The Changing Face of Agriculture in Australia

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Abstract

This paper focuses on changes in production and farming demographics in Australia, it also provides some future trends. Australian farmers are recognised as the most efficient in the world. This is driven by having to farm oceans away from our markets, in an environment of fragile soils and an unforgiving climate. With relatively little farm support we have to be good at what we do to survive and grow. The area of land in Australia devoted to cropping reached new heights in 2001 at 24.5 million hectares. There has been an incredible increase in the area cropped during the nineties. This raises questions about our ability to maintain this growth and manage weed resistance and disease, production risk associated with high farm inputs, climate variability and price. Our cropping systems are dominated by cereal growing with increased production fuelled by a huge migration of those who ran mixed crop/livestock farms to grains industry farms. We are about to see this trend reversed. In addition, to remain globally competitive, we will have to transfer from a yield and "paddock" focus to a "whole farm" approach. We will have to embrace key performance indicators across the full range of profit drivers including water use efficiency, farm inputs, machinery, labour and financing costs. To achieve this we will need an expanded public and private extension service. We will need to provide access to better tertiary education, infield training and coaching. We will need to link all consultants and advisors to a nationally recognised accreditation program.

1. *Current Farming Practices*

The first part of this paper provides a situation analysis of the grains industry in relation to area sown, farming systems, demand for farm inputs and demographic trends.

1.1 Area sown

Winter and summer crops are mainly grown in the 350 to 700 mm annual rainfall band. Figure 1 Cropping Zone shows the cropping zone in Australia with one dot representing 2,500 hectares of crop sown.

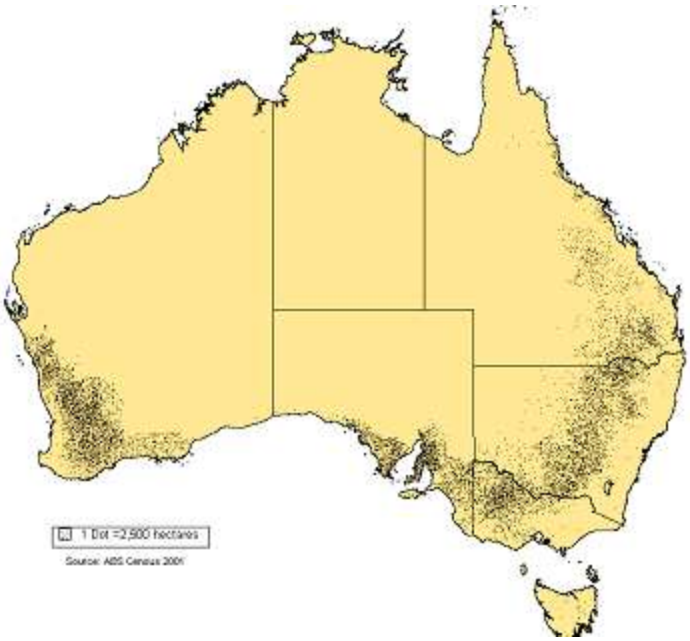

Figure 1 Cropping Zone

In the 10 years from 1992 to 2001 the area sown to winter and summer crops has increased by 8.1 million hectares from 14.6 to 22.7 million hectares. The expansion in area sown has come from increased cropping intensity on grains industry farms and an increase in area sown on mixed farms.

The rate of growth varies from state to state with Western Australia increasing by 38% to 5.8 million hectares and New South Wales increasing by 81% to 5.1 million hectares. Since the record year of 2001 Table 1 Winter and Summer Crops Sown shows the area sown has dropped slightly.

Table 1 Winter and Summer Crops Sown, 2000-01 to 2003-04

Production Year	Hectares, million
2000-01	22.7
2001-02	21.0
2002-03	20.3
2003-04	21.2

Source: ABS/ABARE

Figure 2 Area Sown by State shows the relativity in each state of hectares sown in the ten years from 1991-92 (red) and 2000-01 (green).

