# Constraints and opportunities facing Australian agriculture : an economist's viewpoint

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Developments in world agricultural markets and in the rest of the Australian economy will continue to exercise a powerful influence on the future pattern of Australian agriculture. These forces, together with our resource endowment, can be used to suggest priority areas for research and extension. To this end my paper will consider three interrelated sets of issues: some key features of the present agricultural sector; future trends in the commodity composition and cost structure of our agriculture, and some implications of these trends for the choice of research projects.

# Present Industry Pattern

It is important to recognise the enormity and complexity of the agricultural sector. It is not just farming and production of grass, crops and animals. Modern agriculture involves a complex of many production stages. The activities of providing machinery, fertilizer and managerial advice to farmers now absorbs over one half of the average farmer's gross receipts. More important is what happens from the farm gate to the consumer. Just as an example, consider the transition of wheat from the time it leaves the header in farmer A's paddock in North Star till the time it turns up as a wrapped loaf of sliced bread in an air-conditioned supermarket in Melbourne or Tokyo. It is estimated that of each consumer's dollar spent on food about two-thirds goes to off-farm activities of storage, transport, processing and distribution and only thirty cents goes to the farmer. What is important is that improvements in technology and efficiency at the off-farm levels as well as at the farm level provide benefits to the producers and consumers of agricultural products. Also, in evaluating new technology and other changes it is imperative to cast the evaluation in this broad context. Thus, for example, a new crop variety which has the same yield/hectare but which at the same time has smaller demands on purchased fertilizers or which reduces the costs of off-farm transport (e.g. less bruising) and processing (e.g. less wastage or higher yield) could provide greater benefits to farmers as well as society than anew crop variety that increases yield per acre.

The typical Australian farm is a multi-enterprise activity, e.g. the wheat- sheep farm. Farmers are more interested in aggregate farm profits rather than in returns to a particular activity. In asking farmers to consider and to adopt new technology the changes should be cast within the context of the whole farm operation. Hence, at some stage it is necessary to evaluate research and extension in terms of soil, crop, livestock, economic and social implications where the important interactions are explicitly recognised.

Australian agriculture is a small part of the broader economy, yet it must compete for the use of general economy resources. Costs of hired labour, of capital, of machinery and chemicals, and, increasingly, inputs such as water for use in the agricultural sector will be similar to rates paid for these inputs in the rest of the economy.

The existing pattern of Australian agriculture reflects our relative abundance of land and the relative scarcity and high cost of labour. In a world context we have a comparative advantage in growing arable crops using large scale and highly mechanised production methods. This includes wheat, coarse grains, sugar and cotton and potentially some of the oilseeds. Similarly we have a comparative advantage in the extensive pastoral industries. Over fifty per cent of the output of these industries go to overseas markets. In this context developments in overseas economies, both as they affect the import requirements and the competition from other exporters, are the dominant determinants of future market prospects.

Australia's relative resource endowment is not compatible with development of those industries and production techniques which are labour-intensive and which have relatively small land requirements. Currently such industries include dairying, fruit growing and some small scale vegetable production. For these reasons, and because of developments overseas, particularly the protectionist policies of the developed countries of the northern hemisphere, there has been a decline in the fortunes and output of

the fruit and dairy industries to the point where exports are tending towards zero. These industries should however survive as suppliers for the domestic market.

Another set of industries provides very bulky and highly perishable products for the domestic market only. This includes the fresh milk, eggs and many of the vegetable industries. Included in the list of non-traded goods are the poultry and pigmeat industries.

An important characteristic of the Australian agricultural sector is its volatility. This stems from climatic factors, particularly in the case of crops, and from market fluctuations, particularly demand for exports. The tendency for overseas countries to protect their domestic agriculture from the viscissitudes of the world market has increased volatility in the export market. Uncertainty not only clouds trends but also it influences producers to adopt risk avoidance and contingency strategies such as product diversification, fodder conservation, choice of less variable and more drought- resistant varieties and so forth, which need to be recognised in developing new technologies that will be acceptable to producers.

#### **Future Trends**

It is convenient to look at future trends in the Australian agricultural sector in terms of non-traded goods, export goods, and input costs. Here I will focus on longer-term trends and averages rather than outcomes for specific years.

Future growth of the non-traded goods industries, which include most of the fruits and vegetables, eggs, poultry, pigmeat, and most of the dairy industry, will be determined primarily by shifts in domestic demand associated with population and real income increases. Likely developments of these forces suggest a low rate of expansion of demand of between zero and two per cent per annum. Even then, production costs will need to fall in line with world developments if domestic production is to compete effectively against world supplies, including those from New Zealand. The growth of real income will bring an expansion of demand for higher-quality products, and for more highly processed convenience foods. The latter, in turn, will mean more processing of foods, and concern by the market for farm products suitable for efficient processing.

Prospects for growth of world import demands for Australia's cropping and Livestock export industries are encouraging, but for Australian exports to increase it is necessary that we retain our competitiveness against supplies of other temperate exporting countries. Projections by the FAO, the USDA, the BAE and others generally anticipate continued growth of world import demand for food grains, a more rapid rate of growth of demand for feed grains and protein supplements for livestock feeding, growth of meat requirements, and some growth of demand for cotton and wool fibres. While there are some forecasters who see the possibility of a world food crisis in the next few decades I would place a low probability on such a trend. But this is not to deny the odd year or two of extreme price fluctuations, both up and down.

