Cell Grazing — the first 10 years in Australia

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Abstract

This paper tracks the progress of Cell Grazing in Australia from 1990 when it was first taught, to 1999, from 2 perspectives. The first is a model of an industry paradigm shift. The introduction of Cell Grazing to Australia has all the hallmarks of a paradigm shift at the industry level. It is following the classic pattern outlined by Kuhn (1970) and is well progressed to the point where its principles will be considered 'normal science' within another 10 years.

The second perspective is industry-oriented, where results obtained from properties throughout eastern Australia are presented. These results illustrate the impact that Cell Grazing can have on business profitability (up to 2–3 times higher profit), soil improvement (it has doubled the available soil P on some properties with a history of phosphate application), rainfall use efficiency (generally 50–100% up on previous levels), biodiversity (usually increases) and animal performance (variable).

Cell Grazing is described as a high-level, time-control grazing method and is thus different from continuous grazing, rotational resting, rotational grazing and multi-camp rotational grazing systems. Comprehensive definitions of the different systems are used to illustrate why the scientific literature differs from industry results. Terminology used in the literature is also categorised to assist in this understanding.

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Introduction

It was May 1989 when Dr Stan Parsons first introduced Cell Grazing and holistic management to Australia with an address to the NT Cattleman's Association at Tennant Creek. During the early 1990s, Cell Grazing was considered to be controversial. The words 'Cell Grazing' and 'Savory' frequently evoked an emotional response from rangeland and pasture scientists. This is apparently due to '*a dense emotional fog engendered by Mr Savory's personality and approach*' (Skovlin 1987). Almost all the scientific literature in fact '*proves*' that the Cell Grazing as outlined by Savory (1988) does not work (Jones 1993).

However, when Cell Grazing is analysed in depth from the perspective of both producer and researcher, one finds a fascinating dichotomy (McCosker 1991;1994) between the results of each. This paper hopes to shed a little light on the reasons for the differences.

To overcome the early conflict in opinion between Parsons and institutions with responsibility for pasture research, I travelled through the USA, Zimbabwe, Namibia and South Africa in 1991 to look at the roots and the development of Cell Grazing. Only after seeing the outcomes time and time again in all possible environments was I finally convinced that the principles could not be faulted. It was therefore only in 1991 that the first cells were built in Australia.

The introduction of Cell Grazing to Australia has followed the classic pattern of a paradigm shift as outlined by Kuhn (1970). Kuhn describes the 'normal science' (or paradigm) as '*...research firmly based upon one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundations for its further practice*'(p.10). The accompanying paper by Joyce (2000) gives a good description of 'normal science' in the context of a central Queensland cattle producer. He also outlines the elements of the new paradigm.

Kuhn depicts a typical process of a paradigm shift as having several stages. These are:

1. 'Normal Science' begins to be troubled by crises *e.g.* high business failure rates, large scale land degradation, widespread soil acidification and salt buildup. See also Joyce (2000).
2. *Ad hoc* modifications are made to 'normal science', while the idea of a paradigm shift is resisted *e.g.* poisoning or clearing trees instead of growing grass under them, monitoring without management context.
3. A new paradigm emerges, which in the beginning can explain only some of the questions which have led to the crisis in the dominant paradigm *e.g.* Cell Grazing and other **Grazing for Profit™** principles.
4. There is a small move towards the new paradigm *e.g.* a handful of brave graziers begin to step outside the conventional paradigm and try Cell Grazing. Pioneering research is conducted by Earl and Jones (1996).
   - Polarisation between the proponents occurs *e.g.* threats were made against the proponents of Cells.
   - Specialised journals and societies appear in the new paradigm *e.g.* The Stockman & Grass Farmer Journal, the **Grazing for Profit™** Club and newsletter, Acres Australia Journal, Holistic Resource Management and Pro-Graze organisations, emerged.
   - Claims are made about the need for education in the new paradigm *e.g.* courses offered by Orange Ag College and Cell Management qualifications at Emerald Ag College.
5. Discussion between the proponents is never quite satisfactory, as theories are incommensurable *e.g.* the 'Will Cells Sell' workshop in 1993.
6. New text books are written *e.g.* Savory's *Holistic Resource Management* in 1988.
7. Popularisation of the new paradigm occurs *e.g.* articles in the popular rural press now appear monthly.
8. Over time, more scientists are convinced that the new paradigm has much to offer *e.g.* a major review of grazing management experiments, based on the new paradigm, was conducted by Norton (1998), which found major flaws in institutionalised understanding. Such views, however, are unlikely to be accepted as 'normal science'.
9. Slowly, the 'new paradigm' becomes 'normal science' *e.g.* the steady shift in emphasis in the Pro-Graze arena to the principles taught by Parsons (S. Martyn, personal communication).

After 10 years in Australia, where do things now stand? The above examples compared with Kuhn's process, indicate that Cell Grazing has already passed through the early stages of an industry paradigm shift and is now situated at Steps 7 and 8. Many of the principles and the need for them, are rapidly becoming widely accepted.

Before proceeding to look at some outcomes of Cell Grazing, we need to be certain that we know what Cell Grazing is.

What is Cell Grazing?