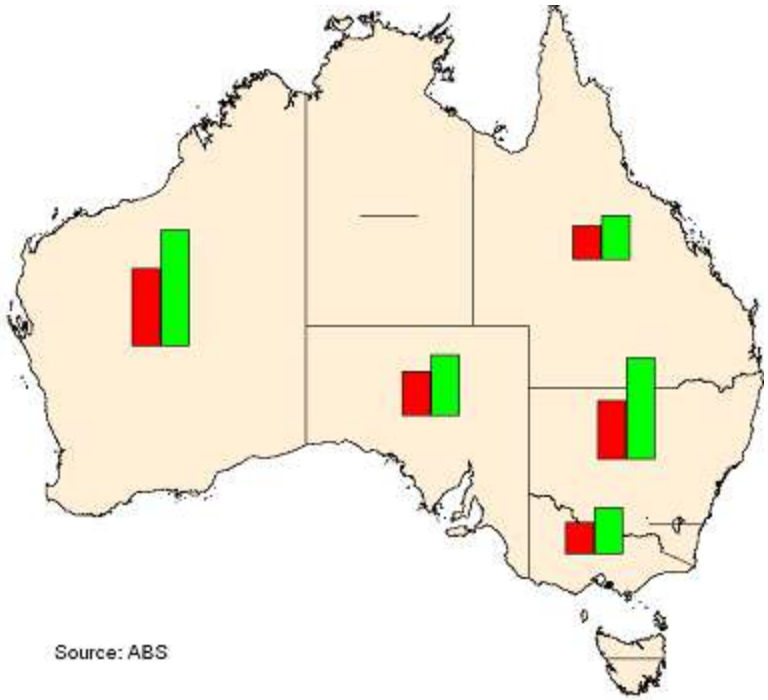

Figure 2 Areas Sown by State

This rapid growth in the area sown raises questions regarding the environmental and economical sustainability of our cropping systems. The cropping area has never been higher and Figure 3 Area Sown highlights the change over time.

Figure 3 Area Sown shows the increase in total area sown (including horticulture) from 11.0 million hectares in production year 1960-61 to 24.5 million hectares in 2003-04. The graph also shows total dry sheep equivalents (DSEs) for beef, dairy and sheep. It is not possible to compare cropping area with on sown and native pasture, however a comparison with DSEs is a starting point.

Note in Figure 3 Area Sown that two earlier peaks in cropping area in 1968-69 and 1983-84 more or less coincided with low levels of DSEs. The same is occurring now. Note also that the total number of DSEs has seldom broken outside of the 400 to 500 million ranges although there have been changes in the relativity within the beef to dairy to sheep populations.

