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PRECISION PASTORALISM – THE KEY TO ENVIRONMENTAL RISK MANAGEMENT

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In 2001 I diversified our agricultural operation to include livestock production. We are based on the flood plains of the Darling River in the Bourke district of Western NSW. Unfortunately, or perhaps fortunately, that move into livestock coincided with the worst drought in living memory. In an attempt to maintain our core breeders we suffered horrendous stock losses and inflicted severe stress on our natural resource. I concluded that if I wanted an acceptable profit margin from livestock production, serious changes to the way I approached our grazing operation needed to be made.

We have three basic land types on our properties. A heavy cracking grey clay, being the low lying flooded country, a softer textured cracking grey clay, which surrounds the lower lying areas and the red ridges consisting of a non cracking red clay.

The pastures we have inherited are in a degraded state. Poor populations of perennial summer grasses created by years of overgrazing have resulted in heavy infestation of Black Roly Poly, particularly in the grey cracking clays. Copperburrs and saltbushes make up a large percentage of our pasture base, particularly on the red ridge country. Medics are a carpet in good autumns and winters.

The median rainfall for Bourke is 338 mm. Although rainfall is slightly summer dominant, it is highly variable all year round, especially in the summer and autumn months.

My fundamental objective as a farmer is to turn water into dollars. The challenge is how can we improve the efficiency or effectiveness of the water we receive to maximise profitability, but maintain or improve our resource health, which I consider the real production driver.

Currently the main focus of our business is cotton production. Ten years ago, if a cotton producer achieved a yield of 10 bales/ha it was considered an incredible result. In 2003 a farmer grew a yield of 15 bales/ha. This result has been achieved on very similar inputs of water and nutrition. Breeding has played a role, but the key differences are precision and objective decision-making.

Data collection has become an essential ingredient in cotton production and now drives the decision making process of growers. Targets or thresholds have been established based on research, and when triggered, disciplined decisions are implemented.

In contrast, when I look at rangeland grazing, gut feel or subjective decision-making makes up the majority of decisions. Performance is similar to that achieved 20-30 years ago and in a lot of cases considerably less.

Technology is now accessible to assist rangeland graziers manage their operations using objective measurement. Equipment is now available to assist in managing our resource using computer modelling and to manage our livestock on an individual basis. We are currently implementing this technology, and designing a management system, which enables us to scrutinise our grazing operation in precise detail.

In my view, the future for Risk Management in all agricultural enterprises revolves around the collection of data, the establishment of thresholds and the discipline to implement actions when

thresholds are triggered.

I have identified Natural Resource Management and Animal Management as the two areas we wish to collect data and set thresholds in our grazing enterprise.

NATURAL RESOURCE MANAGEMENT

My system for managing our natural resources involves measuring standing dry matter and modelling future pasture growth and quality based on soil moisture and projected climate data.

Before any analysis, it is critical that we better understand the natural resource we manage. We have done this by accurately mapping the physical features of the property using GPS. Layers we have mapped include boundary fences, internal fences, rivers, water points, pipelines, buildings, yards and roads. GPS mapping software is a tremendous tool in planning infrastructure for maximum production and designing a long-term farm plan.

Variability of pasture type, under rangeland conditions is the major obstacle in estimating available feed and its quality. This variability can be greatly reduced, by identifying the different land systems in each paddock. Using satellite imagery and mapping software we have been able to identify these key land types on our property and calculate the area for each paddock.

Importing our land types into the GRASP Native Pasture Production Model gives us the capacity to project pasture growth for each of these land types. This model can be run using a number of different weather scenarios based on criteria such as average weather data, Southern Oscillation Index or Sea Surface Temperatures.

Regular monitoring (weekly on paddocks being grazed – monthly on land being rested) of actual standing dry matter and quality, compared to the modelled data will help to fine tune the model. This monitoring also provides backup to modelled projections and is vital in identifying elements, which may not be predicted in the model run and to initiate changes in management to compensate.

Long-term improvement of our pasture is a key objective of our business. We have inherited pastures in a degraded state with low numbers of perennial grasses and high infestations of unpalatable annuals.

Permanent monitoring sites have been established on each land system on each property. Vegetation targets for each land system are being established. We aim to monitor these sites twice yearly, in summer and winter. A database of species, densities, ground-cover % and photos are being developed which we will use to compare to our targets. A review is carried out on our grazing strategy following each monitoring period to ensure we are not adversely affecting our chances of achieving our long-term vegetation targets.

REMOTE INDIVIDUAL ANIMAL MANAGEMENT

My desire in the management of our livestock is to be constantly measuring every animal's liveweight and strategically measuring other characteristics on representative numbers of each mob.

