

Dangemanning Farm: a holistic development

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DANGEMANNING Farm is a cereal, pulse and sheep property in the central wheatbelt of Western Australia with a 325 mm annual rainfall which falls mainly in winter. The farm was first settled in the early 1900s and has evolved, both in design and farm practice, in response to the effects of past practices on production and land degradation. It is now a farm in its early stages of a modern holistic development, with an emphasis on the integration of agricultural systems, Landcare and nature conservation. The long-term goal for the farm is to achieve sustainable farming in a non-degraded landscape.

PHILOSOPHY WHICH LED TO ADOPTING PRESENT FARMING

In the late 1960s to the mid 1970s our main interest in farming, like other farmers of our era, was based around machinery, especially that used in cropping of cereals. Over time, that interest changed to the point that the less we drive or operate a machine, like a tractor, the better we like it. The change has come about through continually acquiring better management skills and knowledge by reading, attending workshops and conferences, and being on advisory committees to agencies such as Agriculture Western Australia. There was also the desire to do things smarter and with less physical effort because farmers can continue old practices and make work for themselves, as well as a heightened awareness of environmental matters due to observations of the steady decline of the landscape in which we live, especially on land we own.

Although we have lived on the property for 40 years, we are constantly re-discovering the farm and its processes. For example, we are still gaining an appreciation of the diversity of flora and fauna which remains after 90–100 years of agriculture (although some of it is only just surviving). We have also reached an understanding of the water table imbalance due to over-clearing and the many problems it is causing to agriculture and nature conservation. The concern that shapes our thinking and actions is that rural communities will not maintain populations and prosperity if the landscape is allowed to decline further. Young people and professionals will not remain in

what they consider to be an unacceptable environment. Ultimately, the urban population will not tolerate an agricultural industry that continues in an unsustainable way. In the near future, we could face legislative restrictions that will reduce our present flexibility and add impost and cost to production.

In the medium term, we face demands by consumers that our products are not only safe and free from contamination by chemicals, but are of high quality and produced in a way that is sustainable and non-damaging to the land and its environment. To fail to do so will prevent our products receiving a premium and the potential number of customers will be smaller.

DEVELOPMENT HISTORY OF THE REGION AND FARM INCLUDING ENVIRONMENT PROBLEMS

The farm is just over 2 200 ha and is made up of seven original properties, one as small as 100 ha which was too small to sustain a family. The smaller blocks were sold by the original owners after some heartache in the early part of the century. The first block was settled pre-1900 and clearing commenced soon after. The farm was progressively cleared until 1964, leaving approximately 8% of native vegetation (Fig. 1). Clearing was slow and patchy. Mostly the woodlands were cleared first because of their more fertile soils. The recession years and two World Wars slowed development, and the introduction of pests such as the European Rabbit *Oryctolagus cuniculus* and European Fox *Vulpes vulpes* caused major environmental damage that still affects the farm today. Many ridges, creek-lines, granite outcrops and poor acid soils were cleared to reduce protective cover for the rabbit. This led to erosion by wind. Slopes and drainage lines were eroded by water resulting in gullies and sheet erosion of top soil. Loss of vegetation increased water recharge in the sandplain and around granite areas. Introduction of livestock more than 100 years ago led to the steady decline in the remaining vegetation with all the remaining mature vegetation being grazed on-and-off for most of the 20th Century. Significant events which affected Dangemanning Farm and the surrounding region during the past 100 years are outlined in Table 1.

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Table 1. Significant events since the 1890s affecting Dangemann Farm and Region.