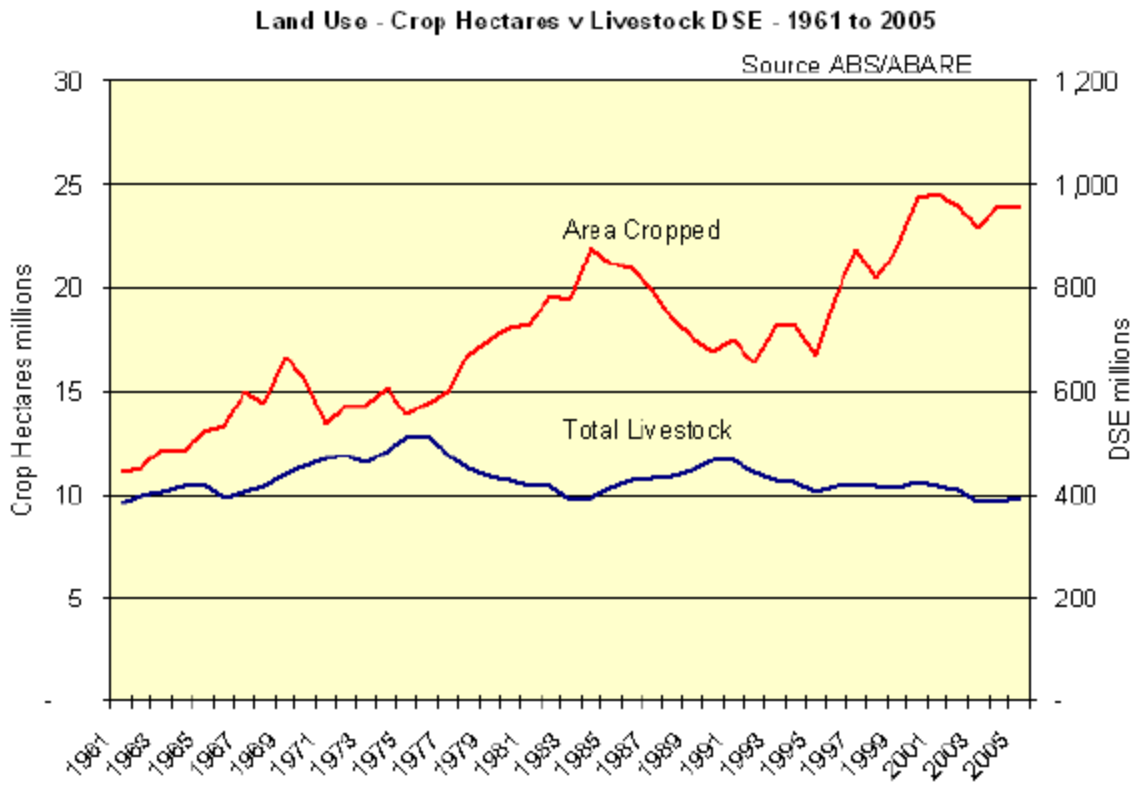

Figure 3 Area Sown

Implications

- Is this high level of area cropped environmentally and economically sustainable?
- Will the cropping area start dropping in favour of livestock as it did following peaks in 1969 and 1984?
- Do we have emerging technology to take the area cropped to new heights?
- Do we have the research, development and extension capacity to maintain or grow this level of crop production?

In summary, the area sown to crops has reached new heights that may prove unsustainable in the short term. No doubt science and technology will provide new ways to break the current barriers to further expansion. It is my view that livestock, especially sheep will be required once again to provide balance in our farming systems.

1.2 Farming Systems by State

To gain a better understanding of the change the has occurred information is provided in Table 2 Cropping by State showing the cropping mix by state for the same 10 year time frame, production year 1991-92 and 2000-01.

Table 2 Cropping by State – percentage of crop sown

State	Percentage crop hectares for production year 1991-92	Percentage crop hectares for production year 2000-01

	Cereals	Grain Legumes	Oilseeds	Cereals	Grain Legumes	Oilseeds
Queensland	87	7	5	88	8	4
New South Wales	88	7	5	85	5	10
Victoria	77	21	3	77	14	10
South Australia	91	9	1	88	8	4
Western Australia	83	17	0	78	15	7

Source: ABS

There has been little change in the enterprise mix in Queensland. Oilseeds had increased slightly in New South Wales. Grain legumes have declined in Victoria in favour of oilseeds. There is little change in South Australia. Oilseeds have increased in Western Australia. In summary, cereals are the backbone of our cropping industry so it is critical that research, development and extension continues to focus on cereal production as well as new crops.

1.3 Farm Financial Performance

Farms with financial scale are performing very well as can be seen from a sample of ABARE data for Western Australia, one of our most important grain growing states in Australia. Data was taken from their Farm Survey results for a five year period from financial year ending June 1998 to 2002. Farm cash income (income less farm costs, but excluding changes in trading stock, depreciation and imputed labour costs) averaged $173,624 from the top 25% (ranked by rate of return), a good performance. Farm cash income from the mid 50% averaged $48,916 and the bottom 25% averaged -$35,947.

The mid 50% and bottom 25% are not making enough money to meet their farm succession and stewardship obligations once allowances are made for depreciation and imputed labour costs. The challenge for agronomists today is to recognise that yield achievement is only one component of profit and that to be really successful we have to grow the business and optimise production inputs along with machinery, labour and financing costs.

1.4 Farm Inputs

With any increase in production there is an increase in the demand for farm inputs. The greatest challenge facing grain growers are to fine tune inputs to produce grain at the lowest unit cost. This means paying attention to expenditure on the main inputs of labour, machinery, seed, fertiliser and crop protection.