There will be a marked shift in the geographical trade pattern, with a decline in the relative importance of Europe and North America and a jump in sales to the centrally-planned and developing countries. Many of these countries are located in the Pacific area. It should be recognised that the type of product sought by the developing countries can be different from those sought by more traditional European markets. For example, it is hard to justify current milling and bread-baking attributes in wheat destined for use in noodles, chapatties, porridges and even livestock feeds, particularly when potential yield increases, perhaps as high as 20 per cent, are sacrificed.

Australia's future share of the growing world markets will depend on our costs relative to those of other exporting countries. In this context intersectoral links with the rest of the Australian economy and movements in the Australian dollar vis-a-vis the currencies of other countries are important. Because of our relatively rich endowment of energy and other minerals it is likely that these forces will work against the Australian farmer, but not so far as to cripple our chances for greater exports; more likely, land values will increase more slowly. The problem will however become critical if the country continues to follow a highly protectionist trade policy stance.

Overall, my inclination is to agree with the reasoning of the BAE that Australian agriculture will see a steady expansion in cropping and a steady to small increase in livestock numbers (see Table 1 for a summary of BAE projections). Current data on returns per hectare and returns per man-year of labour indicate a wide margin in favour of crops, mainly wheat and to a lesser extent feedgrains, over sheep and cattle. Further, the relative labour intensity of after-farm livestock transport and processing as compared to that involved in grains give further advantages to cropping.

The increase in cropping will take the form of more intensive cropping of existing areas and extension of cropping into both the drier and the higher rainfall zones. These changes already have raised questions of varieties, weed/disease/pest control, soil management, and they also have implications for the establishment, management and utilisation of pastures in cropping areas.

There will be changes in the relative costs of inputs used at the farm and the off-farm levels. Labour, which is the most important input, will continue to increase with economic growth at from one to two per cent per annum in real terms. This pattern will continue to force the adoption of processes that substitute machines for labour and which generally increase labour productivity.

The trend toward increased mechanisation of storage, transport, processing and distribution of agricultural products will place higher premiums on highly standardised products. Such standardisation can be achieved by changes in production systems and/or by the development of classification and measurement schemes. Given the variability of Australian biological and physical factors I imagine that the second option will have to be adopted.

While there is much uncertainty about future energy prices, it is likely that they will rise in real terms. But there is only a small chance that the widespread use of crops for ethanol production will be a viable economic activity over the next decade or so. The cost of Australia's most important fertilizer, superphosphate, will increase as it becomes necessary to use more costly and more distant sources of rock phosphate. Costs of machinery, buildings and other materials will remain around current real levels, although there will be many exceptions associated with rapid technological change. Costs of water, particularly that from new schemes, will rise substantially.

It is likely that the future will see continued attention by the population in general and by legislation for concern of the environment.

Table 1. Current Level of Activity and Projected Growth of Selected Agricultural Commodities

Commodity	Average 1977-8 to 1979-80 levels <sup>4</sup>			
	Gross Value Şm	Production kt	Area '000 ha	Projections to 1985-6 <sup>b</sup>
Wheat	1903	14549	10452	Increase to 14 million ha
Coarse grains	521	5822	4386	Small area increase
Rice	84	598	106	Small area increase
0ilseeds	77	331	396	Small area increase, large yield increase
Sugar	455	22034	271	Not known
Cotton	91	60	54	Growth as great as 332
Wool	1411	699	n.r.	Increase about 1% per annum
Beef	1906	1922	n.r.	Small increase
Sheepmeats	485	518	n.r.	Small increase
Pigmeat	259	206	n.r.	Small increase
Poultry	257	275	n.r.	Small increase
Pome fruits	131	42.7	n . r .	Continue decline
Stone fruits	33	94	Π.Γ.	Continue decline
Citrus	9.4	462	п.г.	Stable
Potatoes	119	822	36	Stable
Other vegetables	263	991	71	Small increase
Dairy products	620	5571(ML)	D . E .	Small decline
<sup>a</sup> From Bureau Rural Econo	of Agricultu my, Vol. 4 (M	ral Economics ay, 1982).	s, <u>Quarte</u>	rly Review of the
bFrom Bureau for medium	of Agricultu term projecti	ral Economics	s, <u>Outloo</u>	k Documents 1982
CSmall incre	ase denotes b	etween 0-1% p	per annum	
n.r. Not re	levant.			

# Implications for Research Priorities

In the final analysis, research and extension yield economic benefits when they provide an impetus for farm and off-farm producers to use new products and processes which either result in more output or lower costs. The benefits are roughly proportional to the extent of the cost reduction per unit output and to the volume of output affected (1). In the case of goods sold on world markets some of the benefits are absorbed by lower prices to overseas consumers. In addition, the benefits to Australia are reduced if the techniques are readily adopted by overseas producers.

# References

1. Edwards, G.W. and Freebairn, J.W. 1981. Measuring a Country's Gains from Research: Theory and Application to Rural Research in Australia. Report to CCREE, Canberra.