavian applied R & D is the all—pervasive user influence and involvement through the whole process in Scandinavia. Scandinavian researchers and research administrators were disbelieving when told that most of our research is done in institutes which have no formal arrangements for goal setting or reviewing by users, are totally Government funded, and are discouraged from doing contract research All Scandinavian institutes visited are operated along business lines under the direct control of a User Board Scandinavian researchers and research administrators were unanimous in their recognition of the need for Dser Boards in the determination of general research priorities, and for financial commitment by users to research projects. Without these strong connections to industry they believe that they would become increasingly irrelevant. However, all those visited agreed that ideas for research only rarely come from the User Board. Its function is to ensure that only those projects which have practical merit are allowed to proceed".

Interestingly the people selected as representatives on the Scandinavian User Boards are young but successful, show foresight and have the willingness and ability to express themselves. Users with economic or technical skills are selected as well as those who have influence in their industry.

Ian McCausland concluded that the relevance of the Australian research effort could be improved through greater user influence. The report suggests that the success of the Rural Industry Funds in directing research towards user needs also provides local evidence of the need to create more effective user input to the direction of research within our research institutions. I strongly support these conclusions.

As well, I suggest that an essential need exists for greater public scrutiny of research objectives. No doubt the farming community and other sections of agribusiness have an important obligation to articulate their needs and priorities more carefully. A proposal for the release of one-year and five- year management plans, already established in some industries, clearly spelling out the objectives of the organisation and the allocation of funds against those objectives, would provide a very cost effective vehicle for public assessment and feed—back. In addition; potential applicants for research funds would have very clear guidelines as to priority areas of research.

The extent to which research in one discipline is influenced by developments in other disciplines is another telling factor which has the potential to significantly increase the value and relevance of the research effort. This approach is encouraged when research is oriented towards the accomplishment of a

goal. That goal should not be defined in isolation from a whole farm enterprise or, for that matter, from the industry in which the enterprise operates. For instance, research aimed at developing new varieties and new technology for production should also take into account overall farm management questions and give attention to the transportation, processing, presentation and retailing requirements of the market.

If the value of the research dollar is to be maximised even basic research could and should be goal-oriented. I am suggesting a project or marketing approach to establishing the objectives of a research project, where the relevance of the research and its application is assessed periodically.

Let me give you an example where the independent conduct and application of research from a number of disciplines can lead to potentially very costly consequences for an industry. A paper to the 1984 International Rangelands Conference in Adelaide, by McCosker, Emerson and Phillpot, provides a case study on Mount Bundey Station in the Northern Territory which illustrated the combined effect of the application of supplement and breeder technology. I quote:-

"The traditional stocking rate was 1 breeder to 42 ha, with a 45% branding rate. 14,000 ha were subdivided, extra water provided and the stocking rate increased to 1 breeder to 14 ha, a threefold increase. Feeding urea-based mineral supplements all year round increased the branding rate to 75%. The increase in intake due to supplements was assumed to be 65%, while the increase in production was calculated to cause a further 50% increase in intake. This amounted to a 2.15-fold increase in grazing pressure from the supplement and its consequent effect on production. When the stocking rate increase was taken into account, the total effect of the improved system was to increase stocking pressure by an estimated 6.25 times over the traditional system. Major changes in yield and botanical composition of the native pasture occurred over significant areas in four years at this stocking pressure."

This suggests that the animal scientists' technology and its use in the Territory is very much out of balance with knowledge of the effects of this increased grazing pressure on long term productivity. The author concluded:-

"All these functions (ie. setting research priorities, undertaking basic and applied research and extension activities) should be conducted within a multi-disciplinary approach tempered by consultation between organisations at a policy making level. The objectives of this approach should be to avoid duplication of research effort and allow for more productive allocation of tasks and finance; and to ensure that the roles of basic and applied research are properly defined and integrated so that producer, research and extension personnel are fully aware of the stage of development of the technology."

I suggest that this example strongly supports the contention that project- based organisations are more suited to applied R & D than those with a discipline-based structure.

The legal structure of a research body can also influence the effectiveness of the research effort. The Australian Meat Research Committee is soon to be revamped into a small Livestock and Meat Research and Development Corporation (LMRDC). By providing the Committee with the legal structure of a Corporation it is removed from the detailed and stifling process of Ministerial approval; given far greater authority over the management of resources; and is provided with the authority to enter into contracts, call for tenders, make patents, participate in joint industry research, initiate research and development work and to undertake research projects of its own creation. These changes should provide the opportunity for a more entrepreneurial approach to research, especially the applied research and development work.

The corporate structure could provide distinct advantages for many research institutes. Furthermore, if institutes were required through a corporate structure to earn a proportion of their funds from private contracts, an ongoing incentive to respond to the needs of industry and forge productive links with industry would be created.

I would like to conclude with some brief comments on the transfer of new technology to the users. McCausland reported that in Scandinavia, where there is no apparent research to development gap, they

continually emphasised the fundamental importance of personal discussion in effective dissemination of research results to a wider audience. They have little faith in the ability of leaflets and seminars to transfer technology. However, McCausland found that the most effective single method of technology transfer in a number of countries is undoubtedly the transfer of the scientist from the research institute into industry. CSIRO has taken several laudable initiatives to encourage researchers to move into industry with their inventions. Other institutes should explore this objective.

In conclusion, I am grateful for this opportunity to further contribute to the very constructive debate which is continuing on Australia's research effort. I am confident this debate will result in the proud performance of our research effort over the last 30 years being repeated. It must be repeated because the continuing importance of agriculture in this economy depends on it.