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Standing Committee on Natural Resource Management

REPORT ON CENTRAL WEST STUDY TOUR

Dubbo, Nyngan, Narromine and Wellington

Report No. 4 – December 2004

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Terms of Reference

(a) current disincentives that exist for ecologically sustainable land and water use in New South Wales;

(b) options for the removal of such disincentives and any consequences in doing so;

(c) approaches to land use management on farms which both reduce salinity and mitigate the effects of drought;

(d) ways of increasing the up-take of such land use management practices;

(e) the effectiveness of management systems for ensuring that sustainability measures for the management of natural resources in New South Wales are achieved;

(f) the impact of water management arrangements on the management of salinity in NSW.

Chairman's Foreword

This report is a descriptive account of conservation farming in Central Western NSW. The visit, by the Standing Committee, forms part of an examination that the committee is currently undertaking into approaches to land use management on farms which both reduce salinity and mitigate the effects of drought. That examination also involves ways of increasing the up-take of such land use management practices.

Parliamentary committee's are able to provide the public with a direct means of participating in the examination of problems and in formulating policies to manage them. As a result of our visit the Committee has obtained even greater practical exposure to the problems of drought and soil salinity as well as very detailed examples of how these problems are being successfully managed on the farms we studied.

The property owners we visited are all specifically mentioned in this report and I extend the thanks of my Committee to them for giving us such a detailed and useful description of their management practices.

I would also like to thank Mr Richard Chewings, the Department of Infrastructure, Planning and Natural Resources; and, Mr Neville Gould, Executive Officer, Central West Conservation Farming Association and Stipa Native Grasses Association, and other officers who gave us such valuable assistance.

The Hon Pam Allan, MP
Chairman

Chapter One - Background

1.1 This report is part of the committee's inquiry into its Term of Reference.

1.2 The report details the conservation farming practices developed by various farmers in the Central West of New South Wales. These practices focus on approaches to land use management on farms which both reduce salinity and mitigate the effects of drought. They also look at ways of increasing the up-take of such land use management practices. This information was obtained from a visit of inspection to five farming properties by a delegation from the Standing Committee on Natural Resource Management.

1.3 The delegation comprised the Hon Pam Allan, MP, Chairman, Mr Greg Aplin, MP, Mr Tony McGrane, MP and Mr Mervyn Sheather, Committee Manager.

Chapter Two - Wednesday 28 April 2004

Properties visited

Property No 1: "The Plains"

2.1 "The Plains" is situated near Nyngan. It is owned and run by Haydon Wass, his wife Heather, and brothers Michael, Nigel and Stuart Wass. Haydon Wass is the Vice-President of the Central West Conservation Farming Association [CWCFA]. The Wass brothers were the 2002 winners of the CWCFA Conservation Farmers of the Year, due to their changed farming practices using zero till.

2.2 The Wass family use both conservation farming and controlled traffic to enhance their natural resources and reduce erosion (both wind and water).They use a combination of tined sowing equipment and disc opener sowing machinery to reduce the amount of soil disturbance to an absolute minimum. Hence there is less loose soil to be removed if any water does start to run over the soil surface. They have also planted a significant number of trees to add to their 2200ha already set aside for native vegetation habitat, particularly in areas needing "squaring off" after the installation of the controlled traffic system.

2.3 They use a 5-year crop rotation system, including cereals, oilseeds and pulses, followed by a pasture ley, which provides an all-round sustainable approach. They are also adding gypsum to their duplex clay soils to stop it from dispersing and allow more water to soak into the profile quickly. This collectively has led to their soils being "softer", enabling the disc openers to be used, more "open" (due to structural improvements and soil biological activity) and more able to absorb rain where it falls and more able to grow crops with greater root systems which not only mean that they can endure harsher dry times but also are healthier and able to withstand weed intrusion, insect or fungal attack (with less need for the addition of insecticides, fungicides and/or herbicides)

2.4 No stock is currently run on the property with sheep being removed in the 1970's and cattle removed in 1999. The Wass family use lucerne as a ground cover, despite having no stock, for nitrogen accumulation, soil structure improvement and a way to control weeds without expensive chemicals. They hope also to minimise seed set of weeds and reduce the onset of chemical resistance problems. The lack of stock and the planting of crops and lucerne have been shown to encourage native grasses to regenerate, help to secure run-off and stop the sealing of the soil surface.

2.5 Stubbles from previous crops (wheat, canola, pulses or lupins, faba beans or chickpeas, and then either wheat or barley is the 5 year crop rotation), are left to provide ground cover, ie they are not burnt or cultivated. Native grasses are not sown but have regenerated naturally under the excellent soil cover provided by the combinations of cereal straw, and lucerne pastures. The policy of 100% ground cover has therefore reduced erosion to a minimum. The regeneration of native pastures (grasses and legumes) has been seen under both cropping and grazing systems across the Central West where the pasture and soil are given first priority, and animals and crops lesser priority.

Property No 2: "Jedburgh"

2.6 "Jedburgh is situated near Warren. It is owned and run by Scott and Jo McCalman. Scott and Jo McCalman are the former winners of both the CWCFA Conservation Farmer of the Year and Young Cotton Growers of the Year. Scott has also won a Churchill Fellowship and been part of the Rural Leadership Program. He is also Chairman of the Central West Research Advisory Committee.

2.7 Scott and Jo McCalman use both conservation farming and controlled traffic to enhance their natural resources and, as such, have a very similar approach to the Wasses. They are converting from tined sowing equipment to disc opener sowing machinery to reduce the amount of soil disturbance to an absolute minimum. They use an extensive range of dryland crops in rotation to build up soil health and reduce carry over of fungal diseases, chemical resistance problems and also provide a variety of carbon feedstocks for soil biota.

2.8 They also have removed stock from their property and have gone to the additional measure of filling in their original "dams" in an effort to return the property to its pristine state. They are also using a range of soil additives, including humic acid, to improve the soil condition and provide a more suitable environment for soil biota. Their major strategy is to have soil cover.

2.9 Scott and Jo McCalman are keen to have their farm as an example of "working with nature whilst farming profitably". They currently have set aside large areas on their farm as remnant areas: 20-30% of Jedburgh, and 40% on Drungalier. The "habitat" they wish to promote is one of harmony between farming and nature, where both areas of the farm are alive with above and below ground biodiversity, where soils and plants are healthy and where water is used efficiently. hey believe at present that their remnant vegetation areas are not meeting this objective and wish to have the flexibility to manage the areas accordingly.

2.10 Scott McCalman said he is being restricted by his inability to get an answer quickly enough regarding clearing approvals, and lack of flexibility in the interpretation of the Native Vegetation Acts. As one of the first farmers in the Central West NSW area to utilise controlled traffic methods, he was also one of the first to confront the issue of getting permission to clear (lone) trees within paddocks and also planting compensatory tree areas. He said there were no guidelines, on what or what not to do available at the time, leading to frustration in implementing his overall plans.

2.11 In Scott's case it was clearly demonstrated that his remnant vegetation areas were devoid of bird life and the soils were hard and unhealthy. It was his intention to "manage" these sites back to life at his own expense. He is currently building a special disc opener planter to enable him to plant crops into these remnant areas and re-establish some ground cover. It is his hope then that this groundcover would kick-start some regeneration of native pastures, with subsequent increases in soil biological and aboveground faunal activity. His overall plan would be to have his soils in the remnant vegetation area as healthy as they were in his adjacent cropping area, moist and full of soil biological activity – and this would enable the whole remnant vegetation area to become healthier and assist him in his farming operations.

Chapter Three - Thursday 29 April 2004

Properties visited

Property No 3 : "Carlile"

3.1 "Carlile" is situated near Wellington. It is owned and run by Peter and Fay Knowles. Peter is an Executive Committee member of the CWCFA. Peter Knowles regards conservation farming was a rewarding lifestyle, with a positive effect on the environment and the general community. He said the introduction of cover cropping will enable better storage of in crop rainfall through mulching, thus minimising the affect of dry spells. As a salinity control it will increase organic matter, enabling more water to be stored at the soil surface reducing deep drainage. Growing the cover crop will also use fallow moisture thus reducing deep drainage and salinity.

3.2 Mr Knowles said the best way to ensure the wide spread adoption of conservation farming is by demonstrating to local farmers that the system is better than the one they are currently practising. As for drought, no farming system is drought proof. A profitable farm with a sound business plan should allow profits to be "nest-egged" in farm management deposits for use in future lean times.

3.3 Peter and Faye Knowles have completely removed stock from their property. They did so because they:

- are a lone operator and therefore did not consider that they had the resources to run stock and crop at the same time;
- run 3 separate properties making it difficult to manage and move stock; and
- were concerned that stock would degrade they soil cover/ soil surface conditions.

3.4 The Knowles grow a diverse range of crops, including cereals (wheat, barley), pulses (faba beans, field peas), oilseeds (canola, linseed), cover crops (millet, oats). Drought tolerance is increasingly being bred into varieties of all these crops. The crop's ability to handle drought is as much dictated by the conditions into which it is planted. The conditions that are present at Carlile (and all the other properties which were visited) which would enable the crops to better survive a drought, ie normally adverse conditions, are:

- soil cover, leading to less evaporation of soil moisture;
- better overall crop management, including crops planted at the correct time;
- soil cover and improved weed management, leading to less weed growth and hence less extraction of moisture due to weeds – more for the crop; and
- increased soil health (particularly soil structure and organic carbon levels) leading to better water infiltration rates, greater soil water holding capacity, greater capacity for crops to have expansive root systems to extract soil moisture.

Property No 4: "Gillinghall"

3.5 "Gillinghall" is situated near Wellington. It is owned and run by Rick and Brenda Maurice. Rick Maurice is the Chairman, Central West Conservation Farming

Association. Mr Maurice regards "conservation farming" as farming profitably while improving the resource base of:

- Soil
- Biodiversity
- Water

3.6 Their farming system incorporates the following:

(a) all the waste in the farming system becomes food for something else.

