"PRODUCTION - DOING OUR BEST"

Andrew Parkes
Parkes Agricultural Consultancy Pty Ltd.
Moree NSW

Background

Parkes Agricultural Consultancy Pty Ltd was employed by Sundown Pastoral Company Pty Ltd to manage the farming enterprises at "Keytah" 38 kilometres west of Moree in July of 1997. It is to this enterprise that these proceedings relate.

Introduction

When I was initially asked to prepare a paper on this topic I thought it would be an easy assignment to relay what it is that we do to achieve consistently high yields. Endeavouring to be both precise and concise about the specifics of almost everything we do or have done over the past six years, is almost a contradiction in terms. I will, therefore, attempt to confine this paper to the overall management issues pertaining to our production, rather than getting into the complexities of what we are doing with varieties, plant spacing, nutrition, irrigation, field design, agronomy, cropping systems, etc. Whilst these are all exceptionally important in producing the most we can out of our farming system, the interests of time and space will not allow the detail required for these topics here.

Further to this is the mass of information that we are all subject to at a conference of this nature and I, for one, have always struggled to ingest and digest the information that is directly relevant to me. Important things to me have always stuck in my mind better when referred to in an amusing or interesting way. So please forgive my indulgence in offering to you some of the "Pearls Of Wisdom" that have assisted me in management over many years.

The Drive Behind Increasing Production

"Pearl Of Wisdom Number 1" - "Yield Is King" has stuck in my mind for many years and has been the real backbone of growing continually high and increasing yields at "Keytah", as shown in Diagram 1. It was first mentioned to me by the owner of Sundown Pastoral Company, Neil Statham, some six years ago. In terms of adding large positives (or negatives) to the bottom line the greatest influence has come from yield. Arguments could be put forward that marketing, reducing costs and saving water all have significant influences on the bottom line as well but so far "Yield Is Still King". It is my opinion, however, that water has started to make a significant move on the "King" over the past few years. To the point where she, (and to a cotton grower something so beautiful yet so difficult to get hold of has to be female!), has probably already married the "King" and become the "Queen". I have a funny feeling that she has her eye on the "Kingdom". The graph in Diagram 1 shows the obvious emphasis we have placed on yield driving the overall bottom line (which is the ultimate test of "production").

Diagram 2 also starts to give us an idea of what potential is possible. This is a histogram of our highest yielding field from 2002-3. Whilst it shows a mean yield of 15.12 Bales per Hectare it also shows that large areas of this field yielded well above this figure. I guess the question then has to be: "If over 50% of this field yielded more than 15.12 Bales why can't all of it yield that?" I don't know what the full genetic potential of our latest varieties is but it must be exceptional. The trick for us as growers is to reduce the number of negative influences on that potential as much as possible during each season.