Cell Grazing is based on a set of principles, the first of which is based on the work of the French agronomist, Andrè Voisin (Voisin 1959). The remaining principles have been steadily evolving in the extensive livestock industries, over the last 30 years. Considerable progress has been made in the understanding and extension of the principles in Australia since 1994. The first Australian research on Cell Grazing was published by Earl and Jones (1996).

Nobody can claim to be Cell Grazing unless at least the first 5 principles are followed strictly and in priority order. Experience over the last 10 years shows that it takes several training events and 3–5 years practice at running cells, to competently manage Cell Grazing. *It is therefore not for the faint hearted or those unwilling to invest in training.*

The principles are:

1. Control rest to suit the growth rate of the plant;
2. Adjust stocking rate to match carrying capacity;
3. Plan, monitor and manage the grazing;
4. Use short graze periods to increase animal performance;
5. Use maximum stock density for the minimum time;
6. Use diversity of plants and animals to improve ecological health; and
7. Use large mob size to encourage herding.

Table 1 (updated from McCosker 1991), summarises the 5 different grazing management systems, and some of the large array of names that are used by various authors. This nomenclature is based on paddock number per herd (which affects relative graze period and stock density) and type of rest, *i.e.*, time-control or calendar-based.

Why is there a difference between the perception of science and that of production?

Terminology of grazing systems and methods

A large reason for the dichotomy between scientific and industry results is the bewildering array of terminologies and approaches referred to in the literature and their general irrelevance to the practice of Cell Grazing. A review of 88 grazing experiments where a form of rotation was compared with continuous grazing revealed that only one was in fact Cell Grazing (McCosker 1993).

One of the problems with interpretation of the literature is the use of similar terminology to describe different systems. For example, Taylor *et al.* (1993a;1993b) in Texas, described a High Intensity Low Frequency (HILF) grazing technique where each of 7 paddocks was grazed for 22 days and rested for 132 days. They subsequently altered the graze and rest periods to 7 and 42 days, respectively, and called this Short Duration Grazing (SDG). Both approaches, however, were Rotational Grazing systems with a different rest period (See Table 1).

Under the HILF system they found that high successional grasses responded favourably but livestock performance was less than optimal. Under SDG with 7 paddocks, livestock production was enhanced but it resulted in a decrease in the standing crop.

Both outcomes were predictable based on the principles of Cell Grazing as outlined above, *i.e.*, a consistently adequate rest period improved range condition (Principle No 1) in the former and a shorter graze period increased animal performance (Principle No 4) in the latter. Being calender-based, neither is a Time-control Grazing method. Nor would the terminology of '*High Intensity*' and '*Short Duration*' equate with the intensity or duration recommended for Cell Grazing.

Taylor *et al.* (1993b) concluded that there were few advantages to be gained from 'more intensive' grazing systems but recommended a combination of continuous grazing, HILF and SDG (their definitions) throughout the year. This is a good example of the classical *ad hoc* modification of 'normal science' while resisting the new paradigm, described by Kuhn (1970). Taylor *et al.* (1993a;1993b) apparently accepted the disadvantages of each system, without attempting to break the nexus between the requirement of the plant for adequate rest and the need of the animal for a short graze period. This nexus can be broken only with more paddocks, which is a fundamental principle (No 4) of Cell Grazing (the rejected paradigm).

The dichotomy between the scientific literature and commercial results

Bryant *et al.* (1989) has been frequently quoted (Burrows 1990, 1992a, 1992b; Hacker 1993) as providing the reasons why Short Duration Grazing (and by implication Time-control Grazing) should not be used by Australian graziers. There are several problems with this proposition. Firstly, Bryant *et al.* (1989) base their comparisons on the Merrill system ('*3 herd, 4 pasture deferred rotation system*'), the *2 pasture switch back system* (both Rotational Resting systems) and the HILF systems ('*1 herd, 7 pasture, high intensity, low frequency systems*') which is a Rotational Grazing system. All were calender-based and conducted at low stock density and thus bear no relationship with Cell Grazing.

Secondly, the conclusions drawn by Bryant et al. (1989) were 'based on experiences of Texas Tech researchers with greater-than-recommended stocking under short duration grazing systems [see the definition of SDG used by Texas Tech defined by Taylor *et al.* (1993a) above] compared with yearlong grazing'. It is therefore apparent that Cell Grazing Principle No 2 was broken in this work.

Thirdly, there is some confusion in the paper by Bryant *et al.* (1989) as to whether the conclusions are based on SDG, HILF or a combination. Nevertheless, the claims made by Bryant *et al.* (1989) provide a good framework to examine the dichotomy.

Claims:

*SDG resulted in a decline in individual animal performance.

Table 1. A summary of grazing systems and methods.