(b) the biodiversity in the farming system is increasing not decreasing.

(c) a high proportion of the energy used in the farming system is current (ie solar)

3.7 The property implements 'best practice' approaches that mitigate the impacts of drought and salinity by:

- matching stocking rate to feed availability;
- planned grazing enables early de-stocking;
- increasing perennials in pasture;
- bring saline areas into production with salt tolerant pasture and planned grazing; and
- planting trees and enabling trees to regenerate in designated areas, adding diversity and providing shelter for livestock and wildlife.

3.8 The conservation farming approaches that are being implemented on the property have a flow on effect in mitigating the impacts of drought and salinity at a broader landscape/regional scale, as opposed to just on-farm as they are a small part of a larger catchment.

3.9 Sites have been set up on property to monitor perennial grasses, groundcover (litter layer) and diversity. Saline sites are fenced off and planted with salt tolerant species which are mostly deep rooted perennials. They are grazed in a manner, which enables them to proliferate. Grazing periods are adjusted according to growth rate at the time. That is:

- rest periods are long to enable plants to fully recover after grazing – this produces stronger, healthier plants which withstand drought; and
- the stocking rate is matched to carrying capacity measured by using grazing chart which enables de-stocking while stock are in good condition and protects the ground cover.

3.10 The cropping program includes a system call 'cover cropping'. This means having something growing in the cropping paddocks all the time. This achieves several things:

- cover over the soil – ie mulch, which reduces evaporation, and provides a healthy environment for soil biota
- biodiversity – different species different seasons
- reduces water accession to water table – water is captured where it fall which reduces danger to salinity
- reduction in chemical usage.

3.11 By sowing cereals into native perennial grass pastures (pasture cropping) – low cost crops are produced at the same time as stimulating improved pasture growth and greater profitability from paddocks not being out of production during a fallow period. These holistic management principles ensure that any water leaving the property is clear and not carrying any soil residues. The increase in biodiversity encourages a healthy ecosystem, which enhances our locality and hopefully the region. "Gillinghall" has excellent soil organic matter levels, very high infiltration levels, excellent soil structure, moderate to excellent soil cover on most paddocks and very high remnant vegetation levels. The reason for change has been mainly for management and economic reasons. They use time controlled grazing and holistic management principles to ensure that areas are not overgrazed and that beneficial species are encouraged.

3.12 These farmers are managing for perennial grasses (native and introduced) using rest in the grazing system to ensure these plants are not overgrazed and given time to set seed and develop fully. They use pasture cropping and advanced sowing (initiated in 2003) to enable ground cover to be kept 100% of the time, even in a cropping program. Strategies used at "Gillinghall" to improve ground cover are:

- the use of cover crops (forage sorghum in 2003-04) over summer;
- the use of time controlled grazing and holistic management principles to ensure that areas are not overgrazed and that beneficial species are encouraged;
- the use of pasture cropping and advanced sowing (initiated in 2004) to enable ground cover to be kept 100% of the time, even in a cropping program; and
- a higher proportion of perennials rather than annual crops/pastures.

3.13 The Resource Consulting Services "Grazing for Profit" grazing chart compares a benchmark made up of historical data (stock days per ha (SDH) / per 100mm of rainfall) to the current situation. A rolling monthly SDH/100mm provides current position versus the benchmark. Once the current position crosses above benchmark the farmer has an early warning signal to de-stock. Feed budgeting is used to determine number of days the current stocking rate can be maintained. This is important for setting stocking rate in winter when plant growth is slow.

3.14 The two properties, Gillinghall and Montauban have 85 paddocks in total. Water management over the 2 properties has been a key focus. Gillinghall has 35 paddocks that are all watered by troughs and a reliable bore. The troughs are only small but are supplemented with portable troughs where necessary. They are ultimately moving towards less watering points. These plug into a ball valve system in each paddock, which is far more cost effective than upgrading each individual trough. Montauban has a mixture of dams and water troughs, with more troughs required as the property is developed. Tracking is reduced due to the high-intensity, short-duration (1-5 days at a time) grazing strategy which gives the soil and pasture time (80-110 days) to recover between grazings ie stock will be in the paddock 3-4 times per year only so the tracking issue becomes less relevant.

Property No 5 -"Baragonumbel"

3.15 "Baragonumbel" is situated near Wellington. It is owned by Matthew and Kylie Burton, CWCFA farmers.

3.16 Improvements that have been noted since the introduction of perennial native grasses are:

- more ground cover throughout all the seasons;
- feed variety for stock; and
- "softer" ground.

3.17 The grasses on the property have not been sown – they have returned naturally to the paddocks despite the fact that the area has been farmed (cultivated) for nearly 130 years.

3.18 Species of grasses on the property include:

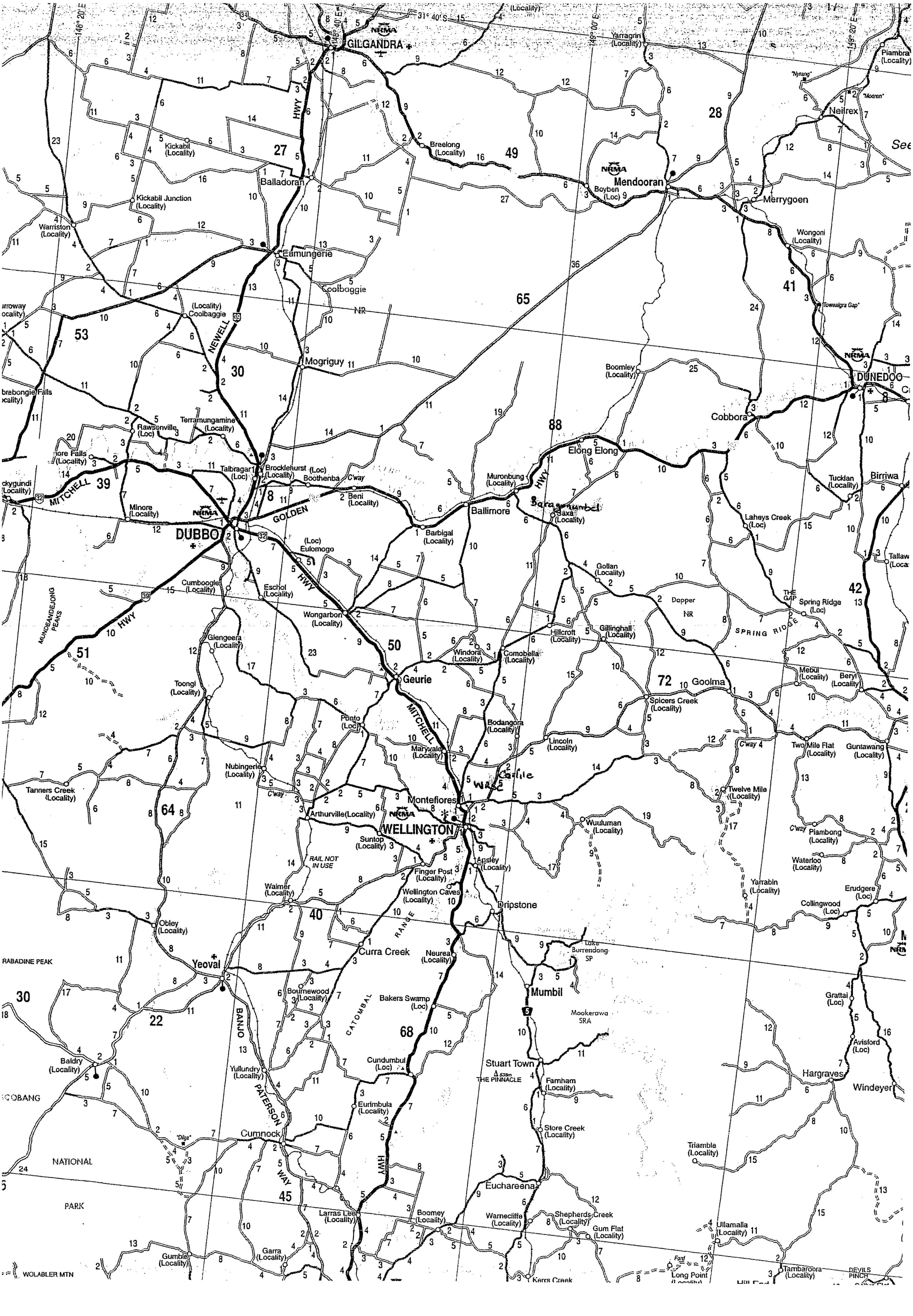
- Microleana;
- Elymus scaba, common wheat grass;
- Chloris truncata, windmill grass;
- Red grass, Bothriochloa macra;
- Warrego summer grass, Paspilidium jubiflorum;
- Queensland bluegrass, Dicanthium sericeum;
- Cotton panic, Digitiria brownii;
- Wallaby grass, Danthonia spp;
- Kangaroo grass, Themada australis; and
- Snowgrass, Poa sieberiana.

3.19 Environmental improvements that are noted in general on this property include:

- no obvious signs of dry land salinity, despite having a major saline problem on the adjacent property;
- excellent ground cover, despite the drought; and
- non-obvious scalded areas.

3.20 Mr Burton said the other benefits from conservation farming included:

- Receiving above budget prices for livestock; and
- Having time available to act as a mentor to others, talk to and motivate other landholders, and both State and Federal politicians on natural resource management issues and participate in Network for Conservation Farmers and Graziers (the alliance between CWCFA, 'Stipa' and now the Central West Sustainable Farmers Network) activities.



