



# The Trembaths at Lonesome Duck Estate

Localising food production and increasing  
diversity in Katherine, Northern Territory

*Part of a wider research project investigating the benefits of regenerative agriculture.*

**May 2024**



## Acknowledgements

This case study explores the holistic benefits of a regenerative approach to farming. It is one of six case studies prepared as part of a wider research project investigating the benefits of regenerative agriculture.

Soils for Life's contribution to the project is the development of case studies, which provide insights drawn from a diverse mix of Australian farmers.

Soils for Life gratefully acknowledges the generous contributions of the Trembath family.

## About Soils for Life

Soils for Life is an independent, non-profit organisation that works across Australia to support Australian farmers in regenerating soil and landscapes, to build natural and social capital, and transform food and fibre systems.

**Front image:** Cattle at Lonesome Duck Estate.  
**Image source:** Courtesy of Jeremy Trembath.

For further information  
[info@soilsforlife.org.au](mailto:info@soilsforlife.org.au)  
[www.soilsforlife.org.au](http://www.soilsforlife.org.au)

### Copyright statement

Copyright in this publication is owned by Soils for Life, except when content has been provided by other contributors, in which case copyright may be owned by another person. With the exception of any material protected by a trade mark, and except where otherwise indicated, these publications are licensed under a Creative Commons Attribution 3.0 Australia licence. Any use of the publication, other than as authorised under this licence or copyright law, is prohibited.

### Attribution

You are free to copy, communicate and adapt the material in this publication, so long as you attribute Soils for Life: "This publication may be downloaded at: [www.soilsforlife.org.au](http://www.soilsforlife.org.au)"

Published by Soils for Life  
Canberra, ACT, May 2024  
© Soils for Life 2024

# Contents

About the Case Study Series	4
Farm Facts	5
The Highlights	6
Landscape and Soils	7
Meet the Trembaths	8
Practices and Strategies	9
Observed Benefits	12
Looking to the Future	16
References	17

## About the Case Study Series

This case study series explores the holistic benefits of a regenerative approach to farming. This case study is one of six that are part of a wider research project investigating the benefits of regenerative agriculture.

It is important to ensure that farmers' perspectives are heard, valued and used to inform research findings and outputs. And so, these case studies have been developed by interviewing each farmer to understand their perspectives, their context and their approaches to new practices. This was done in order to understand their views on the benefits of a regenerative approach to farming.

These case study farmers were selected following an expression-of-interest process calling for farmers who self-identify as 'regenerative.' The project did not include any new on-ground testing or analysis of existing monitoring data by Soils for Life.



# Farm Facts

## Location

Jawoyn, Dagoman and Wardaman Country | Katherine, NT

## Climate

Hot humid wet summer, dry winter

## Average Annual Rainfall

1107 mm (recent, 1993-2022)

## Agro-ecological Region

Tropical savannah, warm-season wet

## Property Size

950 ha

## Elevation

108 m

## Social Structure

Family owned and operated

## Enterprises

Beef cattle grazing, organic vegetable production and fodder cropping; 70 ha leased to an energy company for a solar farm operation

## Landscape

Gently undulating plains and rises on limestone, sandstone and siltstone with minor limestone rock outcrops; vegetation is dominated by wooded savannah grasslands

## Soils

Red loamy earths to sandy clays ([Kandosols](#)) with minor areas of black cracking clay soils ([Vertosols](#)) and associated sand sheets.<sup>1</sup>

---

<sup>1</sup> [The Australian Soil Classification](#) (Isbell and NCST, 2021).