System/ method	Common names and/or sub-methods	Definition	Comments
Continuous	– Continuous grazing – Set stocking	Plants are continuously exposed to animals.	At high stocking rate, it causes widespread overgrazing of plants, is drought- and erosion-prone, and has fluctuating animal performance due to variations in quantity and quality. At low stocking rate, it causes undergrazing in patches and overgrazing in the remainder. May lead to woody weed ingress and overuse of fire. Animal performance is high and relatively stable.
Rotational resting systems	– Spelling – Deferred rotation – Deferred grazing – Merrill system	One or two more paddocks than there are herds or flocks. Rest may vary from weeks to years.	May defer effects of overgrazing. Leads to undergrazing and can reduce animal performance. Common reasons for use include: burning, drought reserve, special animal needs, allowing plants to seed.
Rotational grazing systems	– Rotational grazing – High intensity, low frequency grazing (HILF) – Short duration grazing	3–7 paddocks per herd on fixed calendar-based moves.	There are many approaches using rest periods of 30–365 days. Suffers from lower animal production than continuous grazing in 43% of cases studied. Perpetuates patch grazing and consequent under- and overgrazing effects. Can slow degradation in about 50% of cases. Can be used only on sweet country due to the effects of a long rest period on quality.
Multi-camp rotational grazing systems	(a) High utilisation grazing (HUG) – Acocks/Howell system – Short duration grazing – Non-selective grazing – Crash grazing – Mob grazing (b) High performance grazing (HPG) – Controlled selective grazing	(a) HUG. > 7 paddocks/herd. Each paddock is severely grazed before moving to the next, generally on fixed calendar-based moves. (b) HPG. > 7 paddocks/herd. Each paddock is lightly grazed for a short period so that only the most palatable plants are grazed. Ungrazed undesirable plants eventually die out. Calendar-based moves.	(a) Will reverse land degradation. High stock density and long grazing periods can lead to high utilisation and good animal impact. Suffers from very low animal performance. Usually uneconomic due to low gross margin. (b) Will reverse land degradation. Designed to increase palatable species. Has a short graze period and high animal performance. Has low stocking rate and is hence more wasteful of rainfall and sunlight energy than HUG. Usually uneconomic due to reduced turnover.
Time-control grazing methods	(a) Production focus – Block grazing – Strip grazing – Rational grazing (Voisin) – High density, short duration grazing (b) Holistic focus – Savory grazing method (SGM) – Cell grazing – Controlled grazing – Management Intensive Grazing (MIG) – Planned grazing – Ultra-high density grazing	> 7 paddocks/herd, but usually 20–40. Moves are based on the growth rate of the pasture and its physiological requirement for rest. It is not calendar-based. Requires high stock density. (a) Production: Focus on maximising plant and animal production. (b) Holistic: Focus on ecosystem sustainability and optimising profit.	Recovery period is determined by plant growth rate. Paddock number and recovery period then determine graze period. Varying recovery period protects the plant. A short graze period maintains high animal performance. Combines the best features of D(a) and D(b). Makes more effective use of rainfall and sunlight energy than other approaches.

*SDG did not improve diet quality of grazing animals.

Response:
Most Rotational Grazing systems which have long graze periods (22 days in the case of Bryant *et al.* 1989) will depress animal performance. Diet quality (Taylor *et al.* 1980) and consequently dry matter intake (McCosker 1993) are depressed as the graze period is extended. Graze periods of 1–3 days will maximise animal performance. *Principle No 4 was not adhered to in their work.*

Claim:
*Doubt has been cast on the hypothesis that SDG improves animal (spatial) distribution.

Response:
Spatial distribution of stock is improved by having a high stock density. Minimum recommended stock density to improve utilisation is 10 head/ha for cattle and 60 head/ha for sheep (McCosker 1991). Success in Australia has been greatest when stock density has exceeded 20 head of cattle/ha or 200 sheep/ha. The stock density used in the experiments summarised by Bryant *et al.* (1989) averaged 0.68 AU/ha (from Taylor *et al.* 1993 b) for the HILF systems. This is approximately one-tenth of the minimum and one-thirtieth of a good level. *Principle No 5 was therefore not adhered to in their work.*

Claim:
*SDG produced no positive influence on germination or establishment of seeded or native plants, but it did result in soil compaction.

Response:
Significant transitions in the pasture community of a brittle ecosystem (Savory 1988; McCosker 1993) are the result of adequate animal impact. Adequate animal impact is unlikely to occur at less than 5 head of cattle or 10 head of sheep/ha (McCosker 1991). The experiments quoted by Bryant *et al.* (1989) did not approach these levels. *Principles No 5 and 7 were not adhered to in their work.*

Species which can grow for extended periods, such as perennial grasses, are successful at penetrating heavily compacted soil (Russell 1977). Root development, however, depends on the plant producing sufficient carbohydrate. Unhealthy plants, be they under- or over-grazed, are typically shallow-rooted, *e.g.* roots of black and blue Grama grasses in New Mexico penetrated to 120 cm, 60 cm and <30 cm on properly grazed, overgrazed and badly overgrazed rangeland, respectively (Russell 1973). Therefore, the compaction found by Bryant *et al.* (1989) would indicate that their pasture was not well managed.

Claims:
*SDG did not improve range condition at the same or higher stocking rates compared with continuous grazing; however, data indicated that range condition might be maintained under SDG at slight increases in stocking rate (10–20%).
*SDG did not increase grass or forb standing crop. Dramatically increased stocking rate was not possible.