The main focus for agronomists now is to minimize production risk and manage inputs accordingly. As cropping intensity increases so does the challenge to manage weed resistance, disease and nutrient decline. Two graphs have been prepared to highlight the change in demand for fertiliser and crop protection inputs.

Figure 4 Fertiliser Consumption shows the consumption of phosphate, nitrogen and potassium from 1991 to 2002. Demand for phosphate (P2O5) has increased by 91% from 580 kt to 1,108 kt. Nitrogen (N) has increased by 138% from 439 kt to 1,049 kt. Potassium (K2O) has increased by 40% from 145 kt to 203 kt.

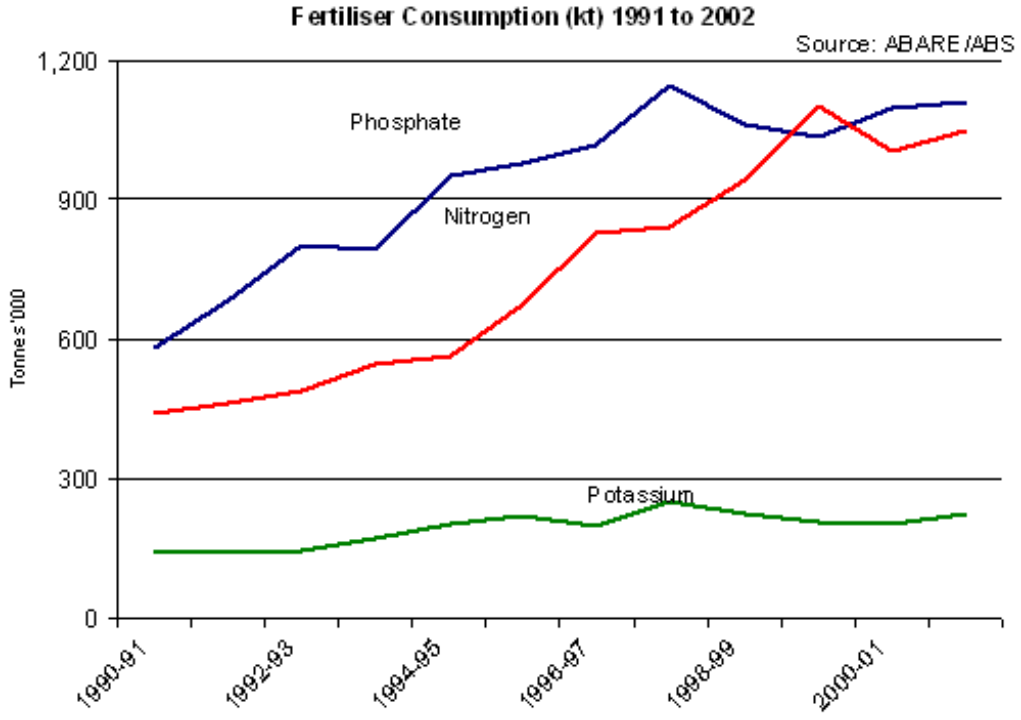

Figure 4 Fertiliser Consumption

Figure 5 Crop Protection and Fertiliser Trends shows the trend in consumption of two major farm inputs. Crop protection products have increased from $527 million in 1991 to an estimated peak of $1,451 million by 2005 (nominal dollars). Fertiliser consumption has increased from $941 million in 1991 to an estimated high of $2,044 million by 2005.