GILGANDRA
NRMA
Yarragrin (Locality)
Piambra (Locality)
Neilrex
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Kickabil (Locality)
Balladoran
Mendooran
Boyben (Loc)
Merrygoen
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Warriston (Locality)
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Boomley (Locality)
DUNEDOO
Cobbora
Rawsonville (Loc)
Terramungamine (Locality)
Elong Elong
Brocklehurst (Locality)
Talbragar (Loc)
Boothenba (Loc)
C'way
Muronbung (Locality)
Tucklan (Locality)
Birriwa
MITCHELL
HWY
Beni (Locality)
Minore (Locality)
DUBBO
GOLDEN
Ballimore
Saxa (Locality)
Laheys Creek (Loc)
Barbigal (Locality)
Eulomogo (Loc)
NEWELL
Gollan (Locality)
Cumboogle (Locality)
Eschol (Locality)
Dapper NR
THE GAP
Spring Ridge (Loc)
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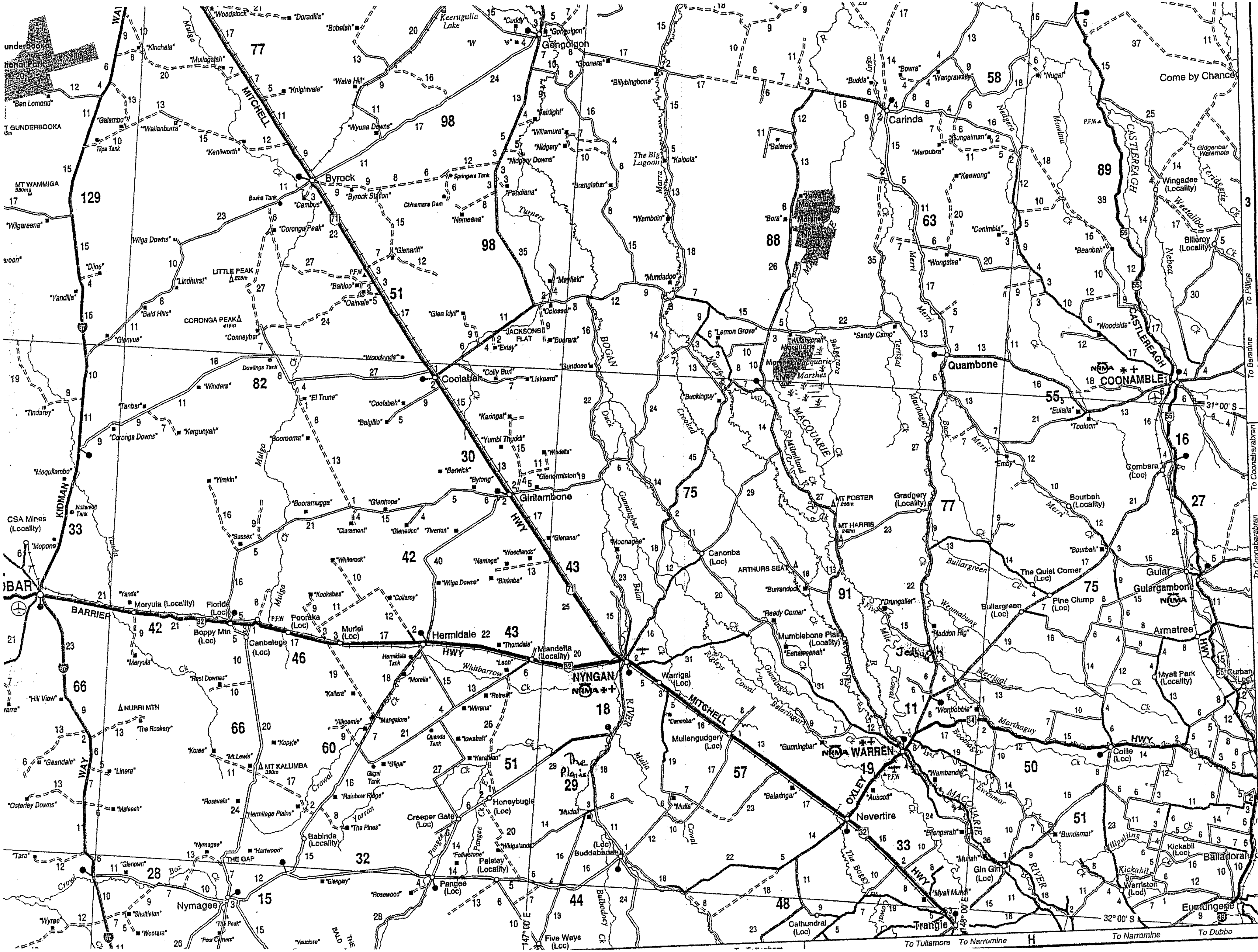
Wongarbon (Locality)
Hillcroft (Locality)
Gillinghall (Locality)
SPRING RIDGE
Glengeera (Locality)
Windora (Locality)
Comobella (Locality)
Geurie
Goolma
Mebul (Locality)
Beryl (Locality)
Toongi (Locality)
Spicers Creek (Locality)
Ponto (Loc)
Bodangora (Locality)
Lincoln (Locality)
Two Mile Flat (Locality)
Guntawang (Locality)
Maryvale (Locality)
Nubingerie (Locality)
Twelve Mile (Locality)
Tanners Creek (Locality)
Montefiores
Arthurville (Locality)
WELLINGTON
Wuuluman (Locality)
Piambong (Locality)
Suntop (Locality)
RAIL NOT IN USE
Apsley (Locality)
Finger Post (Locality)
Waterloo (Locality)
Walmer (Locality)
Yarrabin (Locality)
Wellington Caves (Locality)
Erudgere (Loc)
Dripstone
Collingwood (Loc)
Obley (Locality)
RANGE
Curra Creek
Neurea (Locality)
Lake Burrendong SP
RABADINE PEAK
Yeoval
Mumbil
Grattai (Loc)
Bournewood (Locality)
CATOMBAL
Bakers Swamp (Loc)
Mookerawa SRA
BANJO
PATERSON
WAY
Avisford (Loc)
Stuart Town
THE PINNACLE
Baldry (Locality)
Cundumbul (Loc)
Yullundry (Locality)
Hargraves
Farnham (Locality)
Windeyer
COBANG
Eurimbula (Locality)
Store Creek (Locality)
"Dilga"
Cumnock
Triamble (Locality)
NATIONAL
PARK
Euchareena
Larras Lee (Locality)
Boomey (Locality)
Warnecliffe (Locality)
Shepherds Creek (Locality)
Gum Flat (Locality)
Ullamalla (Locality)
Gumble (Locality)
Garra (Locality)
Kerrs Creek
Ford
Long Point (Locality)
Tambaroora (Locality)
DEVILS PINCH
Hill End
WOLABLER MTN
148° 20' E
148° 40' E
149° 00' E
149° 20' E
31° 40' S



Come by Chance
Gongolgon
Carinda
Byrock
Coolabah
Quambone
COONAMBLE
Girilambone
Hermidale
NYNGAN
WARREN
Nevertire
Trangie
Nymagee
Canonba (Loc)
Gradgery (Locality)
Gular
Gulargambone
Armatree
Collie (Loc)
Balladoran
Eumungerie
Kickabil (Loc)
Warriston (Loc)
Gin Gin (Loc)
Mullengudgery (Loc)
Warrigal (Loc)
Mumblebone Plain (Locality)
Miandetta (Locality)
Muriel (Loc)
Pooraka (Loc)
Canbelego (Loc)
Boppy Mtn (Loc)
Florida (Loc)
Meryula (Locality)
Honeybugle (Loc)
Creeper Gate (Loc)
Babinda (Locality)
Pangee (Loc)
Pelsley (Locality)
Buddabadah (Loc)
Five Ways (Loc)
Cathundral (Loc)
Bullargreen (Loc)
Pine Clump (Loc)
The Quiet Corner (Loc)
Bourbah (Locality)
Combara (Loc)
Wingadee (Locality)
Billeroy (Locality)
Myall Park (Locality)
Curban (Loc)
CSA Mines (Locality)
JACKSONS FLAT
MITCHELL HWY
BARRIER HWY
KIDMAN WAY
OXLEY HWY
CASTLEREAGH HWY
MACQUARIE RIVER
BOGAN RIVER
MT FOSTER
MT HARRIS
ARTHURS SEAT
LITTLE PEAK
CORONGA PEAK
MT WAMMIGA
MT KALUMBA
NURRI MTN
GUNDERBOOKA
The Big Lagoon
Keerugulla Lake
31° 00' S
32° 00' S
147° 00' E
148° 00' E
To Pilliga
To Baradine
To Coonabarabran
To Gilgandra
To Dubbo
To Narromine
To Tullamore

WASS BROTHERS PARTNERSHIP
"The Plains", Nyngan

Wass brothers is a family partnership comprising of Judith Wass and her sons and their families consisting of Michael, Haydon (Vice Chairman of CWCFA) and Heather, Nigel and Wendy, Stuart and Louise. The brothers manage "The Plains"; a property located 28kms south of Nyngan. The property has a total area of 10,360 hectares and has about a 10-km frontage to the Bogan River on the western side and 3-kms on the eastern side the river. The Pangee Creek flood plain extends along the northern side of the property; the soils on both flood plain areas are duplex red / brown hard setting clay loams with areas of self mulching grey clay. This area totals about 2000ha and is regularly flooded. The remaining soils are sandy red loams with some areas of red brown earths.

Trees on the flood plain are Myall, Belah, Black Box, Bimble Box, Wilga and Rose wood and on the sandy soils consisting of Bimble Box, Pine, Wilga, Red Box, Grey Box and Mallee with understorey of Quandong, Sword Bush and Wattles.

"The Plains" has been held by the family since 1923, and until 1970 was run as a sheep and cattle operation with fodder crops from 1933 onward. Wheat was first grown for grain in about 1958, this cropping funded land development to control regrowth that had occurred from over-grazing by sheep and rabbits during the drought years of the 1940s and early 1950s. This period also exposed some of the open duplex soil areas to severe wind erosion with some areas losing 300mm of top soil. Few watering points, over stocking and lack of transport to agistment led to this soil abuse. Floods in 1955 and 1956 germinated Black Box seedlings across the flood plain, Wilga and Bimble Box on the red soils.