# The Highlights

## Practices and strategies

- Eliminated synthetic chemicals
- Stopped tillage
- Integrated [No-Kill Cropping](#) principles and practices
- Integrated a holistic grazing strategy
- Implemented an integrated weed management strategy
- Livestock management and earthworks to prevent erosion
- Engaged in learning programs (ie. NT NRM) and peer networks
- Focus on low production costs with minimal outlays

## Observed benefits<sup>2</sup>

- Increased stocking rate
- Increased biodiversity across the farm
- Effective weed management without need for chemicals
- Preservation of top soil and water retention
- Health benefits from eliminating synthetic chemicals

## Monitoring progress

- Extensive, regular soil testing
- Tracking landscape health through regular observation of the property whilst rotating livestock
- Monitoring change through regular use of photography and video
- Accountability and knowledge sharing through participating in local programs
- Paying close attention to what is happening across the whole farm in response to holistic decision making.

---

<sup>2</sup> These benefits are based on farmers' observations, except where noted otherwise. No additional testing or analysis has been undertaken for this case study.

## Landscape and Soils

Lonesome Duck Estate is located 5 kms north-west of the town of Katherine, in the Kimberley region of the Northern Territory. The region experiences distinct wet and dry seasons, with daily temperatures in the wet season (November to April) ranging from 30°C to 37°C. The wet season is also characterised by intense humidity (greater than 80%), followed by tropical downpours. During the warm, sunny days and cool nights of the dry season, temperatures range from 21°C to 32°C and humidity drops to a tolerable 60-65%.

When the dry season begins around May, there is often no rain until the following October. For this reason, most producers, including the Trembaths, rely on bore water. The landscape surrounding the property comprises undulating plains and rises, and plateaux on weathered and unweathered limestone, dolomite, chalcedony, shale, sandstone and siltstone with associated sand sheets.

The soils range from loamy earths to sandy clays and are likely to be Kandosols, a common soil type across the Top End. These soils are often referred to as 'earths' and are recognised by their lack of soil structure. They are considered important agricultural and horticultural soils with the red, sandy variant suited to growing most varieties of vegetables.<sup>3</sup> Vegetation across the landscape includes dry tropical savanna woodlands of bloodwoods (*Corymbia* spp.) and eucalypts (*Eucalyptus* spp.) over tropical tall grasses including sorghum (*Sorghum* spp.), kangaroo grass (*Themeda triandra*), and rat's tail grass (*Sporobolus* spp.).<sup>4</sup>



**Image 1.** Jeremy Trembath putting hay out for cattle at Lonesome Duck Estate. Source: Jeremy Trembath.

<sup>3</sup> Northern Territory Department of Land Resource Management Resources (no date).

<sup>4</sup> Much of the soil and landscape information in this section is sourced from Northern Territory Department of Land Resource Management (2012).

## Meet the Trembaths

Jeremy and Amy have been running Lonesome Duck Estate since 2016. Although Jeremy's parents decided to take a step back from managing the property at this time, Lonesome Duck Estate is still 'definitely a family show.'

From six heifers in 2016, the Trembaths have bred 140 head of cattle, and in 2019 they began making other changes to the farm, which includes over 800 hectares of grazing land and four hectares of organic vegetable production. Their family's journey in regenerative agriculture involved learning how 'organic fertility works' through a lot of trial and error.

In a relatively short period, the Trembaths have worked to improve the landscape and production, and to open direct markets for their food in the local community. They began by changing their livestock management and working to stop erosion to protect and preserve the soil. They have stopped tillage, eliminated the use of chemicals, and integrated [No-Kill principles](#). Their approach has been to pay closer attention to what is happening on the farm and monitor the impact of their decisions.

Jeremy works full time on the farm and Amy, a vet, supports the farm business in a range of ways, including with soil testing and animal management. Jeremy's dad, Peter, is also a vet and an experienced farmer, so Jeremy is 'surrounded by intelligent people,' which he finds useful and inspiring. The Trembaths have a small child, Turin, and Jeremy's parents and his brother's family also live on the property. The family is enjoying time on the farm and are excited by their future plans.