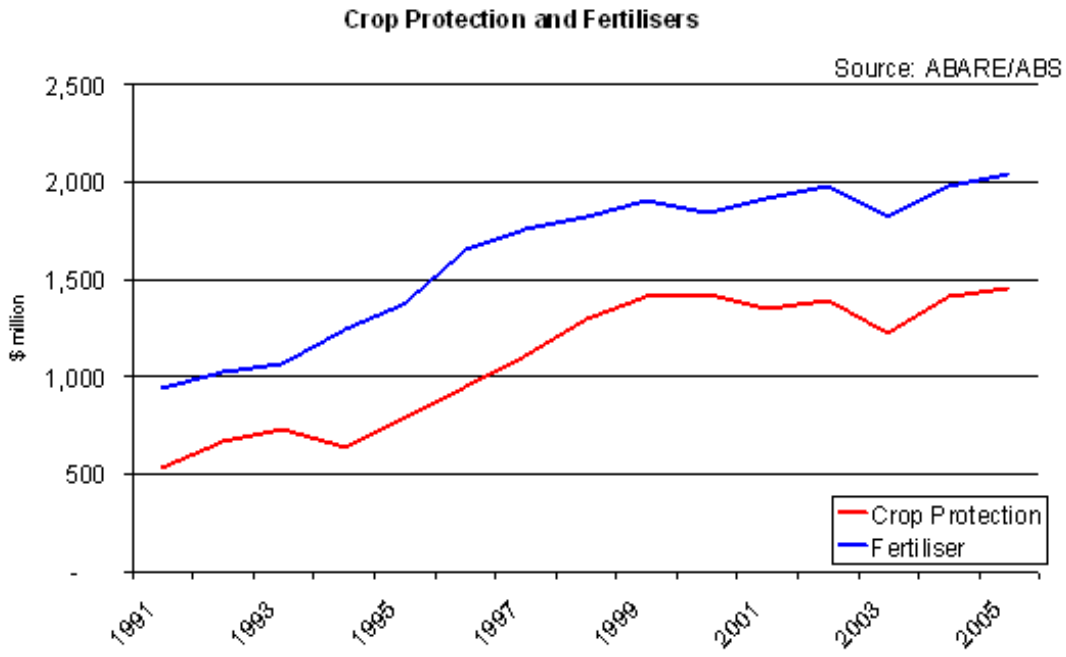

Figure 5 Crop Protection and Fertiliser Trends

1.5 Demogrpahic Trends

It is a widely held belief that farming enterprises will continue to increase in scale and that more land will be managed by corporations. This is certainly the case in the pig and poultry industry, the “top end” beef industry and intensive horticulture and dairying linked to irrigation or high rainfall areas.

In dryland cropping the family farm is alive and well and likely to continue so. There are a total of 40,500 grain producers. 39% are in the ANZSIC grains industry, 38% are in the ANZSIC mixed farming industry and the balance of 23% is spread across a range of industries such as cotton, beef and sheep. See detailed explanation of ANZSIC Industry segments in Table 3 ANZSIC Industries.

Table 3 ANZSIC Industries

ANZSIC Code	Industry	Description	Establishments
0121	Grain Growing	Enterprises defined as grain growers have more than 80% of their turnover generated from crop production. They are intensive croppers and they are focused on issues such as machinery management, rotations, nutrient auditing and integrated weed management programs.	15,956
0122	Mixed Farming	These enterprises have approximately 40% of their turnover from crop production and 40% from livestock. They have softer farming systems and wider options for dealing with weed resistance. They grow pastures so invest less on nitrogen.	15,568

Source: ABS Census 2001

A study of producer segments indicates there are still a large number of small and medium sized producers and eventually their land will be available for aggregation. Adjustments in favour of larger commercial units will be a reality for many years to come. In the meantime, extension will need to be geared to meet the needs of large “corporate” family enterprises, medium and smaller farms.

The demographics of the grains industry are constantly changing. This is driven by changes in industry viability, terms of trade, climate and price risk, environmental issues and family structures.

Grain farming segments are defined using the Australian and New Zealand Standard Industry Classification (ANZSIC). Most of the grain is produced from two industries.

Grain production takes place in other industries such as enterprises assigned to cotton, sheep or beef production. Other industry enterprises growing grain total 9,976. This brings the total number of grain growers to 40,500.

Figure 6 Demographic Trends shows the change in farms that fall into the ANZSIC grains and mixed farming classifications. Between production years 1991-92 and 2000-01 the number of grains industry farms increased significantly from 8,343 to 16,315 enterprises. On the other hand the number of mixed farms reduced slightly to 15,918. Mixed farms migrated into the grains industry but mixed farming numbers were maintained from new entrants mainly from the sheep and mixed livestock industries.

