



The difference of utilising direct drilling farming methods in comparison to non-direct drilling farming methods.

1.0 Introduction

Regenerative farming's six core principles (Figure 1) has drawn increased attention towards direct drilling (O'Donoghue, Minasny, & McBratney, 2022).

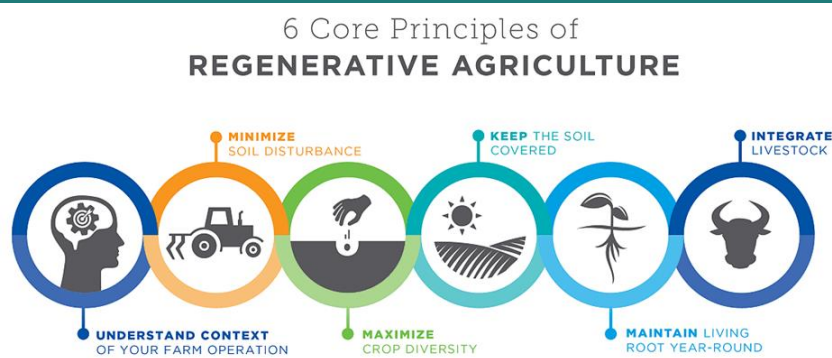


Figure 1: Principles of regenerative agriculture (Source: Wood, 2023)

2.0 Aims and Objectives

2.1 Aims

To assess the difference in output (grain) between highly invasive (non-direct drilling) and less invasive (direct drilling) farming practices.

2.2 Objectives

1. Collect yield results from farms utilising direct drilling and non-direct drilling farming methods.
2. Create a comparative analysis to determine the output differences between direct and non-direct drilling farming methods.

3.0 Literature Review

- The "green revolution" coined in 1968 to improve crop yield (Ameen & Raza, 2017) discovered too came at the cost of environmental degradation (Jouzi, *et al.*, 2017).
- To achieve high yields, large amounts of chemical fertilisers and pesticides were used.
- To reduce the reliance on pesticides and chemical fertilisers, farmers resorted to direct drilling.
- O'Brien & Daigh (2019) state leaving the soil covered by this residue through the winter months could prevent soil erosion and optimise soil temperature and moisture.

4.0 Methodology

- Thirty-five journals/posts were found using the search criteria of direct or non-direct drilling (Figure 2).
- The sample size, and physical soil structure for each location were noted.
- Non-direct drilling data was collected from Nun-Monkton Estate Farm.
- Anderson Darling test was completed to determine if there was a normal distribution.
- A 2-sample t-test was used to determine if there was a significant statistical difference.



Figure 2: 35 journal/farm locations (Source: Author's Own, 2024)

5.0 Results

The results shown in Figure 3 imply that the non-direct drilling method could produce higher yields at 10.96 tonnes per hectare.

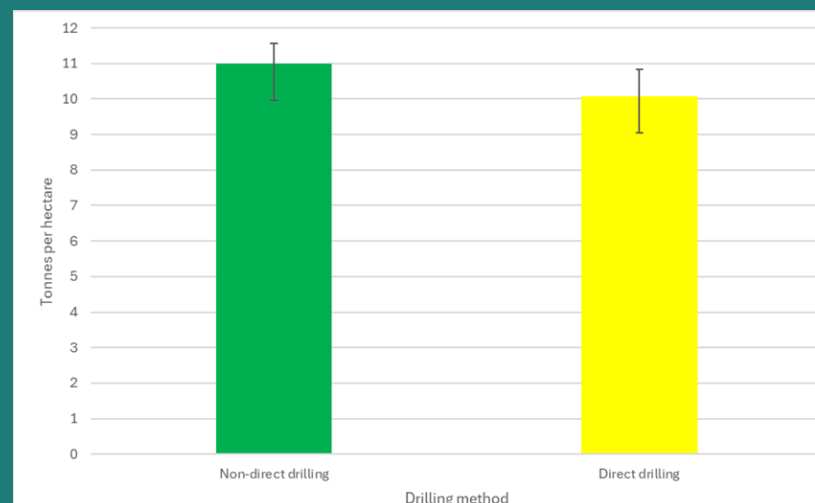


Figure 3: Yield results (average per drilling method) (Source: Author's Own, 2024).

6.0 Discussion

- Results imply that there is no significant statistical difference between direct and non-direct drilling methods to yield outcomes.
- Case study 4 had a considerably lower yield than case study 5 despite using the same farm practices (direct drilling). However, case studies 1, 2, and 3, which followed a non-direct drilling practice, had a more uniform yield output of 10.3-11.9 tonnes per hectare.
- Wood (2023) suggests that case studies 1, 2, and 3 may have only incorporated five core principles of regenerative farming due to following the context principle (no two farms are alike).
- This principle is demonstrated in that the farm's location is prone to black-grass, resulting in not using direct drilling.
- Case study 4 could potentially only be implementing one or two principles, therefore reducing the potential yields.

7.0 Conclusion

- The results of this project concludes that there is no single recommendation for methods of farming due to there being many factors that could influence the yield outcome and crop growth.
- The farm needs to determine if the potential yield loss will be replaced by the money saved in fuel, person-hours, fertiliser.
- Many farms could not afford to transfer the whole farm to direct drilling immediately because it takes over three years before yields start plateauing to the same or near the original yields achieved from non-direct drilling.
- Direct drilling is most effective when following all six principles of regenerative farming.
- It is recommended for a farm to adopt as many core principles as possible.

8.0 References

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