Individual animal management offers tremendous productivity gains for any grazing enterprise. The introduction of the electronic ear tag, scanning equipment and telemetry equipment gives us the ability to remotely identify and measure each animal's performance under rangeland conditions as it enters a

water point.

In the system we are developing, all waters are isolated by a trap-yard. Only the waters in an area of the paddock we are grazing are open. A remote electronic reader, weighbridge and drafter are at the entrance to these water points. As stock enter the water point they are weighed. This information is logged on computer and information is downloaded to our office via remote telemetry.

The automatic drafter combined with the electronic ear tag gives us the ability to draft animals into a holding paddock as they enter the water point. The drafter can be preset to any criteria.

Some data collection for better decision making may not need to be done on an individual animal basis. For example, to estimate calving percentages or fleece development, a relative sample, randomly selected, of animals from a mob can be automatically drafted into a separate portable yard adjoining a water point and tested.

Remote individual animal management also enables us to box mobs together but still manage them either individually or in their traditional mobs. This gives us larger mob sizes, which encourages less selective grazing and improved pasture utilisation.

Through this technology, we can obtain a wealth of information and perform a number of operations without physically having to handle the animals.

CONSIDERATIONS FOR RISK MANAGEMENT

The data collection processes we are implementing offer us the potential to scrutinise our grazing operation to levels previously unthought of. It offers us risk management solutions for environment, animal and financial performance.

The challenge is to establish a truly Integrated Management System, which interrogates the data identifying the productive spread and health of your animals and rangelands which is compared to strategic targets and when triggered, initiates a disciplined decision process. Some examples of the process are in the table below.

MEASUREMENT	THRESHOLD	ACTION
Natural Resource		
Ground Cover	< 30% ground cover	Remove all animals
Perennial grass population	> 2 / square meter	Increase utilisation to 70%
Animal Performance		
Decrease in daily liveweight of mob	Pasture losing quality & Animals losing value	Sell
Decrease in daily liveweight of individuals	> 15% below mob average	Auto draft and analyse
Financial Performance		
Commodity price falling	Projected profit drops below 10%	Fix price on minimum 50% of guaranteed production
Meat forward contract	Daily growth rate less than projected 2 months prior to delivery.	Advise buyer with new projections. If need be – cash out contract.

No risk management strategy is complete without accurately knowing your cost of production and

profit levels. Precision grazing technology enables us to view business performance daily, on an individual animal, land type or paddock basis.

Marketing tools such as the Eastern Cattle Indicator and the Mutton Indicator are available which enable us to identify opportunities. Sydney and Macquarie wool and cattle futures are also a good source for market trends and potential hedging tools. It is my objective to forward market our livestock, and we are currently communicating our system with processors and other potential purchasers.

MANAGING CLIMATE RISK

Knowing the water holding capacity of our soils and knowing the quantities of dry matter, which can be produced from that moisture, can reduce climate risk. The simple use of historical average weather data offers relatively accurate forecasting for temperature and evaporation. Running a pasture growth model based on soil water and forecasted temperatures and evaporation is also reasonably accurate.

Our current grazing strategy is to buy stock based on pasture availability from current soil water. We make no assumption for further rainfall. Our purchase criteria are based on a % return on investment. When soil moisture is depleted and before animal performance is declining, we aim to sell. If further rainfall occurs we reassess each mob. If they continue to show a good return on investment they will be held beyond their initial intended sale date, and a new sale date is established.

Seasonal rainfall forecasting may be useful in assisting in purchase decisions. For example, if the projections are for dryer conditions, we may tend to target a fattening strategy over a breeding strategy.

We have not used seasonal rainfall forecasts for decision-making in any of our agricultural enterprises to date. I see a reasonable correlation to SOI and Darling River flows, which may impact our cotton planting decisions in September. There is also a good correlation between SOI in June to August and potential rainfall for the coming season in our area of NSW.

CONCLUSION

Risk management is about protecting the downside and as we know there is plenty of downside in agriculture. Precision grazing technology enables us to implement a management system based on data collection, which provides us with information which can make the decision making process much clearer.

Once the system is established discipline is paramount. When thresholds are triggered, actions must be implemented without hesitation. Sometimes when we encounter the unexpected, these decisions will involve pain, but the pain will be bearable, and when an opportunity arises again, we will be ready to strike.

Long-term sustainability of our natural resource is an important component of our risk management system. The establishment of targets for the health of our rangelands is an important goal. Our grazing strategy must always take these goals into account.