Response:
It is highly improbable that carrying capacity can be lifted in a Rotational Resting or Rotational Grazing System by more than 10–20% due to poor utilisation (a function of low density grazing), generally inadequate rest and lack of animal impact. A survey of properties using either Multi-camp Rotational grazing or Time-control grazing for 5–25 years (average 9.5 years) in the USA, RSA, Zimbabwe and Namibia, indicated an average increase in carrying capacity over that time by a factor of 2.1 (McCosker 1991). *Ignoring Principles No 1, 2, 3, 4, 5, 6 and 7 will all contribute to this conclusion.*

In a study conducted on a 16-paddock Cell in Kansas by Darrell Emmick of the New York Soil Conservation Service (Cubbage 1992), it was shown that:

- the animal unit grazing days increased from 80 to 147 per acre (+84%);
- forage production increased from 3561 kg/ha to 6976 kg/ha (+96%);
- average daily gains remained similar to a continuously grazed program; and
- the property owner saved US $100/cow/year on input costs.

Despite the fact that the second principle of Cell Grazing is to match stocking rate to carrying capacity, reviewers such as Jones (1993) and Burrows (1992a; 1992b) express concern that stocking rate can be doubled with Cell Grazing. Table 2 indicates why carrying capacity has been lifted under Cell Grazing. Data in Table 2 were collected on a property near Windhoek, Namibia (Argo Rust, personal communication). This property has operated under Cell Grazing since 1970 and shows clear long-term improvement.

This improvement in range condition has led to an improvement in carrying capacity, which has in turn led to a doubling of the stocking rate.

Table 2. Long-term range condition trend on a property in Namibia (from McCosker 1991).

	Maximum points	1969	1982	1988
Soil condition	20	0	17	18
Vegetation density	10	2	4	7
Vegetation composition and structure	10	3	9	9
Plant vigour rating	10	2	9	9
TOTAL	50	7	37	43

Claim:
*The level of economic input and management intensity required to establish and operate a SDG system is excessive, except to increase the ease or flexibility of livestock handling. The return did not justify the expense.

Response:
Economics are best left to the people who have to make their living out of grazing. Australian industry results are typified by those of Sparke (2000) and Joyce (2000) in the accompanying papers. Ninety-five percent of international respondents to a survey indicated that TCG or MCRG significantly increased their profitability, and 80% had reduced labour inputs (McCosker 1991).

Claim:
*SDG resulted in an increase in animal yield per unit area grazed if stocking was increased. This would be true regardless of grazing strategy.

Response:
See Principle No 2.

The claims by Bryant *et al.* (1989) and the above responses clearly indicate what happens when the Cell Grazing principles are not applied. The question now is: 'What happens when the principles are applied?'

What happens when the Cell Grazing principles are followed?

In all the data quoted below, Cell Grazing was an important component; however, other factors also contributed to the profitability results. The practitioners quoted have also been students of the *Rural Profit System*, which has involved intensive training and support in business management, nutrition, ecology, reproduction, finance, economics and active benchmarking. The profitability results are therefore not a direct outcome of Cell Grazing alone.

Profits generally go up

The following 2 graphs show results from a group of central Queensland beef producers (Figure 1) and a group of Tasmanian wool growers (Figure 2) who have implemented the *Rural Profit System*™. The Tasmanian group have substantial areas of their properties under cells, while the central Queensland group started to be influenced by cells only in the last 2 years. Both data sets indicate that the case study groups started as average producers, but both have moved their profitability above their contemporaries and closed the gap with the top 25%, against downward price trends.

Cost of production goes down

Figure 3 shows that, for the central Queensland beef case study group, cost of beef production has been lowered by approximately 30–40c/kg. At the same time, return on assets managed has doubled, despite substantially lower beef prices in 1998/99 than in 1993/94. The years 1992 to 1995 were severe drought years in central Queensland, with 1996 to 1998 having above average rainfall. While the data are not shown, the Tasmanian producers also substantially lowered cost of production by about 50% (See Tables 4 and 5).

Inputs go down

In high input areas such as the southern and northern tablelands of NSW, and parts of Victoria and Tasmania, graziers who have adopted Cell Grazing have reduced inputs. Generally they have ceased fertilising or substantially reduced it, ceased artificial weed control measures, substantially reduced animal health costs and ceased substitution feeding of livestock with hay, silage or grain. These are obviously inputs and costs that are not needed in an environmentally based management system. One of the best examples of this has been where a Flinders Island grazier split