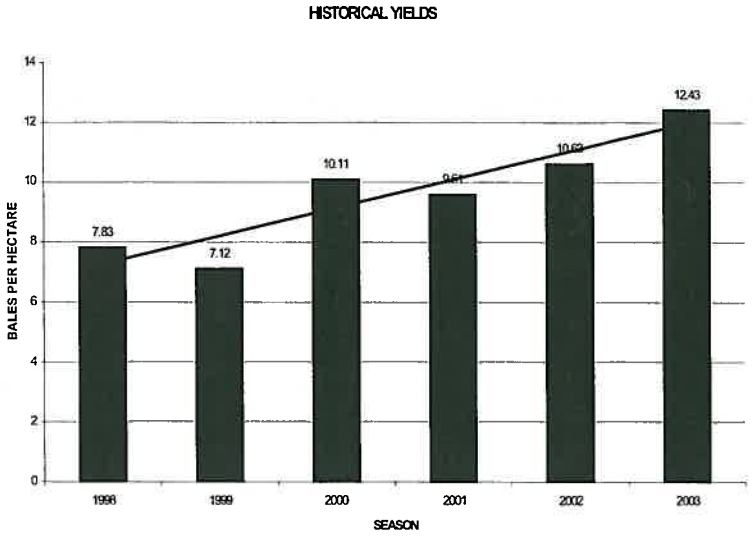

Diagram 1 Yield trends at "Keytah" since 1998

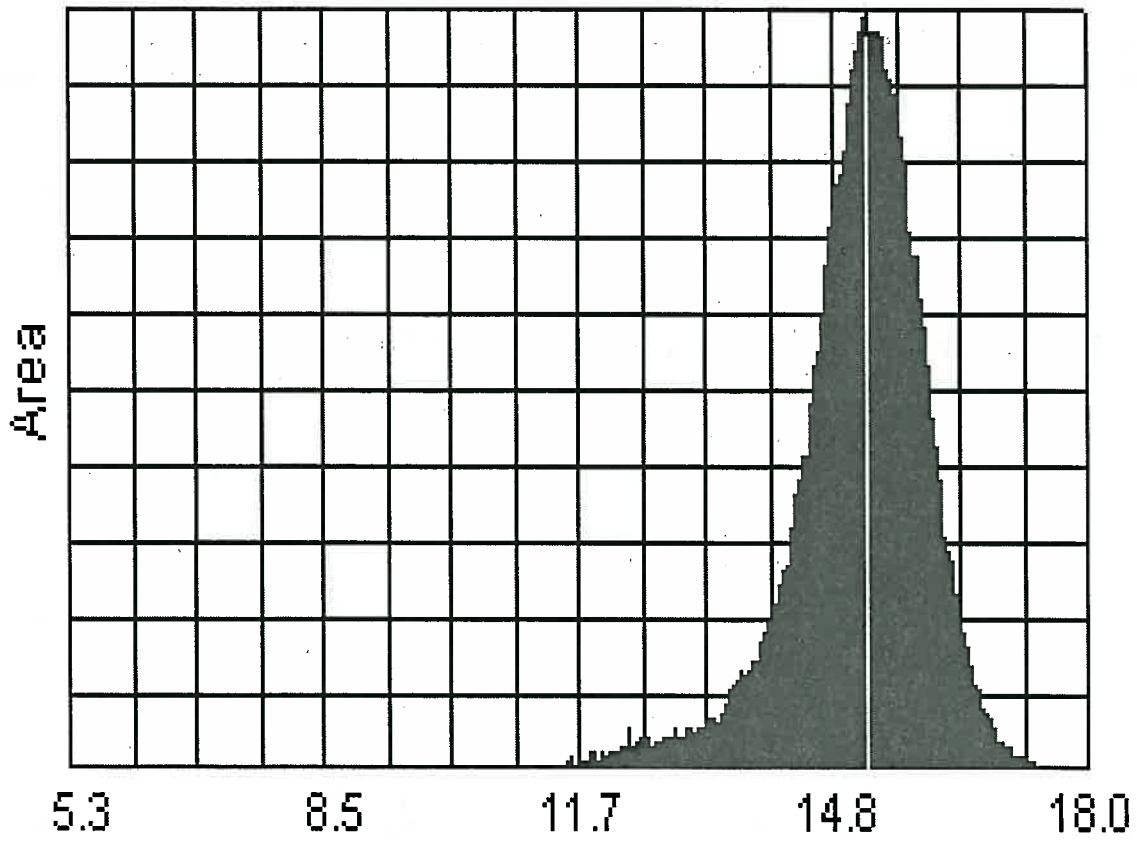

Diagram 2 Histogram Of Yield From B16 2002-3

Planning And Management For Consistently High Yields

As mentioned in my introduction there are a considerable number of influences on the production of high yielding cotton crops. When managing a farming system to achieve consistently high yields the following "broad categories" can be broken down into management components of the production system:

S	Staff
O	Operations
A	Agronomy
P	Planning
I	Infrastructure
E	Economics

These production system components, in no particular order, provide the fundamental background or skeleton through which each cotton crop is grown. They all inter-twine, overlap and rely on each other to be utilised to the best of our ability to achieve a positive result. If any one of the above individual categories doesn't perform then production will fall and the bottom line will suffer. Individually each category is generally managed separately but must operate together to be functional.

Staff

In reference to this papers title this is the "Our" in "Doing Our Best". Any successful farming system needs the focused support of its staff, whether they are direct employees, family members, contractors or sub contractors. Whatever combination is used it has to mould into a team that is required to work together along common guidelines towards a common goal. This requirement is best expressed through "Pearl Of Wisdom Number 2" which has influenced my thinking in relation to increasing our production and is extracted from the Boyce and Co Comparative Analysis.

"Top class results cannot be produced without having employees who are efficient, focused, motivated and stable."

How this is achieved and maintained is very much an individual choice worked in with the staff. The past six seasons have seen a heavy reliance on contractors at "Keytah" and those contractors have played a significant role in the increasing production trend. Having a contract system on a large enterprise enables management to focus on other areas rather than getting bogged down with the daily pass by pass operations. There is a time, however, when the thought process turns to a belief that maybe we are able to develop a more precise farming operation with our own equipment. This is the point where we are at now. The outcome remains to be seen and the next two to three seasons will tell us if this decision is right or wrong.

