

‘Yanget farm’ rehydration project by Rod O’Bree and Peter Andrews

Catchment Function Analysis by Tim Wiley, Tierra Australia, Broome

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In early 2008 Rod and Bridie O’Bree purchased ‘Yanget Farm’ which is 25 km east of Geraldton. Soon after Rod engaged Peter Andrews to advise him on implementing Peter’s Natural Sequence Farming (NSF) methods on Yanget. Most of the earth works for NSF were completed by the end of 2009. <http://www.nsfarming.com/>

Rod has also planted some perennial grass pastures on the slopes and flats. Some trees have been planted higher in the landscape, but most of the new vegetations is from natural regeneration. DAFWA established perennial pasture trials in Yanget in 2009. Rod also uses mechanical mulching to slash weeds and dumps manures at flood out points on the contour banks so that water spreads nutrients down the landscape.

Yanget is one of the oldest farms in the region. It has a history of grazing and some cropping. Yanget contains some of the most fertile soils in the region, and is reported of have carried “700 wethers on 100 acres’ in its earlier days. http://www.yanget.com.au/Yanget_Station/History.html

Yanget is now an 800 ha property that straddles a break away between the gently undulating sandplain and the deeply incise upper catchment of the Chapman River.

<https://www.agric.wa.gov.au/land-use-planning/agricultural-land-areas-alas>

Yanget is the longest running example of NSF principles in WA. This makes it an ideal study and demonstration site. Rod has followed up on the earth works by introducing a wide range of perennial plants to enhance the NSF system. Rod has also used Peter Andrew’s methods of mulching of weeds and placing heaps of manure at spill points along the contours.

Natural Sequence Farming rehydration principles.

- Construct earth banks within the creek lines at the places where there should be natural steps in the flow line (Figure 2).
- Recreate wet lands in the ponds that form behind those steps. This involves some planting of trees and other vegetation, but many wet lands species will naturally come back once the ponds are formed (Figure 3).
- Construct near level contour banks that will hold water high in the landscape, and run water out of the creek lines from the ponding banks (Figure 3).
- Construct spill out points in the contours on the ridges so that water spreads out over the largest area below as possible.
- Place heaps of manures at the spill points so that nutrients are spread across the landscape by water flow.
- Introduce perennials back into cleared land.
 - woody perennials are used at the top of the landscape,
 - water tolerant perennials in the reformed flood plains low in the landscape,
 - perennial grasses or legumes that will be compatible with cropping are used in the mid slopes.

- Allowing deep rooted 'weeds' to grow and repair soils. The 'weeds' can be mechanically mulched which helps to facilitate the natural succession to higher order plant communities.

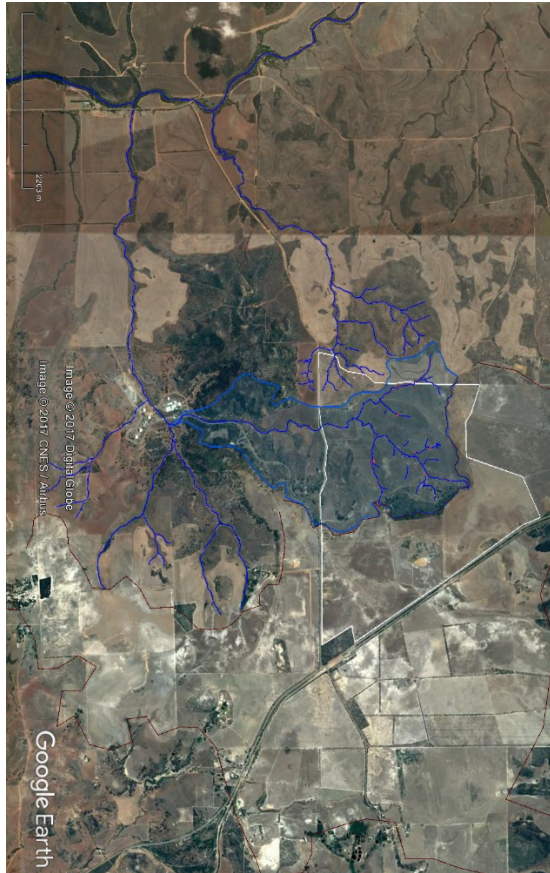


Figure 1; Yanget farm (white boundary) within the Yanget creek (blue line) sub catchment (blue shade) of the Chapman River to the east of Geraldton, WA.