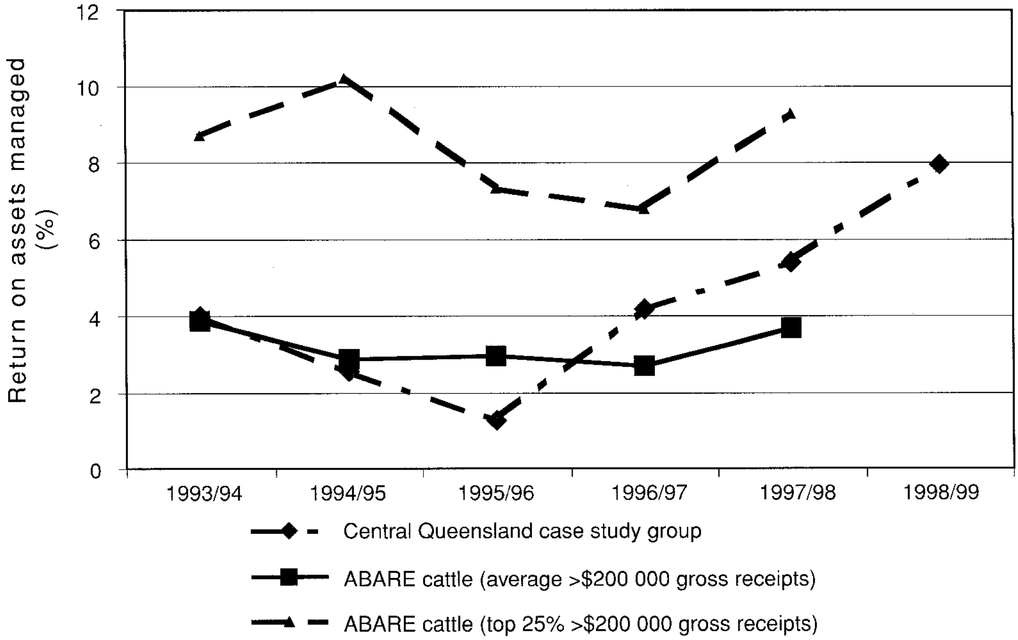

Figure 1. Comparison of return on assets managed between ABARE results and a case study group of central Queensland graziers who have implemented the *Rural Profit System*™. Note — ABARE figures for 1998–99 have not been included as actuals are not available.

his property into 3 portions and ran 3 different production systems for 5 years. 1999 was an extreme drought year, but the cells still maintained a high stocking rate relative to the two continuously grazed systems, both of which had been fertilised annually, and the high input system, very heavily (Table 3).

Table 3. Relative stocking rates from 3 production systems on 'Burra Downs', Flinders Island.

Years	Continuously grazed, conventional input control system	Cell grazed and low input system	Continuously grazed, high input system
1995	100	100	100
1996	100	120	120
1997	100	120	120
1998	85	120	100
1999	73	110	93

Production and economic performance from the total property are shown in Table 4.

Despite two-thirds of the property being run under systems which were less effective, the owners, Steve and Marie Crawford, have made improvements to the business. As a result of the relative performance of the 3 systems during the 1999 drought, both the conventional and high-input systems are to be disbanded in favour of Cell Grazing over the whole property.

The Fergusson family on their 'Grindstone Bay' property on the east coast of Tasmania have shown similar results from the introduction of Cell Grazing, as shown below in Table 5. Annual pasture renovation, maintenance fertiliser and overheads have all fallen while there has been a corresponding increase in carrying capacity and gross margin per DSE.

Table 4. Production results from 'Burra Downs', Flinders Island, during four years of drought.

	1994/95	1995/96	1996/97	1997/98
Cost of production ($/kg greasy wool)	4.64	2.97	2.79	3.09
Wool price ($/kg greasy wool)	4.65	3.40	3.68	4.10
Annual rainfall (mm) (AAR = 750mm)	550	550	470	620
DSE carried	3044	4879	6550	7769
Return on assets managed (%)	–0.2	2.1	3.1	3.4

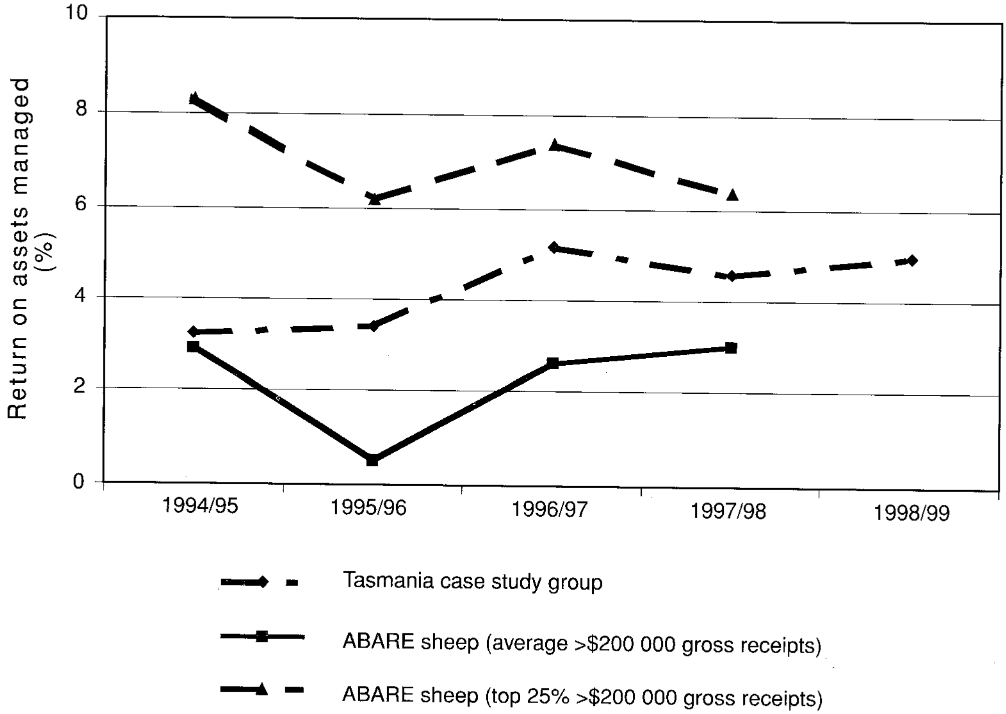

Figure 2. Comparison of return on assets managed between ABARE results and a case study group of Tasmanian graziers who have implemented the *Rural Profit System*™. Note — ABARE figures for 1998-99 have not been included as actuals are not available.