In moving away from a contract farming situation, even more emphasis is placed on staff. It has always been a belief that staff should share in profits and I believe that is one of the main tools we have used to ensure the staff we have are "efficient, focused, motivated and stable."

Operations

Most cotton farming operations (i.e. planting, cultivating, irrigating, etc), are similar throughout the Australian cotton growing regions. Differences from valley to valley or from farm to farm are usually only subtle. The single most important component of the farming operation, in my view, is reflected by Pearl Of Wisdom Number 3" which again is extracted from the Boyce and Co Comparative Analysis. "Top performers do all the little things thoroughly and on time". Timing has always and will always be crucial to maintaining and or increasing production just as a lack of it can be extremely detrimental to production. Poor timing in agriculture can often cause a snowball effect, and particularly in irrigated agriculture. Consider for a moment the effect of not timing a cultivation correctly before an irrigation on a quickly growing

cotton crop around early flowering. Assume the crop needs a mepiquat chloride application as well. If the cultivation doesn't get done on time then the following chain of events gathers momentum:

1. The mepiquat chloride has been applied prior to any delay being realised.
2. There will be a delay in getting the irrigation started.
3. The crop starts to suffer from moisture stress.
4. Nodes Above White Flower (NAWF) start decreasing.
5. Irrigation is started but takes longer to get through because the profile is demanding greater amounts of water.
6. As irrigation takes longer the crop still to be watered is steadily getting even drier and NAWF decrease even further and quicker.
7. As this drying trend continues in front of the irrigation schedule a water logging event is now occurring behind the irrigation as it is taking longer and longer to water each hectare because it is getting too dry.
8. A triple "whammy" on the crop of mepiquat chloride, moisture stress followed by a water logging stress drives NAWF to, and perhaps even past, a dangerous point and the crop prematurely cuts out.

I hate to even consider this scenario in a Bollgard II crop, but it does highlight the point that timing of operations and attention to detail both now and in the future will be even more important than ever before.

Agronomy

Probably the most widely varied component of the irrigated cotton production system. Nearly every cotton grower and his consultant or adviser will have a different view about almost every aspect relating to the agronomy of a cotton crop. That is why there are so many different views on variety selection, plant spacing, soil applied insecticide or not?, how much nitrogen to apply and when, when to control various insect populations and with what, what irrigation deficit to use, etc, etc.

In an area that can often appear to be exceptionally complex I often refer back to a comment made to me some ten to twelve years ago. “Pearl Of Wisdom Number 4” “No matter which way you look at a cotton plant it is just a plant and plants are fundamentally simple things”. They require certain elements to function and produce cotton:

1. They need water
2. They like lots of sunlight
3. They need to be fed
4. They don't like being eaten by insects
5. They don't like to compete with weeds

Whilst this sounds like an over simplification of the requirements of a cotton crop, it really is the basis of what the crop requires. We fine tune and vary all of these inputs according to varieties, seasons, soils, history, etc. and it is this fine tuning that helps push production higher. I believe that sometimes, however, we can get carried away with the thought that we are dealing with some incredibly sophisticated, exceptionally demanding, life form that requires all sorts of pampering and "feel good" applications of whatever we can dream up. At the end of the day it is just a plant!

Planning

Planning for cotton production is possibly the component we think least about but can have the greatest of detrimental impacts if it isn't done or isn't done well. Often we don't realise we are planning as many activities take place automatically, like how many hectares can be grown, which fields are being planted to which crops, which varieties will go where, etc. The difficult side of planning is endeavouring to make plans pro-active rather than reactive. If we are being reactive it will almost always be because of a poor result. Good forward planning will, hopefully, avoid a problem or

bad result before it occurs. There isn't much you can do once a crop is in the ground about a field that badly needs a re-lasering. You will learn at the end of that crop, however, what it costs you for not planning well enough to ensure it is re-lasered prior to a detrimental result. There are all sorts of tools that we have at our disposal today to assist us in this area. Record keeping, yield mapping, GPS height data maps, EM 38 surveys, etc. all help us get a picture of both what has gone before but, most importantly, what may be ahead of us.
The diagram below shows an example of a field that was due to be planted to an irrigated cotton crop until we received a map of the height data retrieved from our automatic steering systems. From this information we changed plans, didn't grow a cotton crop, and re-lasered the field.