Figure 2; Creeks (blue), contour banks (orange) and constructed earth bank steps in the creek lines (pink) on Yanget farm, east Geraldton, WA.



Figure 3 a & b; Constructed earth bank steps (pink) in creeks (blue) where some steps spill water out of the creeks into contour banks (orange) to spread water back across the landscape.

Impacts on Yanget

Improvements in ground cover, biodiversity and productivity

Photos taken at the 'Three Creek' dam prior to commencing rehydration works and 9 years later demonstrate the dramatic improvements on Yanget farm.





Figure 4; 'Three creek' dam catchment a) photo site, b) 2009 before rehydration photo and c) 2017 after rehydration works photo

Improvements in the utilisation of rainfall

By luck there have been two almost identical summer thunderstorms on Yanget that have demonstrated how dramatically water use has changed on the property in the first 4 years. The first storm was just after the property was purchased and before any NSF works had commenced. The first storm was a benchmark that represents catchment water use under traditional land management of the WA wheatbelt.

The first storm dropped 25 mm over several hours on the 20 February 2009. As a result of the fairly intense rainfall, water ran off the steep slopes below the breakaways and into the creeks. The water flowed through the creeks and then off the property at the creek crossing on the western boundary of the farm. Twenty four hours after the rain fell the creeks were dry again and all the surface water had left the property.

Four years later there was an almost identical February rainfall which was within 2 mm and 2 days of the first storm. In this case there was also some water that ran off the steep slopes below the breakaways. This water filled the top contour banks and the first pond. Once the top pond was filled it over flowed and filled the next pond. It took three weeks for the water in the creek to fill all the ponds and to reach the boundary. The creek continued flowing until late May when the next rain fell.

This before and after comparison demonstrates that **the NSF implemented on Yanget as increased the time that the landscape has been hydrated from a summer rain event by 100 fold.** i.e. water in the creek for 1 day versus water in the creek for 100 days

Persistence of perennial pastures.

A variety of perennial grass and some perennial legume pastures are now persisting on Yanget. Perennial pasture species sown includes green panic, Bambatsi panic, Signal grass, Consul Love grass, Siratro and Lucerne.



Figure 5; Rod O'Bree and Prof Mark Gibberd, Curtin University inspect perennial grass that have persisted for eight years on a DAFWA trial site (October 2017)

Next steps

Production

The next steps to increase the production of Yanget would be to introduce a 'state of the art' grazing systems. This would be based on a) rotational grazing using Holistic Management method, b) feed budgeting using fodder measurements with drones, c) daily weighing of cattle using Walk Over Weighing in watering hubs, and d) contract growing out of pastoral cattle as part of a supply chain.

Research

Yanget represents an opportunity to study the NSF system at the farm scale. Research should focus on Yanget as a system. This would include monitoring and modelling cattle production, pasture production, land condition, biodiversity, landscape function and economic. The research should be aimed at evaluating whether it is possible to build a robust, holistic system for sustainable

agricultural based on NSF principles and advanced farming technologies. Yanget is a model that could be used to inform the adoption of these innovative systems in wheatbelt regions.

Tierra Australia is interested in setting a similar land management system at Muresk to the east of Perth. Muresk is a commercial farm that also host an agricultural training facility. Being close to Perth it is ideal experimental site for city based researchers.

Ideally research on Yanget and Muresk would link in to a national network of research sites.

Tierra Australia has also developed similar rehydration plans for pastoral stations in WA and the NT.

A new business model

Tierra Australia is developing a major new agricultural business for an integrated beef supply chain targeting Asian markets. A supply chain will be built based on breeding calves in the rangelands and growing sale cattle out on quality pastures on southern farms and northern irrigation. Production pathways will be monitored, and continuously adjusted, using new technologies that measure cattle weights and fodder supply in real time across the whole production chain. Continuous monitoring and responding to real conditions will insure the beef products are reliably delivered to customers on time and on specification. The business modelled includes both buying some properties out as well as joint ventures and long term off take agreements with indigenous and family owned properties.

Critical to the model is implementing innovations which will substantial lift production, lower costs and minimise variability of the supply chain. Yanget demonstrates how Pater Andrews rehydration methods can significantly increase productivity. These rehydration principles can also be applied in the rangelands. Tierra Australia believes good management practices that improve the environment will also be more profitable in the medium to long term.

Tierra Australia has done detailed economic and investment analysis on a range of properties in the north and south, and of the whole supply chain including into Asian market. Tierra Australia is in discussions with major investors and joint venture producer partners. It has developed research proposals with key Universities and innovative companies.