**Image 2.** Jeremy and Amy Trembath at Lonesome Duck Estate.  
Source: Jeremy Trembath.

## Practices and Strategies

### Approaching the farm as an integrated system

Many of the changes the Trembaths have made to managing livestock have become part of a larger shift in their understanding of the farm as a system, and their realisation that making decisions in an integrated way allows them to capitalise on system-wide benefits. Jeremy describes the overall change in his approach as becoming more 'intentional' in his decision making.

'If you just stopped spraying the weeds and did nothing else that's not going to work. You need to manage your livestock differently and make greater effort and be more intentional.

That's the word I'm looking for, to have intention in every action that you do.'

**Jeremy Trembath**

The Trembaths no longer set stock and their grazing management is more attuned to high intensity for shorter durations. They carry more livestock on the farm than when they took over in 2016, and they plan to continue increasing stock numbers. As Jeremy describes, 'We are using disruption as a tool. We are not on a set system, which allows for some variation in our grazing plan rather than a set system.'

In this dry, tropical savanna climate, heavy rains in the wet season can have a significant impact on production and water management is crucial. The Trembaths have implemented specific practices to address soil erosion and reduce run-off, including water diversion measures and 'whoa boys' (trafficable diversion banks constructed to divert water without causing erosion). They have 'grassed up' large areas with ground cover to hold the soil in place and prevent it from washing away during heavy rains. Building up the ground cover by grassing large areas has required changes in their livestock management, keeping stock off regenerating areas so that ground cover can get established.

### Reducing synthetic inputs

Jeremy and Amy's approach to weed management on the farm has also changed and is still 'evolving'. They no longer use synthetic herbicides, pesticides or insecticides. As Jeremy grew up, he would regularly help his father apply chemicals to manage weeds across the property. Moving away from using chemicals required a shift in thinking across both generations in order to change the practices that Jeremy inherited from Peter. They now work together to diversify their rotations as part of a strategy to



improve soil and landscape health, and as a weed control mechanism. Jeremy reflects, 'We have found that the way to manage weeds is through good landscape and grazing practices that promote an environment better suited to desirable species'.

The Trembaths also decided to eliminate synthetic fertilisers and now grow their forage crops and vegetables (eggplant, zucchini, pumpkins, watermelon, garlic, leafy greens, root vegetables and corn) without chemical inputs. Part of their process involved their decision to embrace 'no-till and No-Kill' principles five years ago. They stopped tilling completely and now sow forage crops straight into the ground. They had some early 'failures due to regime design and lack of experience', so they returned to using the plough for about a year before they eventually 'weaned off' cultivating.

## Supporting the local food system

Jeremy and Amy are keen to support the local food system in Katherine, which has a fluctuating population of around 12,000 people and is a busy tourist hub in the region. As Jeremy explains, 'We don't really want any of the food we produce here to travel away from this town ... There's minimal processing and packaging and it just goes straight to town and that's good'. Jeremy and Amy sell their organic fruit and vegetable produce at the farmers market and to a local store in town. Their intention is to set up a micro-abattoir so they can avoid the live export market and sell 100% local beef, locally.

## Monitoring for soil and landscape health

Through soil monitoring, including regular soil chemistry tests over the past four years, the Trembaths have increased their understanding of soil health. They follow a consistent method of collecting soil samples from across the farm and the samples are analysed at the same laboratory. Amy's background knowledge of chemistry has helped them interpret and understand the impact their practice changes are having on the soil.

Both Jeremy and Amy are mindful of the costs of soil testing and while they have trialled soil biological testing, they did not feel as confident interpreting the results. This meant that they didn't learn as much from the biological testing as hoped, and until something changes, they don't see this as good value for money.

The Trembaths have participated in the Soil Your Undies program, a Sustainable Soils Skill Set course run by the Territory Natural Resource Management (TNRM). They have taken part a few times, 'burying undies in different places.' Jeremy is proud to have had their undies return the 'best biological activity of anyone involved.'