Regrowth was cleared and part of this land cropped throughout the 1960s; wiregrass made way for more palatable native grasses and lucerne was planted at the end of each crop phase. Sheep were still causing ground cover loss mainly through trampling and dragging their feet. A decision was made to sell all the sheep by 1970; cattle numbers were increased to around 500 breeders and calves were sold as vealers. The change to cattle and a good run of seasons saw most of the eroded clay pan areas start to regenerate, the lucerne based pastures, high quality feed and grazing rotation would allow resting of these degraded areas. Cropping development continued through out the 1980s and by 1991 all the areas that were to be cleared were completed.

Cropping on "The Plains" has always challenged us to overcome the environmental issues such as wind erosion, ground cover, organic matter decline, soil crusting and compaction. In 1978 we purchased a 300hp 4wd tractor and 43' Morris chisel plough to which was attached an air seeder cart; this was our first attempt at stubble retention. The concept was good. However the seed placement and seed contact with stubble mixed with the soil resulted in reduced crop establishment, and the crop then had to battle disease as it developed; the yield loss in wet years was too much. We changed back to conventional cropping ways in 1983. This system was based on two cereal crops, the second under sown to lucerne. This farming system had problems as well with some major pieces of the no till puzzle still missing. Cattle and conventional cropping remained the only farming system until 1992. Good summer rain built up subsoil moisture to a full profile by March 1992, however minimal rainfall at planting allowed only the sandy soil to be planted. About 800ha had to be

fallowed through with almost full moisture. We needed a better system for this type of year; a further 200ha was chemically fallowed that spring and was no-till seeded in 1993. A trash worker chisel plough was converted with spear points and press wheels, and seed cart so as to take advantage of sub soil moisture by furrow sowing crops on time. This machine allowed us to ease into no-till planted crops and moisture-seek planting for less than $10,000.

Brothers Michael, Nigel, Stuart and Haydon with their controlled traffic Cat Challenger and Janke No-till planter

Conventional tillage at the same depth each year and soil structure decline was starting to create soil crusting and compaction. The improved lucerne based pasture had increased the cow's average weight to 680kgs; these cattle were adding more compaction in wet weather. Adding a heavier, more powerful tractor to rip up this compaction only created a better environment for faster re-compaction. What to do next?

The goal was to improve soil structure, ground cover, stop siltation of the river and wetlands, improve profitability, increase leisure time and improve or maintain the farm's biodiversity.

We had been using knockdown herbicides since 1988, mainly when the soil was too wet for tillage. This ability plus the zero till planter and a 4 ton per hectare crop from the 200ha no-till block in 1993 got us started on a positive course.

Crops grown using no-till methods increased to about 60% of crop area by 1997. That year also saw the first areas of clay pan treated with 2.5 tons per ha gypsum which was incorporated with a chisel plough. Some of these areas had yields in 1998 around 3.5t ha; normally this area would never yield more than1 t /ha.

During1997 we sold off our 20 ton Baldwin wheel tractor and replaced it with a CAT Challenger 85c on rubber tracks. An Agrowplow Plough was purchased second hand which is used in old pasture blocks when they are returned to crop. Once ripped on 26" spacings these are then no-tilled for the remainder of the rotation. 1998 also saw canola, albus lupins, narrow leaf lupins and wheat sown with no-till methods.

We commenced selling the cattle at the end of 1998 and they were all gone by June 1999. Fencing on the farm has generally been retained but a few short sections have been removed to make some cropping areas more efficient. A Flexicoil 5000 Air Drill and seed cart was purchased and fitted with knock-on Acremate knifepoints with wings. Primary Sales double shoot seed boots were also fitted. The Shearer Trashworker that we were using for no-till had seed tubes attached to the presswheel arms. They had vertical and horizontal depth adjustment which increased planting accuracy and allowed very even one pass canola establishment in 2000 sowing.

Woody weeds have been a problem on some mallee soils; these weeds have germinated in the pasture phase, and in the past they have been offset ploughed or cut off with a Copperfield blade plough. As the ungrazed pastures are now staying soft, they will now have one pass with the blade plough. This plough will remove the woody weeds and lucerne which are both difficult to kill with herbicide. The blade plough also retains 95% of the ground cover on top of the soil.

We have been considering building a bush pulling machine to remove these woody weeds when the soil is wet. Another option is a second spray line and tank fitted to the spray rig, a series of one metre long beams parallel to the ground will actuate a solenoid on that metre of boom. The bars would be positioned just above the pasture and would make contact with the woody weed to spray only that section. This operation would occur as part of the annual pasture topping that we now carry out. This system could reduce costs by as much as 90% compared to blanket coverage.

Rotations, developed over the last five years have been:

- *wheat as the first crop after pasture.* This usually targets APH quality and restores full ground cover. This stubble will remain through the second crop, which is:
- *canola* sown at 2kgs per ha, and has 100kgs of MAP and 100kgs of SOA banded below and to the side of the seed. Gypsum is applied at 350 kgs per ha instead of SOA and 50kgs of urea added in some paddocks.
- *Wheat* follows canola, all wheat crops have 100kgs of MAP banded with the seed.
- The fourth crop in the rotation is *Albus lupins, narrow leaf lupins or faba bean. Chick pea* is also being trialed in this phase with 100kgs of MAP sulphur banded below the seed.
- *Barley or wheat* is sown as the last crop and has 1kg per ha of lucerne banded in front of the press wheel. 100kgs of MAP is also banded below the seed.

Crop rotations can have a fallow year added if soil moisture is limited or too wet and if weeds are

likely to be difficult to manage in the following crop; the better gross margins are worth the wait. Total crop area each year is around 4000ha, consisting of 2400ha wheat, 800 to1400 ha canola, 200 to 800ha of pulses.

Pasture based around lucerne now covers the remaining 4160ha of arable land. This pasture also has native grasses and old crop residue to provide a mulch layer over the soil to protect against raindrop impact. This rain damage normally seals the surface and creates excessive runoff and siltation of waterways.

This soil damage also causes the surface to bake hard in the sun, which only compounds the soil damage.

Native vegetation now covers 2200ha of the farm. This vegetation is managed as habitat for flora and fauna and to provide wind breaks for crops and pastures, as well as providing cover and corridors for wildlife migration. Control of feral pigs, kangaroos, cats and foxes has been an ongoing problem. We now have about 15kms of 2 metre high fencing around southwest end of the property. This has reduced the kangaroos, however now that we have the only grass around, the kangaroos are moving in. We are now considering fencing off the water points, as this would prove more cost effective and a time saver.

Controlled traffic farm layout has been planned for a few years; most of the 2003 crop was sown on 12 metre swaths and 3 metre traffic spacings. A new high clearance spray rig is under construction in the farm workshop along with a new "Daybreak" disc opener planter; the sprayer will also have 3-metre wheel spacing and a 36-metre boom. The existing farm built spray rig will have its 21-metre boom extended to 36 metres and its sub metre DGPS replaced with auto steer guidance system.

A 12-metre wide planter was constructed for the 2001 planting. It also has the centre wheels on 3-metre centres and has 36 parallelograms set at 333mm spacing, the two units behind the wheels will be removed for permanent tracks. A tow behind Flexicoil seed cart has been set on 3 metre wheel tracks. This unit is equipped to triple shoot product to the home made fertiliser tines and side banding seed tube; this seed tube is located on the presswheel arm. This planter is pulled by a CAT Challenger 55 spaced at 3 metre tracks; this tractor had a 20cm auto steer system fitted for the 2003 planting.

A special frame is being manufactured which incorporate parallelogram arms fro the "Daybreak" disc openers. This will facilitate better depth control. The "Daybreak" planter is being used to minimise soil disturbance and will be used in conjunction with the existing tined Janke seeder.

The setting up of a controlled traffic farming system has produced areas that are not parallel to the tracks. These areas have or will be revegetated and in some paddocks new corridors added where over clearing occurred. This will bring the total native vegetation areas to 2360 ha or 22% of the property.

Planting's no chore at Nyngan

By PHOEBE KERIN

A MOVE to conservation farming for the Wass brothers, "The Plains", Nyngan, has been not only a productivity and environmental improvement but also a lifestyle change.

No longer do the brothers have two tractors running 24 hours a day to prepare soil for planting.

Instead they can sit back and relax until performing the single pass required at sowing time, yet know the weeds have been controlled and soil does not need to be worked.

The 2002 winners of the Central West Conservation Farming Association (CWCFA) Conservation Farmer of the Year award, the brothers and their families – consisting of Haydon and Heather, Nigel and Wendy, Stuart and Louise, and Michael Wass – began to change their practices in 1992.

Their first crop zero-tilled into fallow was in 1993 "with pretty rough sort of equipment".

On their 10,360-hectare property – of which 2000ha is heavy duplex clay sometimes flooded by the Pangee Creek and the Bogan River, and the balance is red alluvial sandy loam – the move to conservation farming was a necessity as wind erosion and scalded hard-setting soils meant the family's production was on a backward move.

Haydon Wass said grazing and rabbit damage 50 years ago had allowed the topsoil to be blown away and compacted the remaining soil in areas along the flood plain.

Stock are no longer a problem, the sheep having been dispersed in the 1970s and the last cattle sold off in 1999.

The Wasses now have a five-year rotation in place: wheat, canola, wheat, pulses or lupins, faba beans or chickpeas, and then either wheat or barley.

A fallow could be slipped in and a sixth year was allowed to cover any weed or moisture problems.

"Summer weed control is what it's all about and last year we saw where we missed spraying parts of a paddock and there was just no crop," Mr Wass said.

The final cereal rotation is undersown with lucerne as the Wasses allow one year of lucerne for every year under crop production.

As the family have no stock, many neighbours have questioned the use of lucerne, but its role has been to provide nitrogen accumulation, soil structure improvement and a way to control weeds without expensive chemicals.

And by minimising seed set they hope to reduce the onset of chemical resistance.

The 800 to 1000ha of lucerne sown each year has also provided necessary groundcover and mulch, encouraging native grasses to regenerate and helping to secure run-off and stopped the sealing of the soil surface.