- Improved infrastructure to the central wheatbelt: development of the railway and the Mundaring to Kalgoorlie water pipeline, both of which run alongside the farm.
- Gradual clearing of vegetation mostly by hand. More intense on smaller holdings.
- European Rabbit invasion — 1930s; Clearing of protective cover of rabbit habitat led to increased erosion and loss of flora and fauna — 1930s on.
- Tractors take over from horses — 1940s.
- Introduction of sub-clover on sandy soils. First legume pastures — 1960s.
- Connected to state electricity network — early 1960s.
- 1960s on, gradual increase in cropping; increased soil erosion due to multiple tillage for weed control.
- Increase in artificial nitrogen applied to crops from 1960s on.
- Gradual increase in chemical pesticides especially herbicides — 1970s.
- Reduction in tillage. Some direct drilling of seed into unworked soils — 1980s.
- 1980s, rotation of cereals with legume crops-lupin/wheat /wheat in sandy soils.
- Revegetation of small areas commenced — 1980s.
- Improved knowledge of farming systems and soils; cropping to soil types — 1990.
- New legume crops, e.g., chickpeas — 1990s.
- Protection of remnant bush starts — 1990.
- Decline in sheep numbers due to poor wool prices, cropping increases — 1990s.
- Revegetation increases in drainage lines and pockets of water shedding land — 1990s.
- Electric fencing introduced — 1991.
- Monitoring of valley floor water tables commenced — 1995.
- Seeing first positive results revegetating shallow granitic areas with reduced waterlogging of crop land lower in the landscape — 1999.
- Reduced damage and erosion of revegetated drainage lines from floods — 2000 onwards.