Another of Jeremy's measures of progress has been to watch for earthworms in the soil. There were no visible signs of earthworms when they began their transition several years ago, but in 2022, the Trembaths began finding earthworms across the farm, and it



was 'a big thing' for them to be able to dig in a paddock and see them. As Jeremy says, 'that is a goal that we have started to realise.'

Jeremy also uses photography and video as a monitoring practice to keep a visual record of how the landscape has been responding to changes in farming practices. They have been capturing images of changes to groundcover over time, which Jeremy considers to be a valuable objective monitoring practice.

'We can absolutely be objective about it because I take photos and videos, especially when there's an area that I want to remediate. Photos and videos of how I'm doing it so we can compare back.'

**Jeremy Trembath**

### Reflecting on challenges and risks

Jeremy believes that the most significant challenge or 'risk' that he has overcome has been his 'own ignorance'. Looking back, he feels that the first two seasons when they were just starting out were the most difficult because of a lack of experience. He highlights how important context is in regenerative farming, and his realisation that he 'can't rely on advice from external experts as confidently.' As he says, 'you can't just have an agro or someone come along as a professional because they don't know your farm.' Jeremy believes that when problems arise, it is up to the farmer to work things out themselves, drawing on a range of sources of advice and information. He notes that there 'can be times where you get it wrong ... and that's probably the biggest risk, because it's not prescriptive.'

'You have to work out what's going to work on your farm, for your soils, for your place, with your animals and your facilities, everything ... because it's not prescriptive farming.'

**Jeremy Trembath**

## Observed Benefits<sup>5</sup>

### Soils and landscapes

#### Improving soil chemistry

Jeremy has undertaken regular soil monitoring over the past four years, and his results indicate that organic matter on the property has increased from 1.0% to 1.3%, the cation exchange capacity has nearly doubled, and the carbon to nitrogen ratio has shifted from eight to twelve.

Soil tests also reveal that calcium availability in the soil has doubled, and Jeremy is convinced that such an increase cannot be accounted for by lime additions alone, given their comparatively minor rates of lime application to combat low levels of soil calcium. With the Trembaths' combined knowledge of the complex soil chemical and biological interactions occurring, they have formed more likely hypotheses to explain the results.

Jeremy now questions the common belief that productive and profitable agriculture requires constant chemical inputs. That is, the 'mindset that if you want it, you have to put it in. But in actual fact, the biology in the soil is mineralising, making these [nutrients] available.'

#### Controlling erosion

Managing erosion and controlling the flow of water on the property has had multiple benefits. The most significant being that they no longer lose soil during the wet season. As Jeremy describes, 'The soil is wholly in place. It's not washing away.' There are no longer issues with soil erosion at Lonesome Duck Estate.

'We don't have any place that's eroded. There's nowhere on the farm that is eroding anymore and that's through livestock management.'

**Jeremy Trembath**

#### Increasing diversity and natural pest management

The Trembaths have noticed increasing diversity in both flora and fauna, which Jeremy considers a positive sign. Conversely he has observed fewer animals - birds and insects - consuming his crops since integrating more diversity into the system. Reflecting on

---

<sup>5</sup> This section presents the benefits of practice change from the farmers' perspective. It is based on the farmers' observations, and in some instances their own interpretation of data and test results. The project did not include any new on-ground testing or analysis of the farmers' data by Soils for Life.

monoculture cropping, Jeremy describes how running a 'plough through somewhere and then planting it, it just feels like everything wants to eat it.' He describes how birds used to land on a freshly ploughed and planted field and 'they pull, you know, 20 seedlings out each. They really do damage.' To prevent this kind of damage to crops, Jeremy used to 'spend a lot of time driving around with a shotgun, and I didn't like shooting at cockies, but sometimes I let shots off.' With changes in their management, there hasn't been a need for this kind of adversarial approach to wildlife, which Jeremy sees as a welcome change. He has also observed fewer insects impacting crops and he also puts this down to the natural pest management that comes with greater diversity in the system.