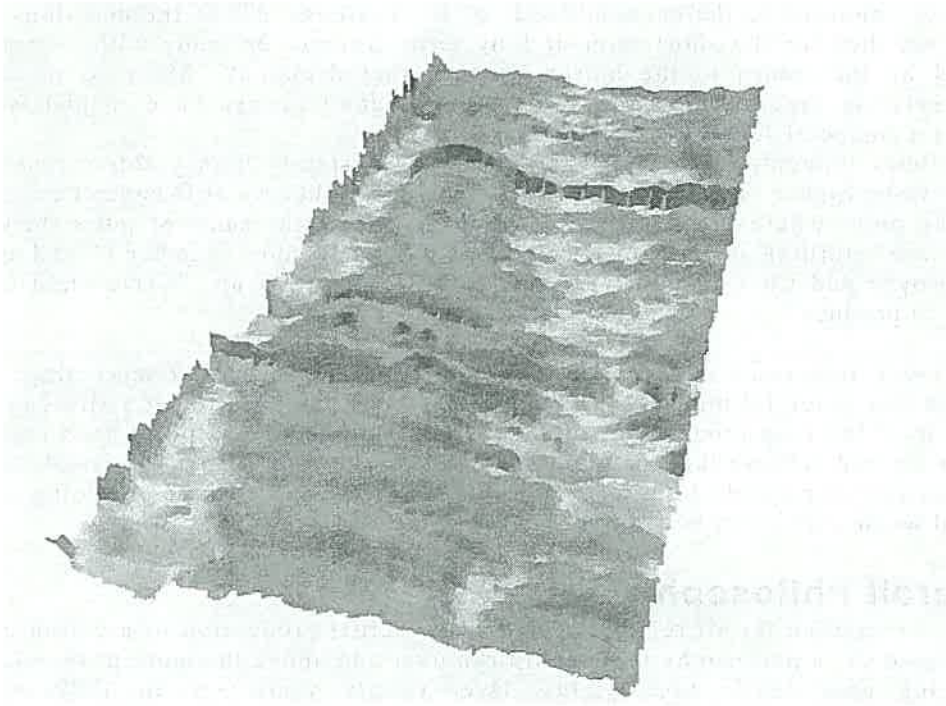

Diagram 3. A 3 Dimensional Error From Perfect Plane

Good forward planning is often referred to by people from outside an enterprise by another term - LUCK. Regularly I have heard comments like; "How lucky was Joe Bloggs, he just finished planting and got an inch of rain and I'm only half finished." In most circumstances like this Joe Bloggs would have had his planting operation planned out well in advance. The whole operation would have gone like clock work and because of that he had the opportunity to be in a position where he could finish before the rain. It reminds me of a definition I was given many years ago for LUCK and is, therefore, "Pearl Of Wisdom Number 4". "LUCK is where prior preparation meets opportunity."

Infrastructure

The infrastructure that is required to successfully operate an irrigated cotton production system is the foundation upon which almost everything else is based. The property itself, the field design, irrigation system, storage capacity, pumping capacity and efficiency, down to sheds for storage of equipment, seed, pesticides, etc. All of these, and many other, infrastructure requirements can greatly influence the

overall property production system if they aren't efficient or are pushed to and beyond their limitations. In many situations, I believe, infrastructure becomes a limiting factor that isn't thought about enough. Production disasters are just around the corner when we decide to grow 1,000 hectares of cotton that has a potential water demand of 140 megalitres per day and our pumps or supply system can provide 120 megalitres per day. To upgrade infrastructure to handle the demands that are being placed on it because we are pushing the production boundaries, can often look expensive. This is where the next component comes into play in that there must be an economic balance that can show a positive return for the dollar invested.

Economics

The production system components discussed above all relate to physical operations in the growing of a particular cotton crop. The one component that is not physical but is extremely important is the economic side of the business. All of the decisions that we make, whether for the short term or long term, have to be made with a view of "what will be the return to the bottom line of that decision?" Many of us make decisions relating inputs on a daily basis, but we don't always have to justify the decision in a financial sense.