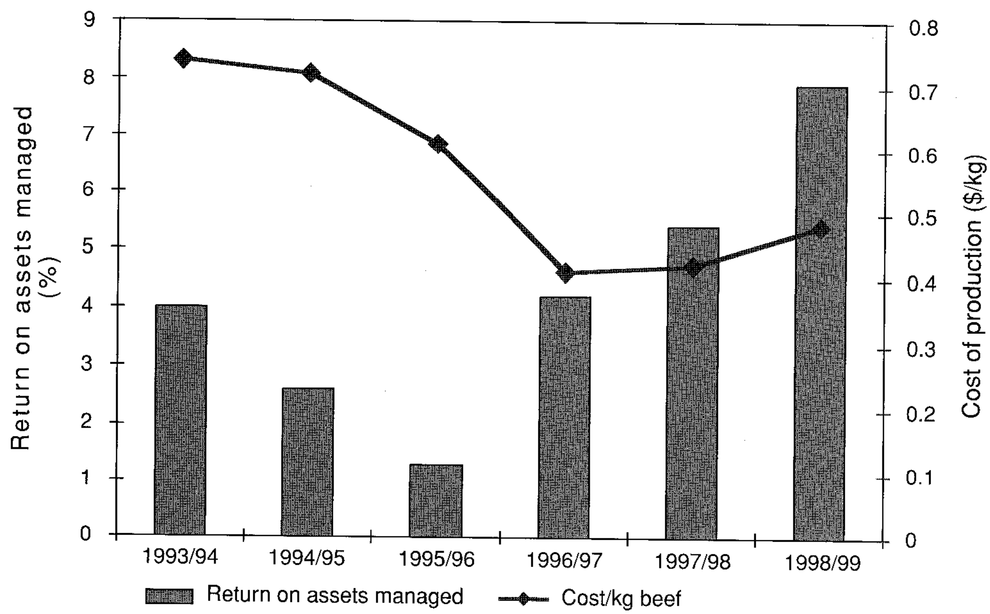

Figure 3. Trends in return on assets managed and cost of production from a case study group of central Queensland graziers who have implemented the *Rural Profit System*™.

Table 5. Production and economic results on 'Grindstone Bay' with the introduction of Cell Grazing.

	Average pre 93/94	1993/94	1994/95	1995/96	1996/97	1997/98
Carrying capacity (DSE)	15 000	16 491	19 198	18 212	24 246	24 775
DSE days/100mm rain	450	350	342	270	580	641
Wool CoP ($/kg greasy)	>6.00	3.60	4.28	1.87	1.64	2.35
Wool price($/kg greasy)	na	3.62	6.80	5.11	4.63	6.67
Gross margin per DSE ($)	na	11	22	20	20	24
Gross product/labour unit ($)	na	107 000	122 672	128 429	163 000	171 343
Fertiliser (kg/ha SSP)	180	71	60	0	50	50
Annual renovation (ha)	100	10	10	10	10	10
Overheads ($/ha)	84	43	44	33	42	44
Rainfall (mm)	500	540	530	807	486	435
ROAM (%)[1]	na	2.8	3.6	3.2	4.2	4.6

[1]Return on assets managed.

Soils improve

Results released by Drs Christine Jones and Judi Earl (see Table 6), showed that on one New England property, which previously had a long history of superphosphate application, the available soil phosphorus levels doubled under Cell Grazing compared with conventionally grazed sites, within 2.5 years (reported by Forge 1999).

Table 6. Soil phosphorus levels (ppm P) at 'Lana', NSW.

Date	Continuous grazing	Cell grazing
Mar 94	4	4
Dec 94	7	5
Nov 96	11	22
Oct 97	8	16

Available soil P has doubled without the addition of more fertiliser. This result has been replicated on both 'Burra Downs' and 'Grindstone Bay', in Tasmania (A. Beattie, personal communication). A probable explanation for this is the improvement in root mass and a consequent increase in soil biological activity, which has led to a transfer of P from the total P pool to the available P pool. This effect has been demonstrated only on soils which have a long fertiliser history and an obvious store of unavailable P, and is expected to be restricted to these conditions.

Rainfall effectiveness improves

Christine Jones (quoted by Forge 1999) found also on 'Lana' that soil strength was lower and infiltration rates significantly higher under Cell Grazed sites compared with conventionally grazed sites.

Figure 4 shows the trend in rainfall use efficiency from 1994–1997 for 'Wirranda', a central Queensland property (see also Sparke 2000). A 50–100% increase in effective use of rainfall has proven to be an achievable goal within 5 years in most areas in Australia, where cells have been in operation for that long (RCS **Profit**Probe™ data). This translates into higher carrying capacity followed by higher stocking rates. Reasons for this improvement include increases in utilisation, lowering soil strength due to root development and increased biological activity and higher ground cover.