"We are basically trying to make the soil healthier," Mr Wass said.

The duplex clay soils are less than three per cent exchangeable sodium, and gypsum has been spread to stop it dispersing and allow water to seep further into the profile.

"Before, with conventional tillage, they were hard-setting and the way we were going yields would decline.

"We don't expect to see massive yield increases straight away," he said.

Although the property has an annual rainfall of 444 millimetres, 2002 presented just 250mm for the year and 130mm in the growing season – hardly idyllic cropping conditions.

The Wasses planted 90 per cent of their 4000ha crop-growing area but some was sprayed out in September to control weeds and conserve moisture.

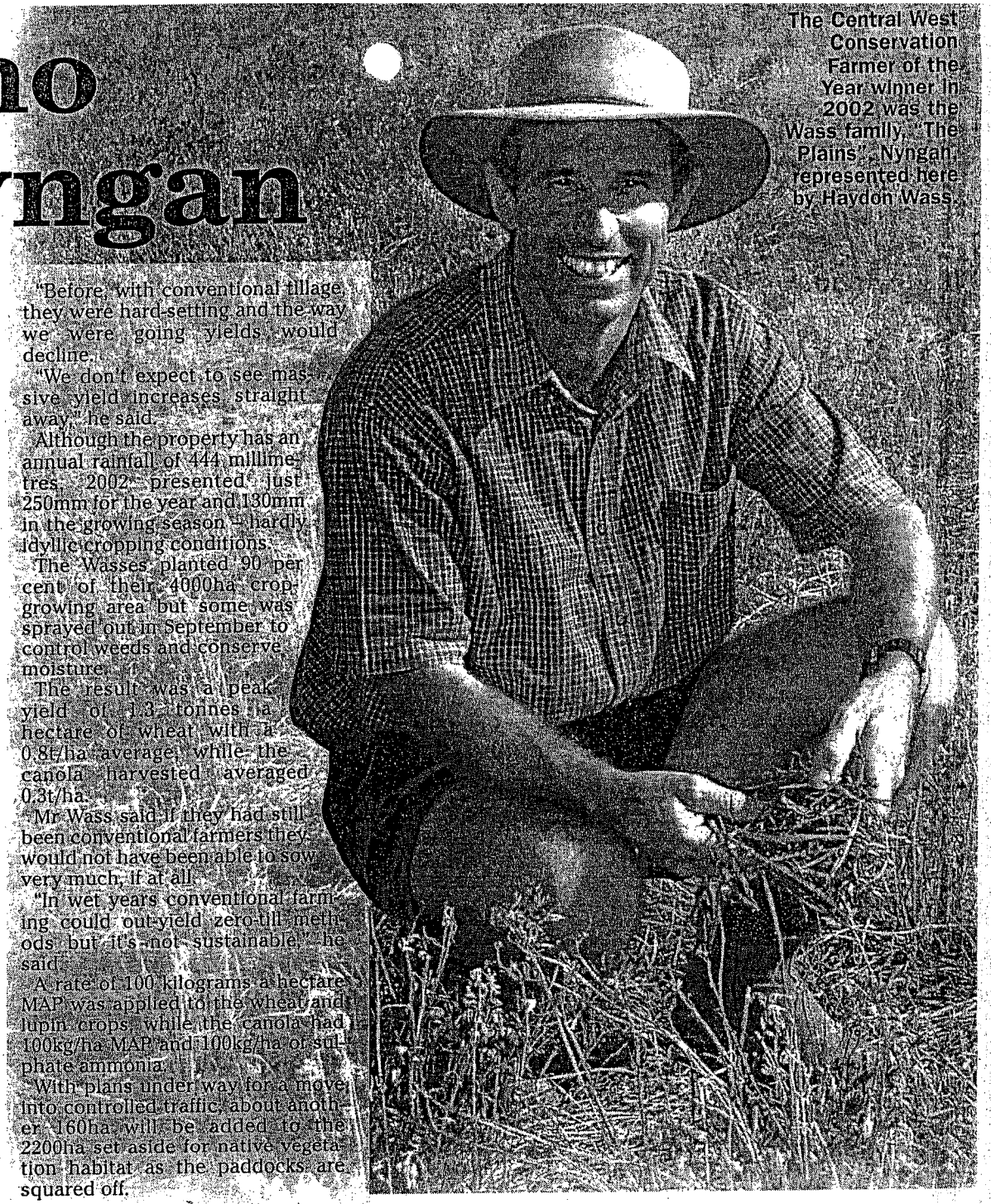
The result was a peak yield of 1.3 tonnes a hectare of wheat with a 0.8t/ha average, while the canola harvested averaged 0.3t/ha.

Mr Wass said if they had still been conventional farmers they would not have been able to sow very much, if at all.

"In wet years conventional farming could out-yield zero-till methods but it's not sustainable," he said.

A rate of 100 kilograms a hectare MAP was applied to the wheat and lupin crops, while the canola had 100kg/ha MAP and 100kg/ha of sulphate ammonia.

With plans under way for a move into controlled traffic, about another 160ha will be added to the 2200ha set aside for native vegetation habitat as the paddocks are squared off.



The Central West Conservation Farmer of the Year winner in 2002 was the Wass family, "The Plains", Nyngan, represented here by Haydon Wass.

SCOTT and JO McCALMAN
"Jedburgh", Warren

Scott and Jo McCalman are well known in farming circles throughout Australia. Former winners of both the CWCFA Conservation Farmer of the Year and Young Cotton Grower of the Year, Scott has also won a Churchill Fellowship and been part of the Rural Leadership Program. He has also been a prominent member and Chairman of the Central West Research Advisory Committee, a body formed to make recommendations on behalf of CW-NSW grain farmers to the Northern Panel of the Grains Research and Development Corporation. Scott and Jo have been well sought after speakers at local and interstate functions addressing both farming and natural resource management issues.

Their farm, "Jedburgh", on the Quambone Road north of Warren is an example of what is possible in improving soil health, even in the difficult circumstances of continuing dry years. Scott and Jo have transformed their combined dryland and irrigated properties, totalling approximately 5000 hectares, into a highly profitable and productive business through the application of conservation farming and controlled traffic farming practices. The home farm is now a habitat to a large number of above ground and below ground (soil biota) fauna. Their hope is to transform a recently acquired (rundown) adjoining property, "Drungalier", into a similar habitat but are being thwarted by current legislation in doing so.

Scott's principle motivation for the introduction of both conservation farming and controlled traffic has been to get consistency into his production system. This has been predicated on the belief that if he was able to improve soil cover and reduce soil compaction, more water could be caught and stored in the soil profile. The resulting improved soil condition along with increased stored soil moisture would enable him to consistently grow crops, even in drought years. This objective has been achieved on "Jedburgh".

The process of change was initiated in 1989 with the complete removal of stock to reduce their impact on the fragile (mainly sodic) soils on the home property. Scott's simultaneous introduction of no-till farming systems, later combined with controlled traffic (initially using manually steered machinery but more recently using Beeline auto-steer technology), has produced remarkable results. Paddocks in which Scott's father had ceased cropping now are extremely productive and profitable.

Scott uses a range of cereal, pulse and oilseed crops in his dryland farming system. He has also introduced cover crops, a system adapted from South America, to enable soil cover to be maintained over summer. Whereas conventional farmers have difficulty with too much crop residue (as a result of their soils being less active), Scott's soils are now so active that the soil biota have the capacity to quickly remove crop residue and hence render the soil surface too bare prior to winter cropping. This is becoming a consistent feature in conservation farming. The cover crops, sown following harvest, not only provide soil cover and use summer rainfall, but enable the soil biota to remain active over summer whilst also providing a natural haven for other above ground fauna. He has designed and built his own crimping roller to enable the cover crop to be managed prior to sowing of his winter crops.

PETER AND FAY KNOWLES
"Carlile", Wellington

Peter and Fay Knowles have used a combination of conservation farming practices and controlled traffic farming systems on their 640ha home property of "Carlile", 7km from Wellington on the Mudgee Road and their associated properties in the Bodangora and Comobella districts. Of this area, about 90 ha is retained for agroforestry, pasture and remnant vegetation. Following the division of the family property, Peter has endeavoured to develop a farming system, which would suit the soil types and topography of these 3 properties as well as accommodate the need to move machinery and resources the considerable distance between them. This facilitated the complete removal of stock from the property as well as a plan to eventually crop each separate property as a distinct cropping unit as part of an overall rotation.

Peter has been practicing controlled traffic and conservation farming for the past 5 and 10 years respectively. Of the practicing "conservation farmers" in the CE NSW area, Peter is perhaps the most adventurous, introducing a very diverse range of crops, using chicken manure as his major fertiliser and introducing cover crops, with the associated use of crimping rollers and disc seeders planned in 2004. Peter is an executive Committee member of the Central West Conservation Farming Association (CWCFA).

Figure 2: Alley tree farming is being used to reduce the impacts of saline discharge on the adjacent controlled traffic farming area.

RICK, BRENDA & ANGUS MAURICE
"Gillinghall", Wellington

Rick and Brenda Maurice, and son Angus, farm on "Gillinghall" in the Spicers Creek region of Wellington. The family has a balanced approach to their business, where they aim to farm profitably and at the same time improve their resource base. The Maurices were early adopters of conservation farming principles in the Wellington district and have more recently adopted holistic management practices and time-controlled grazing on their 865 ha farm. They have also recently acquired a lease on an adjoining property, " Montauban", 1100 ha across the Spicers Creek, which will enable them to have more flexibility in the control of their time-controlled grazing system with 85 paddocks to use now in their rotation.

Rick is chairman of the Central West Conservation Farming Association (CWCFA) and has been the major advocate for a stronger focus on soil health and natural resource management within the Association. On their farm, the primary focus is to preserve ground cover. This approach has seen a dramatic improvement in soil health with extremely high soil infiltration rates in cropping and grazing paddocks. The large levels of soil biota and the effect of their activity are also evidenced in the turnover rate of manure (by dung beetles) and above ground organic matter/crop residue.