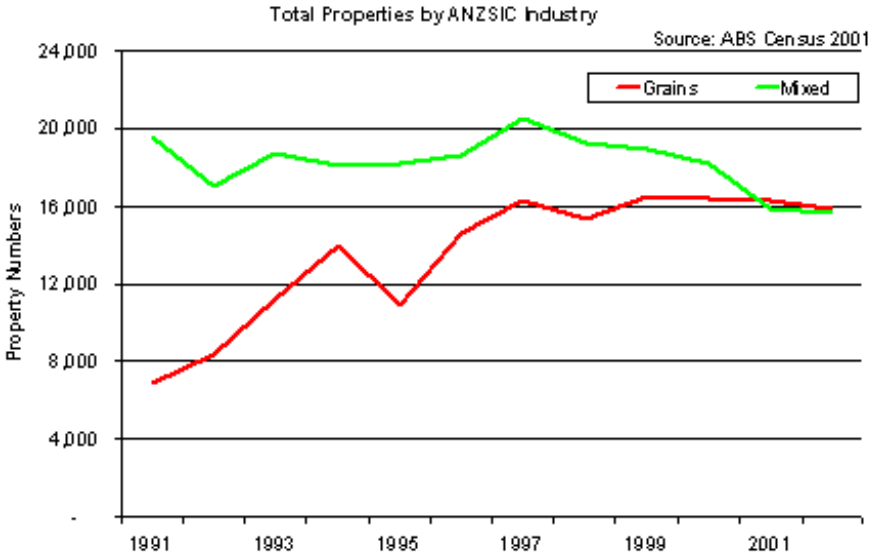

Figure 6 Demographic Trends

Implications

- Enterprise numbers are declining slowly but the average and dynamic family farm is alive and well;
- There has been a rapid increase in the number of grains enterprises and this will slow in favour of mixed farms; and
- A return to livestock in mixed farming areas over the next ten years will lead to “softer” and safer rotations so the challenge for agronomists will be to define profitable ways for grain farmers to produce more sheep meat and quality wool.

2 Business Benchmarks for Graingrowers

Most grain in Australia is grown under dryland conditions and on family farms rather than by corporate entities. Farming families will continue to form the backbone of Australian grain production. Leading edge farmers with assistance from their agronomist or consultant are now highly skilled in managing finances, production, succession, risk and their environment.

Farm Management 500 (Farm500) is a private extension program with 350 paying members in southern New South Wales, Victoria and South Australia. The aim of Farm 500 is to accelerate the adoption of farm business management. Members work in groups which are facilitated by an agricultural consultant.

In 1997 Farm500 completed the GRDC funded FAST National Project. This research identified Business Health Indicators to measure Whole of Business Performance. These indicators are now used extensively by the farmer participants and the grains industry in general. They have focused farm managers on areas which require priority attention or deserve praise.

In June 2003, the Farm500 Summit provided an opportunity to update the Business Health Indicators for successful business management. As a result, some Indicators have been redefined and benchmarks modified, however the overall nature and use of the benchmarks remains the same. The updated Farm500 Business Health Indicators are detailed in Table 5

Table 4 Benchmarks (O'Callaghan, 2003)

Farm500 Business Health Indicators

	Unit	Weak	Medium	Strong
Key Performance Indicators				
1 Return on Capital	%	<2	2-6	>6
2 Change in Net Worth (annual)	%	<4	4-10	>10
3 Farm Profit	$	<0	0-90,000	>90,000
Profit Drivers				
4 Water Use Efficiency	?			
Cropping	$/ha/100mm rainfall	<80	80-120	>120
Mixed & Grazing	$/ha/100mm rainfall	<50	50-90	>90
5 Farm Input Costs	% to Farm Income	>40	40-30	<30
6 Machinery Costs	% to Farm Income	>30	30-20	<20

7 Labour Costs (includes all labour)	% to Farm Income	>25	25-15	<15
8 Financing Costs	% to Farm Income	>12	12-5	<5

The Business Health Indicators in Table 4 are relevant for most dryland cropping farms in Southern Australia. Ideally, each Agroclimatic Zone should have its own benchmarks. Gathering financial information and updating these benchmarks is a key priority. In fact the greatest future gains may well be made though expert financial management rather than through husbandry achievements in the years ahead.