Pastures improve

Cell Grazing has the ability to reverse the decline of perennial pasture species. This was demonstrated most clearly by Earl and Jones (1996), who showed scientifically, what graziers who use the Cell Grazing system have observed. Practitioners of Cell Grazing report an increase in desirable species (*e.g.* the return of green panic or phalaris to degraded pastures), a significant increase in native legume content, better ground cover, and a reduction in undesirable species. The data below in Figures 5(a) and 5(b) are from GRASSCheck sites on a north Queensland property, and are representative of these trends. Figure 5(a), only 500m from water, indicates a strong increase in ground cover and an increase in the bluegrass species. Figure 5(b) is 1000 m from the same water. This was a bare area which has had a substantial increase in ground cover. The 1000m site (Figure 5(b)) has both an increase in bluegrass species and an increase in *Aristida*. This is an expected response on

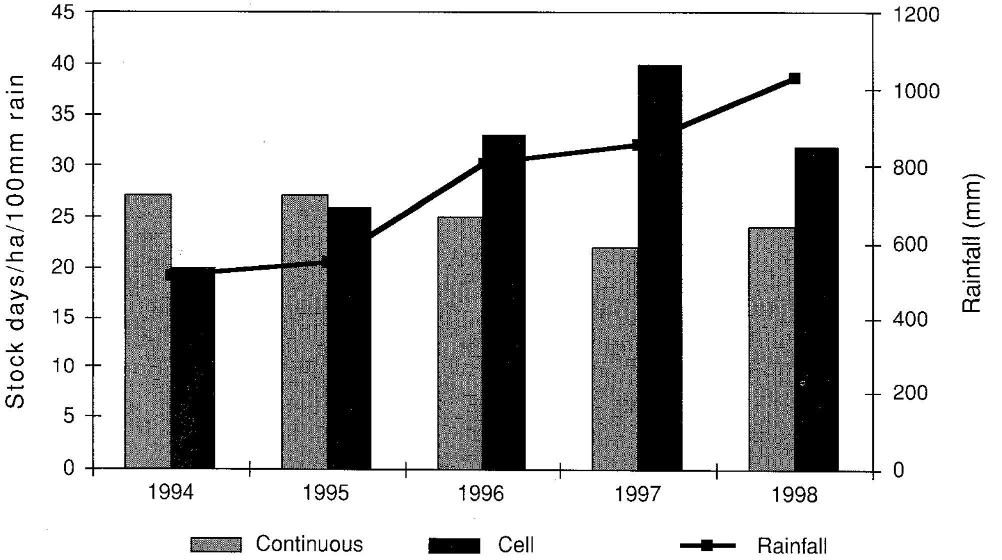

Figure 4. A comparison of water use efficiency in cell grazed and continuously grazed paddocks on 'Wirranda', a central Queensland property.

degraded land, where the pioneer species was the first to colonise the bare ground. The less desirable *Aristida* is expected to decline over time as the soil conditions improve. Figure 5 shows both total desirable perennials and ground cover increasing under cell grazing at the same time as stocking rate is increasing.

Animal performance usually improves

Two recent surveys of our NSW clients showed the following:

	Mail survey	Workshop survey
No. of respondents	20	60
% with higher performance[1]	50	30
% with no change	40	50
% with lower performance[1]	10	20

[1]Performance was judged relative to experience prior to cells.

The NSW survey results (S. Martyn, personal communication) showed that animal performance (per unit) can be either lower or higher in a proportion of cells. A number of management factors, including the use of dams as water sources, stocking rate exceeding carrying capacity, and nutritional deficiencies, were identified as the major causes of poorer performance. A more recent review of Cell Grazing in Queensland (RCS internal report, May 2000) found that some very high animal production has been achieved in cells (*e.g.* conception rates exceeding 90%, fattening Jap ox). However, a similar proportion to that found in NSW also had lower animal performance. It was concluded that two of the major causes of lower animal performance in the Queensland review were due to an emphasis on ecological goals (using animals to knock country into shape) and high utilisation (>40%) of available feed. While production per head has been lower in 10–20% of cells for the above reasons, production per hectare has invariably been higher.

Summary

An estimated 20–30% of Australian graziers have now heard of Cell Grazing. Some 3–4% have had limited exposure to the theory, some 0.9% have had basic training and about 0.5% have adopted the practice. The adoption rate amongst those who have had basic training in the technology is over 60%, a high adoption rate for such a complex agricultural practice.