It has also resulted in a (some would call subtle) change of approach to their farming system. They are moving away from a no-till cropping and grazing system which required pasture establishment during the last stage of the cropping phase to using grazing to improve pastures and selecting the most suitable of the farming paddocks for selective cropping. This new process uses improved pastures and cropping techniques (pasture cropping and advanced sowing using disc planters) which aim to continually improve the soil whilst growing crops, rather than using steel and horsepower. The range of crops has also changed, with the introduction of cover crops and dual-purpose crops.

They have put in a considerable amount of effort into researching natural processes and in particular the drivers of soil health. As part of this, they are involved in numerous Resource Consulting Services programs (eg. Grazing for Profit, Executive Link) and now look to animal impact and conversion of solar energy as major ingredients in their farming system.

They are also attempting to overcome a major problem in farming at present, that of succession planning. A local TARGET project in the nearly Little River Catchment has identified lack of succession planning as being the major impediment to the speedy adoption of improved natural resource management systems. The Maurices have overcome this problem by allowing all members of the family to be equally involved in the decision making process. This enables the respective strengths of the family members to impact on this process and also importantly brings a longer-term approach, keeping in mind the younger member for the family.

Water management over the 2 properties has also been a key focus. Gillinghall has 35 paddocks that are all watered by troughs and a reliable bore. The troughs are only small but are supplemented with portable troughs where necessary. These plug into a ball valve system in each paddock, which is far more cost effective than upgrading each individual trough. Montauban has a mixture of dams and water troughs, with more troughs required as the property is developed.

Figure 3: The use of cover crops over summer has not only reduced recharge but has also provided an ideal environment for sowing of subsequent winter crops.

The paddocks are presently, on average, 25ha in size. This may change as the time-controlled grazing systems changes and the pastures improve especially the perennial native component (eg Warriego, red grass, corkscrew, umbrella grass). The stocking rate is planned for 6.5 DSE but at present the property is almost completely destocked (moved to agistment property at Gulargambone) in an effort to protect the soil and pasture resource. The animal enterprise is now also more trading related, allowing animals to be moved onto and off the properties as conditions dictate. This process removes the focus from the animals to the soil and feed base ie moving towards growing the feed, putting the feed "in the Bank", and then stocking it. The use of grazing charts measures property and individual paddock productivity. This process is combined with benchmark feed budgeting ie stepping out square metres in the paddock and judging the feed levels.

Profitability is obviously a key indicator of the success of any system. This new process includes a process called "profit probe" which has been used, in this case, to buy in tradeable cattle, to seek agistment and to acquire the leased property next door.

10 of our Best

'We're custodians of the land'

Farming for the future at 'Gillinghall'

By NEIL LYON

CLEAR goals and an inherent sense of custodianship have given the Maurice family a framework for managing the long-term viability of their 876-hectare mixed farm, "Gillinghall", at Spicers Creek near Wellington.

Rick and Brenda Maurice and their son, Angus, focus on a balanced approach to their business, where they aim to farm profitably and at the same time improve their resource base.

Behind their success has been a long commitment to conservation farming principles and, more recently, the adoption of holistic management practices and time-control grazing.

"To improve the resource base as we farm has become our goal," Mr Maurice said.

"It means we look after the soils and pastures as a first priority but at the same time we bring in the economic, environmental and social needs."

The Maurices' credentials as dedicated natural resource managers go back a long way.

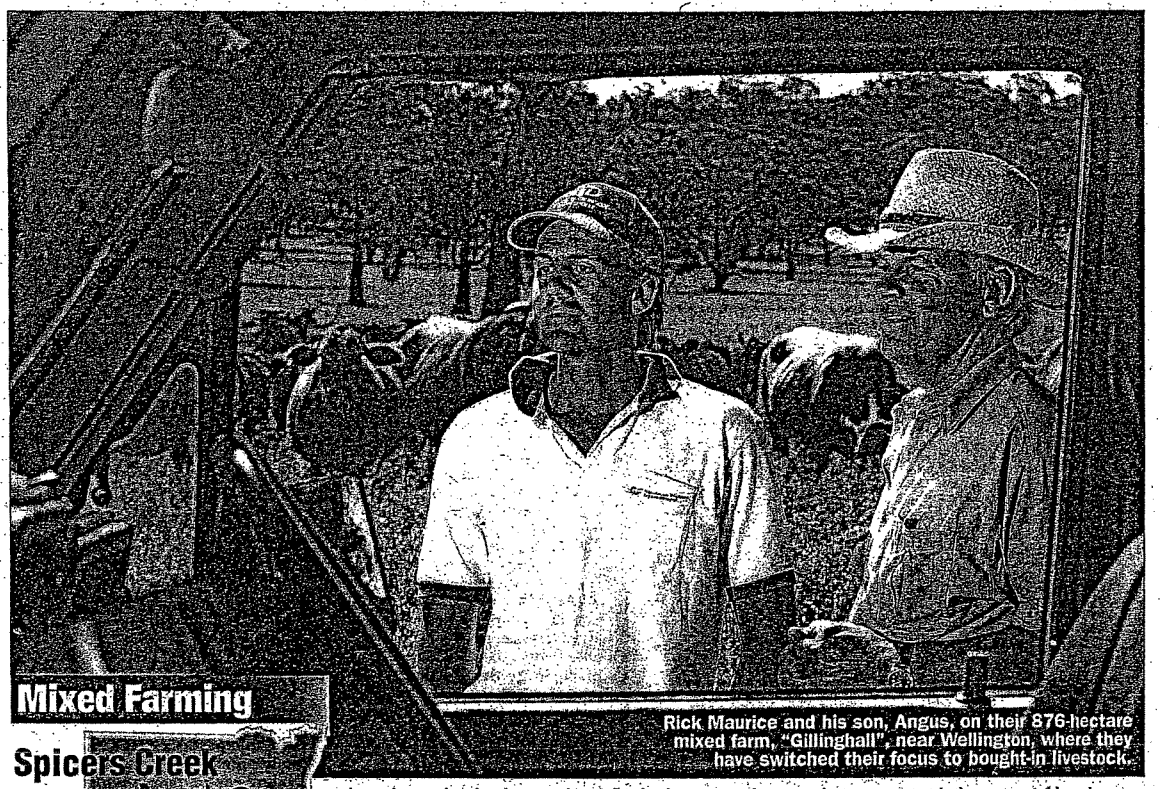
Mr Maurice was among the first in the district to adopt P.A. Yeomans' Keyline system of landscape management in the 1960s and 1970s.

He was also a conservation farming pioneer in the area, introducing minimum-tillage practices on the property in the 1970s and pursuing his interest in the development of sustainable farming and rotational grazing systems in the following decades.

Today that interest has seen him become chairman of the Central West Conservation Farming Association.

Three years ago the family started to move into the holistic management principles espoused by Zimbabwean-born ecologist, Allan Savory.

In early 2002 they extended their interest in the philosophy by completing a Grazing for Profit school run by Resource Consulting Services (RCS).



Rick Maurice and his son, Angus, on their 876-hectare mixed farm, "Gillinghall", near Wellington, where they have switched their focus to bought-in livestock.

Mixed Farming

Spicers Creek

Rick, Brenda and Angus Maurice

Mr Maurice said the adoption of the holistic approach with its focus on setting goals for the business and all involved in it had given the family a renewed sense of direction.

"It has reinvigorated our whole farming energy," he said.

"We have a goal; we set our sights on it and work towards it.

"It has involved the whole family."

Angus Maurice said the grazing policy on "Gillinghall" was now based on the fundamental principle of matching stocking rates to carrying capacity.

"The RCS grazing management tool has been a great aid in decision-making and we're only just learning how to manage our grazing properly," he said.

"It takes into consideration the amount of rain we have had and the condition of the pasture based on historical stocking rates and it projects into the future what sort of stocking rates we can run.

"We combine that with visual assessment of what is in the paddock and it helps us decide whether we are understocked or overstocked.

"Our primary aim is to look after the soil and pastures, and we stock accordingly."

Mr Maurice said the system had alerted them to the need to destock early in the drought – although "not early enough as it turned out" as they didn't immediately act on the early warning signals the system provided.

"The primary goal was to preserve ground cover," he said.

"We took the decision not to spend money feeding our stock because we didn't want to have the damage to the ground cover.

"It wasn't an option to run stock elsewhere as there wasn't any feed anywhere else, so we destocked.

"Because we didn't respond quickly, when we did destock we had to sell almost half our stock numbers.

"Although we took a loss with those cattle it was still cheaper than feeding them, and on an environmental level we came out ahead because our pastures responded very quickly when we had rain."

Since adopting the holistic approach, the Maurices have moved away from a set enterprise system and have introduced greater flexibility into the types of enterprises they run.