2.1 Benchmarks as Decision Tools

We must know where we are in order to get to where we want to go. If we are planning a physical trip, we use a map.

Using the business health indicators and benchmarks is the key to carrying out the same process for businesses. They enable a business to establish where they are and put that in context with where they want to be, they can then plan how they are going to get there.

Then like the map for a physical journey, they can be used to track progress and reorient the business if unforeseen things arise or circumstances change.

When using Benchmarks as tools to assist in management and decision making, start with “Whole of Business” then the “Performance Measures". This gives a logical progression in questioning a businesses performance. The suggested order of use is then as follows:

Return on Capital → Change in Net Worth → Farm Profit → $WUE → Cost/Income Ratios → $/ha (Performance Indicators)

2.2 Farm500 Business Lifecycle Stages

Understanding where you are in your lifecycle and linking this to the appropriate benchmarks for business stages is a powerful new resource. Farm500 Business Lifecycle Benchmarks can be used to develop a “road map” to guide the family through each business lifecycle stage of their farming career.

Within one generation the business may move through three to four stages. This information is helping families identify each business stage and become more comfortable with their performance as they progress through the stages.

Business performance will vary with age and stage in life. For example, families with children at school and dependant parents may have heavy commitments and this may coincide with a high growth stage. The financing costs to income ratio may be very high at this point in the lifecycle.

Successful businesses may have to increase their scale to accommodate the next generation. Passing through this stage can lead to highly efficient use of machinery and labour, above average inputs and profits that transfer to growth in scale.

Passing the farm on to the next generation will not be an issue for some families as their children do not aspire to a career in farming. This retiring stage may be characterised by increasing lifestyle choices, slowing down and a lower return on capital.

Most families are highly skilled at managing production but understanding and managing Farm500 Business Lifecycle Benchmarks is a different challenge. The priority is to identify where the family is now,

set new targets and budgets to reach the next business stage, then measure and monitor business performance.

It is important that every farm business identifies there current business stage, what stages they have passed through and where they would like to be in the future. In doing so, they can learn from past performance and plan for future success.

2.3 Business Stages and Growth

Business Stages can be measure as the Dollar value of Net Worth while the Business Growth can be measured as the change in Net Worth over time. The stage in the Farm500 Business Lifecycle is calculated by considering the current net worth and the change in net worth over the last five years. Table 5 Business Stages shows net worth and change in net worth values used to define each stage.

Table 5 Business Stages (Clark, 2003)

	Business Stages	Net Worth June 2002 $ (million)	Change in Net Worth, 7 Year Average %
1	Emerging	<1.2	4 -10
2	Growing	<1.2	>10
3	Successful	1.2 – 2.5	>10
4	Stable	1.2 – 2.5	4 -10
5	Re-Inventing	>2.5	4-12
6	Retiring	<1.2	<4
7	Dynamic	>2.5	>12

Note: Net Worth equals Total Assets *less* Liabilities

Farming enterprises can move between the Business Stages as they grow, mature and introduce new generations.

The key message from this analysis is that family farms in dryland cropping zones can grow to Dynamic status but then usually break up to settle family estates. This often means that the size of the farming entity is greatly reduced to accommodate two or more siblings.

Only a few farming families can actually stay in a Dynamic state through the phase if intergenerational change. This is one of the main reasons that the number of grain growing enterprises will be maintained and the only drop off in numbers will occur when technology allows a family unit to farm more land. Good examples of this technology breakthrough are with tractors replacing horses, the advent of minimum tillage and the wider use of contracting services associated with very large and efficient tractors, sprayers and headers.

Identifying the next major breakthrough in production and risk management is the challenge that we all face.