The introduction and marketing of Cell Grazing in Australia has created a paradigm shift, which is currently only a quiet ripple throughout the country. This ripple is being reflected in a rise in simple rotational grazing techniques and the general infusion of **Grazing for Profit** principles

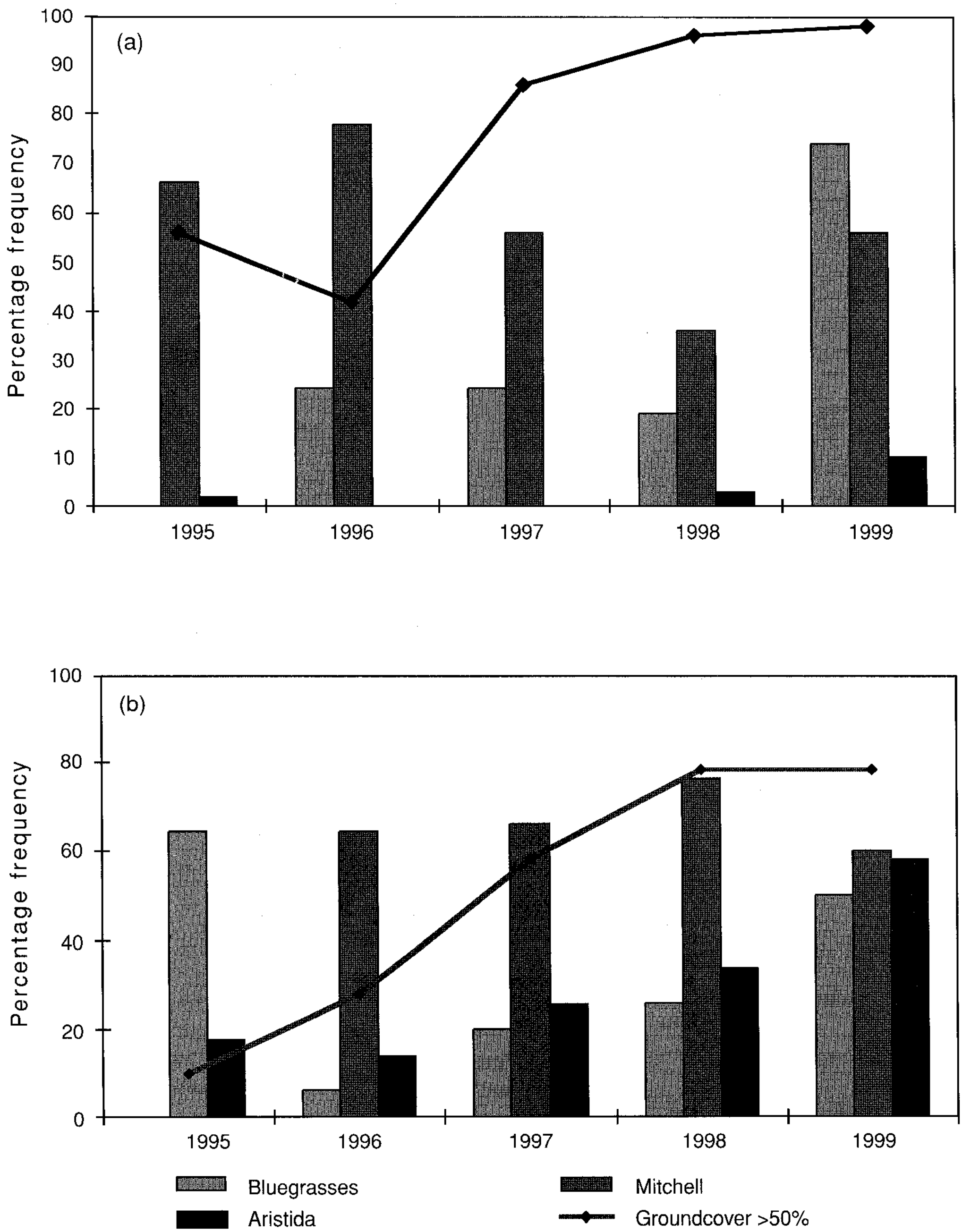

Figure 5. Frequency of occurrence of perennial species under Cell Grazing at 'Somerville', Richmond: (a) GRASSCheck Site 1 located 0.5km from water point, and (b) GRASSCheck Site 2 located 1km from the same water point.

into Prograze and the Southern Grazing Systems project.

The scientific attitudes to Cell Grazing are at considerable variance with commercial experience, and are steadily changing as a result of commercial success. The differences between much of the literature and the commercial results appear to be due to several factors. These include:

- Inconsistent terminology has lead to different techniques being researched from those being used by graziers. Additionally, the techniques being used by the innovative graziers are also changing over time as more knowledge and experience are added. The Cell Grazing method being used in Australia today is a far cry from that called High Density Short Duration grazing by Allan Savory and Stan Parsons in Zimbabwe 30 years ago, and has even changed in some respects from that taught in Australia only 5 years ago. It is thus an evolving knowledge and experience base.
- Lack of both awareness and understanding of these differences by some members of the scientific community is a problem in itself. It has been a popularly held belief that the techniques differ in name only but not significantly in substance. People who must make their living from grazing do not find the subtleties to be so academic.
- There appears to be a reluctance to accept producer experience as valid knowledge. This has led to the demonstrably false belief that good information can come only from a replicated trial which is duly written up in a recognised journal. Because of its holistic nature, Cell Grazing is very difficult to research using traditional statistical models. This may be partially overcome if more effort is expended on understanding biological processes rather than attempting to measure outcomes.
- There is little doubt, however, that the expanding interest in Cell Grazing in Australia will continue. While its adoption rate is undoubtedly being slowed by the 'old' paradigm, there is now an adequate knowledge and experience base to carry it forward without the need for much further research.
- In the final analysis, it is the practice adopted by land owners which will determine the sustainability of our pasture and rangelands.

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