It is sometimes thought, I believe, that growing consistently high yields means that costs have to be higher. To some extent this may be true but we still haven't even got close to the point where the dollars we are spending are the same or more than the dollars we are returning in additional cotton. "Pearl Of Wisdom Number 6" and again from the Boyce and Co Comparative Analysis best sums this up; "Extra yield costs very little to produce"

The other very important side to the economic equation is that of marketing. Our approach to this potential minefield of problems has always been to set a strategy and stick with it. If the crop production side of the equation keeps its end up then there is no need to try and achieve the top of the market because it is almost impossible to do and is definitely impossible long term. We pick a figure we know we are going to do well at and when cotton can be sold at that figure we sell it.

An Overall Philosophy?

The points covered so far all relate directly to the actual production of a cotton crop. There is, however, a philosophy that should run over and above the more physical side of producing consistently high yields. Over twenty years ago in 1982 whilst jackarooing for David Brownhill at Spring Ridge in NSW, I was exposed to a theory that David adopted in farming that I still very much abide by and is as practical today (or more so) as what it was back then. David's theory was the TIITS theory and, with apologies for the obvious, stood for:

T	Timing
I	Intuition
I	Information
T	Technology
S	Season

Timing

As was mentioned earlier in particular reference to farming operations, timing is of crucial importance in everything we do in agriculture. It is the difference between a good or bad result in every component of production mentioned earlier. It is, therefore, a timely point at which to highlight Pearl Of Wisdom Number 3: "Top performers do all the little things thoroughly and on time".

Intuition

Due to the fact that farmers are trying to make decisions every day that will be influenced heavily by what is to occur in the future, so in the absence of a crystal ball, we all need some good old fashioned "Gut Feel" to help guide the way. Something that really can't be taught, quantified or qualified and sometimes could well be argued to be something that doesn't even exist. In endeavours of sport, when trying to understand what it is that makes one athlete a little better than another, the "instinct" or "intuition" that occurs before the athlete even realises themselves is what gives them an edge. In agriculture as well, I believe, we need to regularly rely on that intuition to direct us.

Information

In irrigated agriculture today there is a plethora of information assisting us to make informed decisions that will have a positive influence on our overall operation. The cotton industry is blessed with more informed information than most other agricultural industries. With a research base and network of support, possibly second to none, as well as so much open dissemination of information between growers, consultants and industry groups the difficulty becomes: which information is relevant to me?

Technology

"Pearl Of Wisdom Number 7" " we won't experience 100 years of progress in the 21st century it will be more like 20,000 years of progress (at todays rate)" - Ray Kurzweil. The use of new technologies has had a marked influence in all areas of our production system. Gadgets and widgets have become real, tangible every day items of use in cotton production. Consider some of the technology we are using as matter of course today compared to five years ago.

EM 38 surveys,
Yield monitors,
GPS tractor guidance systems,
Variable rate application of product (both by ground and air),
Roundup ready cotton,
Capacitance probes that read directly back to the office every fifteen minutes
Near Infra Red Imagery
Palm Pilots hooked up to GPS antenna's to ground truth aerial maps

All of these technologies have had a large role to play in lifting our production levels to where they are now and will continue to play a major role in increasing our production even further. As Mr Kurzweil suggests, there will be other technological advancements that will play pivotal roles in the future as well. I would, however, like to temper the role that technology will play with "Pearl Of Wisdom Number 6", which is the only article of knowledge in this whole paper that was actually coined by me. "No technology will ever negate the need to walk into your crop". Now I know "ever" is a long time but I believe that you get a "feel" for the crop and how it is functioning by walking into it as often as possible.

Season

The one thing we haven't learnt how to control in broad scale agriculture is the weather. We have to operate within the confines of what each season offers us. Generally we all like to blame the season following a poor result but all believe a good result is due to management no matter how kind the season has been. How well we perform at seasons end shows us how well we planned for and reacted to what the season had to offer us.

Tying It All Together

The dynamics of a crop like irrigated cotton and the social, economic, political and physical environments in which we all have to operate demand that we all continue to set our production sites higher. Achieving consistently high production levels doesn't come at any major additional cost. It comes from working smarter and operating as efficiently as possible. In our operation each aim or goal we set and each result we ultimately achieve can be brought back to the two acronyms highlighted throughout this paper. As mentioned at the start I have always remembered important things to me put in a way that I can recall them. Again with apologies to the obvious my management strategy for "Production- Doing Our Best" is summarised simply as:

How well organised and utilised were our management system components: S O A P I E

AND

Did our overall philosophy help enhance the management system: T I I T S

References
Michael Boyce & Co Comparative Analysis
David Brownhill 1982 Proceedings from The Big Men Seminar