3 The Future

What we have learnt from the past is that research, development and extension have played a huge role in shaping agriculture as we know it today. Predicting the future is challenging but something we all need to consider. The trends that follow are my view only and stem from working in rural market development and with farmers in Farm Management 500 and the Birchip Cropping Group.

3.1 Farm Profits

The main challenge over the next decade will be to develop production systems that will guarantee sound farm profits. We can expect terms of trade to decline so farm managers will have to continue to lower unit cost of production. To date research and extension has focused on production and an assumption that increasing yield will increase profits. This will still remain a focus but the greatest profit gains will come from a “whole of farm” approach. This will mean fine tuning farm inputs and adopting prescription farming to minimize production risk, optimizing farm scale to effectively utilize labour and machinery and managing climate, price and relationship risk.

3.2 Farming Systems

Cropping intensity will be reduced in many parts of our dryland cropping zone. Over the next decade we will see a swing back to mixed farming with improved pastures, especially lucerne. This will be accompanied by some improvement in demand for wool and much higher demand for prime lamb and cattle meat. Pastures and crops for hay production will continue to gather momentum. This reduced cropping intensity and softening of rotations will improve our ability to manage weed resistance and reduce our dependence on artificial fertilizers as a source of nitrogen.

Production of niche crops and closed loop marketing will develop very slowly and only on soils with the capacity to produce crops with unique attributes, year in and year out. Most broadacre grain producers would rather produce bulk tonnes at the lowest unit cost. They seldom see a cost benefit in value adding. The exception will be an increase in the capacity to store grain on farm. This will simplify logistics at harvesting, improve segregation and provide wider marketing options.

3.3 Market Development and Extension

As discussed earlier the majority of dryland broadacre grain production will come from family farms. This means that there will be a constant turnover of farm managers in favour of younger farmers as part of the family succession program. The outcome will be an increasing demand for information from existing and new managers.

New generation farmers grew up with technology such as computers and the internet so have a higher demand for information and knowledge. They also lack the wisdom and native cunning developed by their parents so have to experiment in the earlier part of their farming career. The demand for market development sevices will continue to increase. These services will be provided in the following manner:

3.3.1 Manufacturers

Manufacturers of capital and expendable inputs will continue to have a major role in market development. In fact farmers are demanding a closer relationship with manufacturers because of information dilution through the supply chain and the increasing complexity of new products and services such as guidance systems or closed loop contracts. This relationship may be on a one to one basis with large commercial producers but also embraces expert communication by manufacturers through specialist print media and over the internet.

3.3.2 Input Providers and Dealers

Input providers and dealers are at the front line for extension and buying decisions. These locally based information and service providers will remain a very strong force in the future. Their advisory service will be provided as part of the sales “bundle” but increasingly they will impose fees for advisory services. There are two reasons for this, the first is that margins for farm inputs are very slim and providing a free advisory service is costly, the second is that larger farmers want to separate negotiation on price from the product/information bundle.

3.3.3 Farm Management and Cropping Groups

Independent research and extension groups will continue to be a major force over the next decade. They are locally based with members who are prepared to pay fees and a few dedicated local leading edge farmers who enjoy the responsibility of running such groups. Research and Development corporations are starting to recognize the wonderful contribution that these groups make to relevant innovation, extension and adoption. They include networks such as the Birchip Cropping Group, Mingenew Irwin Group and Farm Management 500. The future role for government extension still exists but the focus is changing towards regulatory control, OH & S and implementing environmental and water use standards.

3.3.4 Private Consultants

The demand for private consultants is increasing at a steady pace for a range of services that include succession planning, financial advise, risk management, environmental management and agronomy. The role of the private consultant is now more clearly understood, even though the ability of farmers to recognize this valuable profession and pay realistic fees is still lacking. Equally, the consulting profession is to blame for not having a united voice in Australia and positioning their profession and promoting the cost benefits of their services.

The capacity of the profession to provide adequate services over the next ten years is doubtful. The real problem is that the profession does not have the capacity to attract adequate numbers of young people into consulting. Over the next decade we need to critically review tertiary education, training programs, in field coaching and develop a national certification program for agronomists and consultants. If we achieve this we will be ready for the future.

References

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