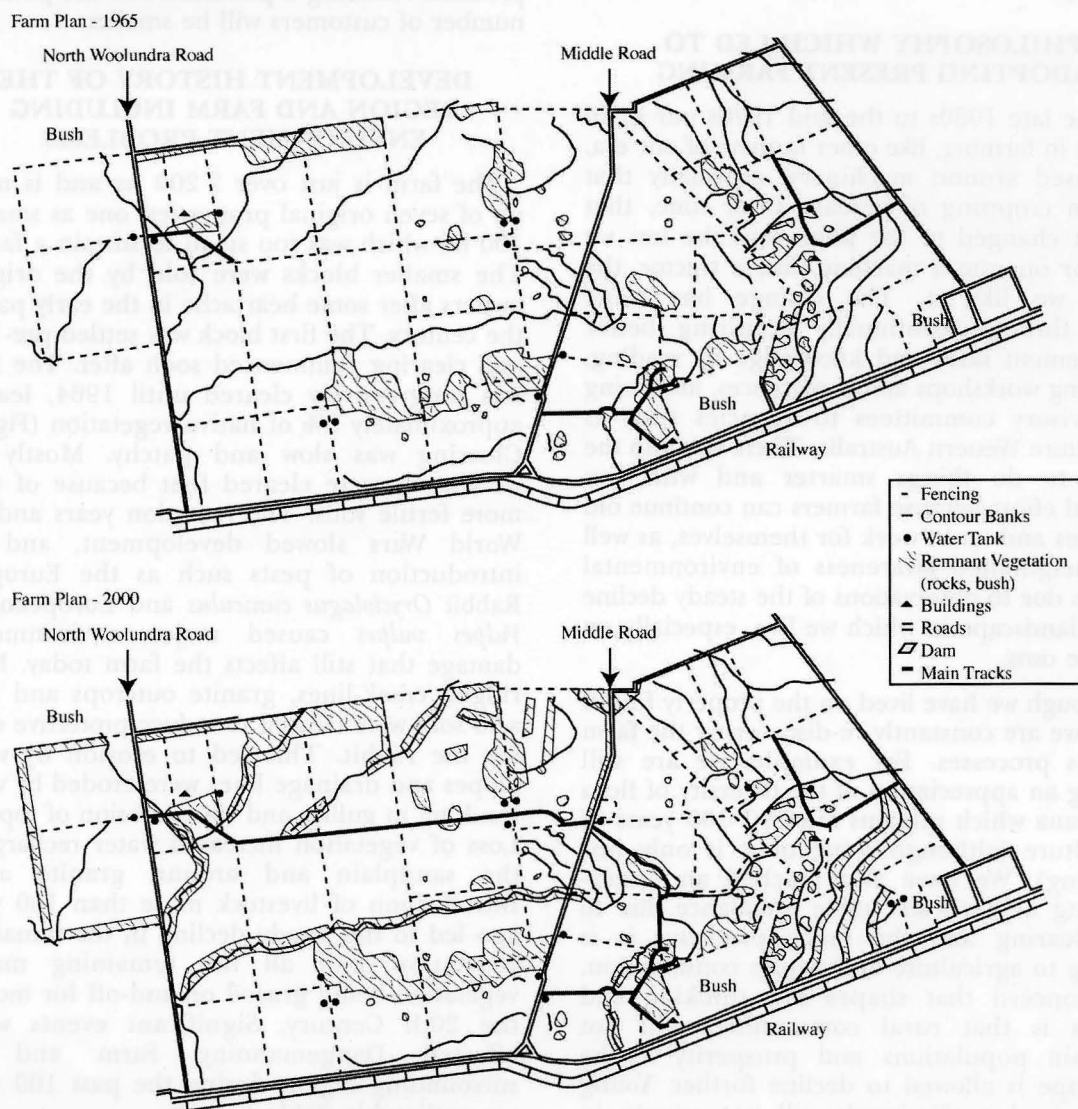


Fig. 1. Dangemann Farm in the central wheatbelt of Western Australia. Only 8% of native vegetation remained on the farm in 1965. Since then, remnants have been protected and allowed to recover with linkages developed along boundaries, drainage lines and between remnants.

LOOKING TO THE FUTURE: MANAGEMENT TO ADDRESS ENVIRONMENT PROBLEMS

Development of the management practices and farm layout (Fig. 1) work towards the integration of three areas:

- a) Farming systems — continue to develop a good soils map. Adopt best practices for the different soil units with good cropping rotations of cereals and pulses, cereals and oil seed, cereals and legume pastures, and possibly a mix if management requires a more flexible rotation to tackle problems with chemical resistant weeds, soil/plant diseases or insect build up. The aim is to utilize maximum seasonal rainfall with early establishment of crops and pastures with good inputs for optimum growth and yield. Establish fodder plants in strategic areas for stock to graze and reduce the cost and need to cut cereal for hay which is labour intensive and spreads weed seeds.
- b) Land Conservation — monitor soil structure and modify, if needed, with gypsum on fine-textured soils. Monitor soil compaction on lighter sandy soils and deep rip if required. Monitor soil pH and modify as required, using lime sand on acidifying areas. Maintain existing contour banks and be prepared to make changes if problems arise. Add more grade banks or eliminate old banks that have completed their purpose. Develop a water conservation plan and steadily implement it so that the farm can be independent of the Government Water System. Planning should include consultation with the local Shire regarding runoff water from public roads to enhance water harvesting and reduce erosion. Use perennial plants to slow and reduce wind and water erosion and to intercept sub-surface water and reduce water logging and recharge when located in strategic positions of the farm, as, for example, planting along existing contour banks.
- c) Nature conservation — there is a real need to increase our knowledge of the local plants and animals, and of biological processes and their importance in the landscape. Develop better records of what plants and animals are on the farm and whether they are being maintained or in decline and likely to disappear. Protect existing remnants of bush no matter how degraded they may be. One area of degraded remnant fenced four years ago initially showed no signs of improvement, but now has an increased understorey which includes plants not remembered to be in that location previously. In developing the farm layout, it is necessary to consider the location of the farm in the landscape and to identify any remnant bush in close proximity to the farm. This helps with linking bush areas to other remnants in the region to develop a working remnant bush network. This enhances the farm and local landscape. It is also necessary to determine what control exists over water entering or leaving the farm and how problems can be minimized and benefits maximized. These last points emphasize the importance of considering factors outside the farm boundaries when developing management plans.

CONCLUSION

The management and development of Dangelmanning Farm must continue to be dynamic and based on good knowledge. It is frustrating to be faced with the urgent need to progress, but be hampered by lack of good and useable information on how to proceed. This is especially so when government agencies and research groups have much relevant information that is not in a useable form or integrated with complementary knowledge to give maximum benefit. As land managers, farmers must not only take increased care of their land, but must be prepared to look beyond to the larger picture and be good custodians of the landscape on which all of us depend.