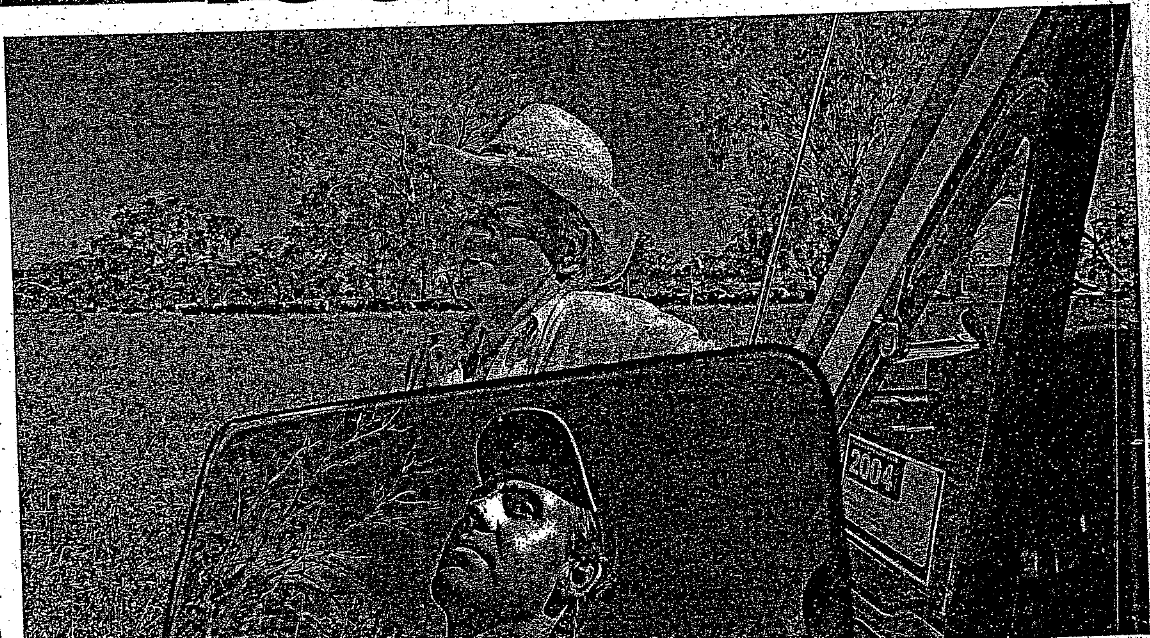
■ Continued p47

Golden Rules

- Set clear, long-term goals
- Involve all the family in decision-making
- Balance economic, social and environmental needs
- Maintain management and enterprise flexibility
- Match stocking rate to carrying capacity

10 of our Best

> ... we don't put as much fertiliser on areas that don't have as much yield potential.



Rick and Angus (in mirror) Maurice see themselves as custodians of "Gillinghall", the family's 876-hectare mixed farming property near Wellington.

Custodians beef up 'Gillinghall'

■ From p35

The livestock enterprises, which were originally based on a traditional cattle breeding herd and in self-replacing Merino flocks, have become mainly trading entities.

Nowadays, the Maurices manipulate stock numbers to fit in with the grazing plan by buying or selling trade stock they can turn over regularly.

"We buy stock we think we can add value to quickly," Mr Maurice said.

"It fits with the grazing because it is a very flexible system."

They now have 1500 ewes, 1400 lambs and 200 head of cattle on the place including a large mob of bought-in mixed breed cows from drought affected areas of Queensland and South Australia.

Another 400 cattle are agisted.

The predictability of the controlled grazing system has given the Maurices the confidence to make greater use of financial management tools like futures and forward contracts for marketing their stock.

"With the cattle we have bought we hedged half of them because we could lock in a profit margin we were happy with and just take on the production risk," he said.

The new approach has also prompted the Maurices to review their approach to cropping.

Five years ago they were cropping about 400 hectares, or almost 50 per cent of the property, but they now plan to reduce the cropping area to below 20pc.

"We will be more selective with our cropping – rather than do every paddock we will pick out the very best paddocks for cropping and reduce the percentage," Mr Maurice said.

"We will hopefully increase our overall return from cropping by doing it only on the best paddocks."

Traditionally, the rotation on "Gillinghall" has been four years of crops followed by a pasture phase of about seven years.

But the Maurices hope that with the new grazing management system they might be able to extend the pasture phases by encouraging regeneration of desirable grasses and increasing ground cover and diversity.

as much fertiliser on areas which don't have as much yield potential," Mr Smith said.

"It's allowed us to target areas more effectively, and while we still put on about the same amount of fertiliser on average, we're getting greater production from it."

He said this equated to about a seven per cent saving in their fertiliser costs.

In future, the Smiths plan to trial split nitrogen application for risk management and productivity gains.

This will mean putting on enough fertiliser up front for an average season and topping it up in seasons in which there's scope to increase yields or secure better protein.

Despite solid productivity and efficiency gains in the past 16 years, the Smiths' farming system is still evolving.

They currently work on a rotation of four crops in four years comprising durum, bread wheat, sorghum and chickpeas but are adamant there is a need to remain flexible and be able to change the rotation to meet seasonal conditions.

Next year they plan to modify their controlled traffic regime introduced seven years ago and move from eight-metre to nine-metre centres, and they hope eventually to accommodate their header within the system.

The couple recently moved from using a light bar to accurately guide their machinery to a John Deere auto-steer system which they are now using in conjunction with their Agleader yield monitor and Raven variable-rate controller.

Finding the right precision ag gear and getting various components to "talk" to each other has become a passion for Mr Smith, using technology from various manufacturers.

Where others would be tempted to give up on the new technology, he has persevered, and as a result he has been able to develop an effective system cheaper than one straight off the shelf.

The Smiths have fast earned the respect of other farmers as being good operators and forward thinkers.

But while they've made some significant gains in productivity in the past two decades, they acknowledge that the pace of these gains will not be sustained.

However, that won't stop them chasing bigger yields, better efficiency and improved profitability down the track.

MATTHEW & KYLIE BARTON
"Baragonumbel", Wellington

The property of "Baragonumbel", owned by Matthew and Kylie Barton, is located in the Saxa-Gollan district, on the Wellington-Dunedoo Road, approximately 45km from Wellington. They have been practicing pasture cropping for the past 3 years. Of the practicing "pasture croppers" in the CW NSW area, Matthew is perhaps the most cropping orientated, planting nearly 2000ha in 2003.

Pasture cropping is a burgeoning farming system in central west NSW and other scattered parts of Australia. This method, being progressively developed, has typically involved the retention of natural populations of summer (C4) based native pastures for grazing over summer and autumn then no-tilling cereal crops (wheat or oats) after the first frosts in autumn. A herbicide application is currently made within several days prior to sowing for the control of non-native annual weeds. Fertiliser application rates are determined prior to sowing following soil tests. Recent developments have also seen the use of summer legume crops (such as cowpea) into winter (C3 dominant) based native pastures. Additional weed control, if needed, is carried out using post emergent selective herbicides. The dominance of perennial native grasses over annual grasses and broadleaf weeds could ultimately allow the production of winter cereal crops without the need for control of annual weeds.

Matthew and Kylie have also attended Grazing For Profit management courses run by Resource Consulting Services. These courses assisted them in determining a new way forward on their property. Matthew, since returning to the farm in 1994 from a position in financial management for a large Sydney company had become concerned that agriculture was quickly becoming a charity case. He observed farmers with low management skills being propped up by Government through subsidies and other programs. As such, they decided that he didn't want to be part of that ethos and so undertook to "work with nature" and achieve profitability in the process.

Matthew has an excellent grasp of the financial aspects of his business. He is less concerned about productivity and more concerned with issues such as return on investment (ROI) and nett return per hectare. As Table 1 shows, the costs associated with pasture cropping, the new farming system he has adopted on his property, are far less (42%) than those associated with the conventional cropping system he once employed.

Table 1: Comparison of costs of conventional cropping and pasture cropping per hectare on Baragonumbel

Consumables	*Conventional cropping*	*Pasture cropping*
Sprays	$ 60.00	$ 12.00
Cultivate	$ 24.00	$ 00.00
Sow	$ 24.00	$ 24.00
Seed	$ 9.60	$ 9.60
Fertilisers	$ 19.20	$ 9.60
Bio Fertilisers	$ 00.00	$ 4.80
Harvest	$ 24.00	$ 24.00
Freight	$ 24.00	$ 24.00
Lease of land	$ 20.00	$ 10.00
Total cost/ha	**$204.80**	**$118.00**

Figure 1: Cropping into a perennial native grass sward has improved soil health, enhanced both the diversity and health of the pastures and provided a farming environment which is both sustainable and financially rewarding.

This effectively means that his cropping yields can be substantially less and he will still return the desired ROI's. With pasture cropping the summer grasses can also be used for grazing immediately following harvest. As such the lease cost of the land is halved. The pasture cropping process has also resulted in a dramatic improvement in the health and the species quantity of the perennial pasture sward. Even when the cereal crop failed in 2002 with the drought and the canola crop failed in 2003 with the frost, the pastures showed a marked improvement in diversity and persistence. He is also finding a decrease in the weed burden and erosion levels and an increase in soil fertility as a result of the increased soil microbial activity.

Their land stands out from the surrounding properties in that it has green ground cover compared to fallow, bare paddocks. These bare paddocks may have government funded tree lines, but in Matthew's paddocks the salinity is being prevented across the whole landscape by the presence of living material (native perennial pastures and crops) all year round – **100% cover 100% of the time.**

Wanted: smarter farming system

By PETER AUSTIN

Andrew Campbell

Matthew Barton

FARMERS have been urged to make stronger demands of the science community and extension providers to help them develop and implement farming systems more compatible with natural resource conservation.

At the third biannual National Native Grasses Conference, held over three days at Cooma last week, the 250 delegates from five States heard repeated pleas for more targeted research and advice directed at better landscape management.

The scene was set in the official opening address to the conference presented by Andrew Campbell, the executive director of Land and Water Australia – a federal research and development corporation specialising in natural resource project funding.

Mr Campbell, himself the owner of a grazing and agri-forestry property in western Victoria, said it dismayed him to see the proportion of public research dollars still being allocated to work such as "phalaris cultivar trials" when there were so many more pressing needs.

"If we were starting afresh in Australia today we'd establish very different systems to those that our forefathers introduced," he said.

"We'd look at systems more in tune with our extremes of climate variability, able to be scaled up quickly to take advantage of good seasons and shut down immediately in bad seasons.

"We'd look at systems that didn't leak nutrients and water like our present systems do, and that made more use of our native species.

"But apart from one project looking at oil mallee in Western Australia, I don't know of any large-scale research under way to support the development of these much-needed systems.

"We need you (farmers) to be more demanding in terms of how your levies are spent; make sure you are getting the landscape science and the extension that will suit modern farm management."

Mr Campbell said it was now being realised by policy-makers and land users alike that natural resource conservation could not be adequately achieved just by "fencing off the odd patch of bush or creek".