## Farmer and farm

### Cost saving

Since integrating No-Kill principles at Lonesome Duck Estate, the Trembaths have seen cost savings on diesel for plough passes with the tractor, and reduced outlays for synthetic chemicals. Jeremy has observed the benefits to the soil from eliminating tillage in terms of keeping nutrients and carbon in the soil. Commenting on tillage, Jeremy says:

'We know that when we turn the soil over and we expose the carbon which combines oxygen and flies off and there it's gone. So, you've paid to destroy your soil and create yourself a problem.'

**Jeremy Trembath**

### Increasing health

Jeremy is relieved not to be using chemicals anymore and sees benefit for his own family's health and the health of the farming ecosystem. Growing and selling organic food also means that Jeremy and Amy have an opportunity to draw on their own farming story as part of their marketing strategy with customers.



**Image 3.** Turin Trembath enjoys time with the cows at Lonesome Duck Estate.  
Source: Jeremy Trembath.

### Reducing time, energy and money on weeds

Another important benefit that has come from eliminating synthetic chemicals from operations includes a significant reduction in time, energy and money that the Trembaths used to spend managing weeds during the growing season.

‘We used to spend every morning in the growing season spraying weeds. We would mix a tank and spend between one and three hours spraying. You can take all that time, energy, money and see it as a benefit for the farm ... and the weeds just aren’t a problem anymore.’

**Jeremy Trembath**

In terms of the financial benefits of making change, Jeremy is confident that overall the farm is on an upward trajectory, and that they are in a better position in terms of their overall profitability because they ‘are not giving everyone else our money all the time.’ Jeremy looks at the situation in a ‘holistic farm sense with every enterprise,’ and affirms that ‘we’re definitely keeping more because we’re not spending more.’





**Image 4.** A 12-way multispecies cover crop at Lonesome Duck Estate, dominated here by sunn hemp and including legumes, flowers, grasses and brassicas.  
Source: Jeremy Trembath.

## Looking to the Future

Currently, the majority of beef in the northern part of the Northern Territory is shipped to Indonesia and Southeast Asia through live export, and nearly all beef for local consumption is brought into the Northern Territory from southern states. This situation doesn't make sense to Jeremy and Amy.

‘We’re sending beef from here to buy beef from somewhere else, and we’re doing this in a social and political climate where we’re trying to reduce carbon emissions. I think the whole thing is absolutely ludicrous.’

**Jeremy Trembath**

Supplying beef locally is something the Trembaths plan to pursue, however, the absence of an abattoir nearby presents a significant hurdle. They intend to tackle this by setting up a micro-abattoir on the property. Jeremy has visited a facility in Darwin and is researching how they can best realise this goal. Part of the process involves generating capital investment to fund the abattoir. As Jeremy says, ‘We just absolutely have to start eating our beef here and there's a market. People want to, and they're screaming out for it.’ Jeremy is confident there is also a market to serve people, ‘Who want hormone free, who want grass fed’ and that Lonesome Duck Estate can supply regeneratively grown beef as part of their market advantage.

The Trembaths are determined to improve on their organic vegetable production albeit through trial and error. They have struggled with yields in their corn crop for the past two years, ‘Planting with the intention to harvest maybe 500 to 1,000 cobs per week. We absolutely have not realised that.’ At this stage, Jeremy is not sure why, but he is confident if they persevere they will figure it out. This example highlights the effort the Trembaths are prepared to make to problem-solve and overcome barriers in order to grow and harvest new crops within an organic, regenerative farming system at Lonesome Duck Estate.



## References

Department of Land Resource Management (DLRM) (no date). *Soils of the Northern Territory - Factsheet*. Department of Land Resource Management, Northern Territory Government.

Department of Land Resource Management (DLRM) (2012). *Summary of the Origin and Derivation of the 1:250,000 Land System Descriptions for the Northern Part of the Northern Territory*. Department of Land Resource Management, Northern Territory Government.