It was the management of the land between those fences – in other words, productive farmland – that would determine the success or otherwise of conservation and biodiversity efforts.

The issue was taken up later by Central West farmer, Matthew Barton, during an outline of his experiences with pasture cropping (sowing winter crops into unploughed native pasture) on his Wellington property, "Baragonumbel".

He said it "astounded" him that profitability and ecological sustainability were still viewed in isolation by policy formulators – at times even "inversely correlated".

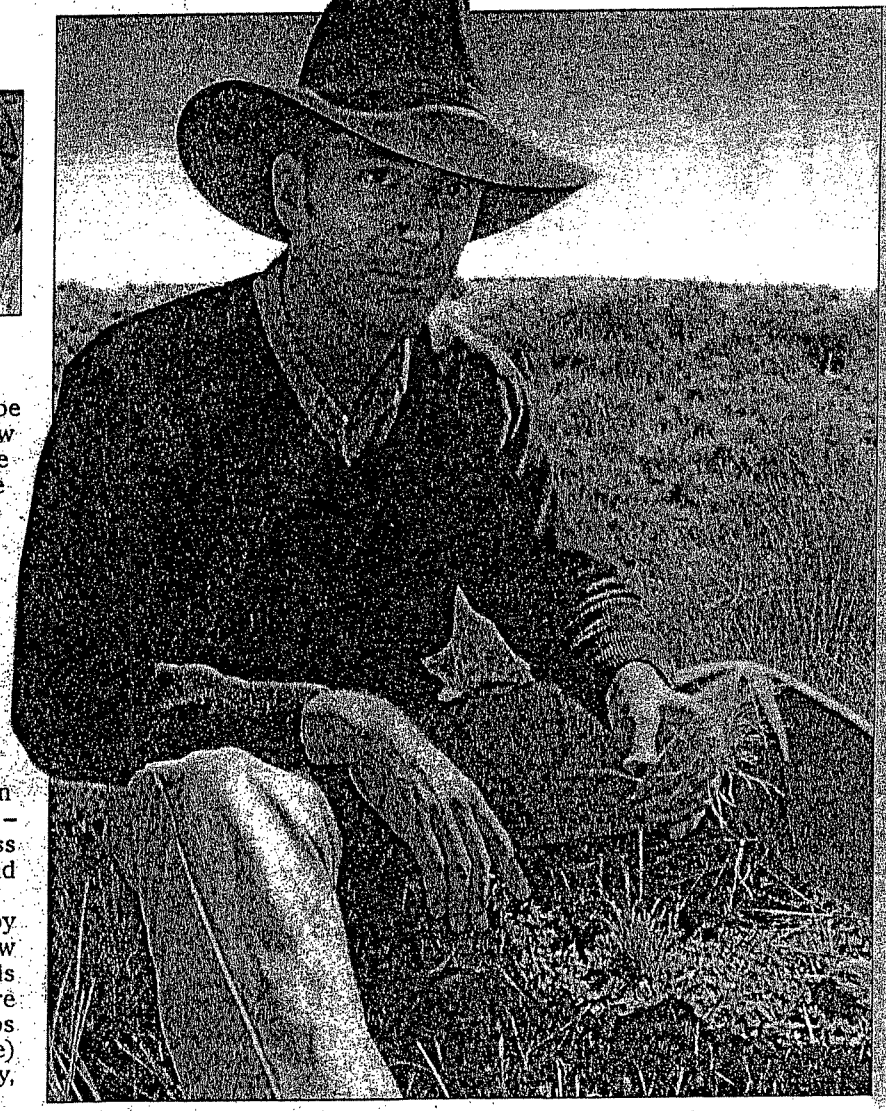
"There is a huge danger in relying largely on the scientific community for solving problems with natural resource management," he said.

"The reductionism that is part and parcel of scientific discovery and proof does not lend itself to observing whole ecosystems or, for that matter, agricultural systems.

"Combine that with an agricultural extension service that is increasingly focused on funding sources and the next funding round and it comes as no surprise that these services are becoming increasingly irrelevant to mainstream agriculture."

Instead, Mr Barton said, policy-makers should be looking to farmers – who had to operate within the bounds of profitability and peer acceptability – as a source of worthwhile agricultural innovations, and supporting their efforts.

■ More on the Native Grasses Conference in *The Land* next week.



Fresh ide on Mona

NATIVE grasses are undergoing a revi standing among landholders on the Mon following a run of drou years that has caused widespread disillusionm with so-called "improve pastures", according to l grassland authority, Dav Eddy.

Mr Eddy (pictured), a fo native pastures specialis NSW Agriculture and nov co-ordinator of the Monar Grasslands Catchment Management Network, sa native grasses are again valued as the resilient an productive resource the

"They are a traditional of Monaro history but fo or 40 years of last centur people were told that exo pasture species were the to go, and native grasses out of favour," he said.

"Those same people are finding that the experime (with exotics) is not work and they are using grazin management to manage t properties back to their original native pasture ba

Mr Eddy said although n of the Monaro pasture environment was now "modified" to some degre still had a high proportio native grassland compare with other regions.

This was one of the facto attracting new settlers to t region, bringing with them new ideas and aspirations, and helping to foster more enlightened attitudes.

talking about it. Here are two of their stories.

Pasture cropping pays

Case Study One

THREE years since he decided to switch from conventional cropping to the "pasture cropping" system developed by Gulgong farmers, Colin Seis and Darryl Cluff, self-confessed "diesel-head" Matthew Barton is positive he made the right move.

Not that his cropping program has returned him rich rewards – the drought took care of his 2002 cereal crop and frost this year decimated his wheat and canola – but, unlike other farmers who met a similar fate, he didn't lose a fortune in the process.

Because his costs for sowing and growing the crop were far less than under a conventional system, his losses were more notional than cold, hard cash.

As a recently-arrived farmer with a background in financial management, Mr Barton (pictured) is more interested in bottom line results than "pub talk" about yields and, to him, the fact that pasture cropping enables him to halve his growing costs is what matters.

Pasture cropping is the technique of planting winter crops directly into dormant summer-active native perennial grasses – a process that protects ground cover, encourages soil organic activity and delivers a "bonus" six months' extra grazing.

Since introducing the system on his "Baragonumbel" property at Gollan in the Central West, Mr Barton estimates his costs for growing a hectare of winter crop have gone from about $250 to $125 a hectare.

Had it not been for the frost damage that wiped out his canola harvest and reduced his wheat yields by more than 50 per cent, he was on track to reap a 25pc return on assets this year and in the longer term he is confident of realising at least 20pc in most seasons.

On top of that, Mr Barton believes that by having a living ecosystem in the soil the whole year round, he will build soil health and fertility, in contrast to the "boom and bust cycle" of traditional cropping enterprises.

Although a student of grazing management techniques, Mr Barton said his passion lay with cropping rather than grazing, but it had only been when he stumbled across pasture cropping that he could see a way of cropping ecologically soundly.

He says perennial native grasses are the key to the pasture cropping system and they can be managed for biodiversity by cell grazing which he will introduce after harvest.

Reclaiming Gular cropland

Case Study Two

TARGETED species of native perennial grasses are being employed to restore run-down cropping land on a long-held family property near Gulargambone, in the State's North West.

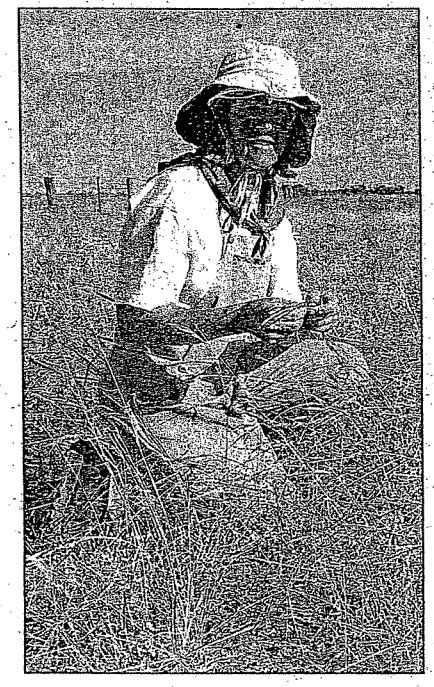
The project is being run by Jenny Anderson (pictured) and her semi-retired stockbroker husband, Neil, on their 2800-hectare property, "Avoca", which before the drought typically ran 3500 Merino sheep and 400 head of Murray Grey cattle.

The property has been built to its present size from a 1400ha portion of the original Avoca Station settled by Jenny's forebears in the 1850s, which she retained from her family's most recent land divvy-up in 1989.

As Jenny described it to the Cooma conference, because she and Neil were in the position of having no children returning to the land, no grandchildren and no debt, they were able to plot a course for "Avoca" free of financial imperatives.

They elected a low-input but profitable grazing enterprise based on re-establishment of the valuable native perennial grasses that once covered the area.

This involved, first, a lengthy process of identifying suitable species and determining their distribution, seasonality and palatability by a combination of botanical research, observation and trial and error.



Three species little in evidence on "Avoca" by 1989 were selected for favoured treatment: silky browntop (*Eulalia aurea*), hoop Mitchell grass (*Astrebla elymoides*) and slender panic (*Paspalidium gracile*).

A grazing system was then developed to encourage these grasses to spread.

This called for stock to be run in large mobs and moved through paddocks to a timetable that ensured the selected grasses were in a "rest" phase at their time of seeding.

The strategy worked and all three species repopulated the former wheat paddocks, producing palatable feed and, in some seasons, yielding sufficient seed to allow it to be harvested.

The onset of drought in 2002 put pressure on the system as sheep "laid waste" to some paddocks although Jenny blames herself for not unloading more stock earlier.

Although the operation is not yet profitable she is confident it ultimately will be, as further fencing expands the tactical grazing options and further investment in saltbush planting and paddock water improves drought preparedness.

In the meantime, she says, the ecology of the property is much improved and their experience so far shows that native perennials can be strategically managed provided you are not in too big a hurry for results.