

Case Study - Increasing crop area while maintaining breeders with Dual Purpose Crops

Dual purpose crops have been utilised in mixed farming operations across WA and the East Coast for many years, however there still remains a requirement to promote this option to further increase adoption and assist growers who are still developing their skill sets in this practice. Completely understanding and measuring the benefits of integrating dual purpose crops into a mixed farming operation can be complex especially when the livestock grazing the crops are ewes and lambs or cows and calves instead of simply lambs or calves or in the scenario of an increased area being sown down to crop. Under this scenario there are several factors to be considered in completing the benefit cost analysis which include:

- Impact on crop yield
- Time of sowing for crop
- Increased crop area
- Improvement in pasture Food on Offer
- Benefit to grazing stock

Southern Dirt has successfully applied for funding through MLA's Producer Demonstration Site (PDS) program to examine the opportunities' dual purpose crops can provide to producers in their mixed farming enterprise. The PDS project will operate nine sites from 2020 through to 2023, demonstrating the suitability, practical application and benefit cost analysis of using dual purpose crops in the Great Southern region of Western Australia. The results and findings will be circulated through the region and the wider industry via field walks, field days, case studies and annual reports, with the aim of assisting producers in the uptake of this beneficial practice.

One of the three 2021 producer demonstration sites is located in Bridgetown and currently manages a mixed operation comprised of:

- Merino ewes joined to White Suffolk and Poll Dorset rams producing crossbred lambs
- Angus/Charolais cows breeding beef calves
- Cereal cropping

This case study will examine the benefit cost analysis of integrating dual purpose crops into this operation. The current operation and outputs are outlined in table 1 below.

Operation	Area (winter)	Breeders/Yield	Offspring/ tons
Crop – Oats	60 Ha	5	300 tons
Cows	170 Ha	180	175 calves
Sheep	255 Ha	2,000	2,100 lambs
Wool	255 Ha	2,000	10,000 kg

Table 1: Operation without dual purpose crops



Photo 1: Grazing cage in oats grazed to measure impact on yield

Production within the operation is quite set and it is difficult to change the livestock operation in the event of a good season. Seasonal conditions have become more extreme over the past ten years with drier seasons being more common than previously experienced impacting the operations risk profile around increasing breeder numbers.

Like all businesses and farming operations strategies to increase productivity without taking on excessive risks are always being examined and dual purpose crops offer a strategy of increasing production (grain) with an appropriate risk reward matrix.

Seasonal conditions can broadly be classified as good, average or below average and production requirements/inputs need to be adjusted and matched to each of the different seasonal conditions. Crop yields are directly linked to seasonal conditions and while livestock offer a production hedge against poorer seasonal conditions they are unable to take complete advantage of an extremely good season. Stocking levels are generally set to match average to slightly below average seasonal conditions due to the constant occurrence of poorer seasonal conditions in recent years.

Dual purpose crops allow producers to increase production in the event of an average or above average season without excessive risk should the season turn negative. The below benefit cost analysis will examine the benefits from using a dual purpose crop to increase production in the event of an above average season and the cost should the season turn to a below average season post seeding or into Spring.

Average to above average season

In an average to above average season and utilizing all the sown crops as dual purpose crops the cropping area was increased by 66% to go from 12.4% of total area to 20.6%. The production output

under this scenario is summarized below in table 2. The livestock production is unchanged and the average crop yield has been reduced by 5% due to the impact of grazing.

Operation	Area (winter)	Breeders/Yield	Offspring/ tonnes
Crop – Oats	100 Ha	4.75	475 tons
Cows	150 Ha	180	175 calves
Sheep	235 Ha	2,000	2,100 lambs
Wool	235 Ha	2,000	10,000 kg

Table 2: Production summary utilising dual purpose crops in a good season

Total production is lifted by 175 tonnes worth \$300 per tonne to generate an additional \$52,500 in revenue. Costs associated with growing an additional 40 Ha of oats were:

- \$210/Ha Fertilizer
- \$55/Ha chemicals
- \$45/Ha seed
- \$100/Ha machinery/labour/diesel
- \$160/Ha grain freight/levies/delivery fees
- \$570/Ha total costs per Ha

The costs associated with growing an additional 40 Ha totaled \$22,800, generating a further \$29,700 of net profit. On current pricing the combined revenue of the operation is indicatively \$820,000 from beef, lamb, grain and wool revenues.

By increasing the cropping area total revenue is increased by 6.5% under this scenario or the additional \$52,500.



Photo 2: Ewes and lambs entering an oat crop for grazing

Below average season

The key risk around sowing a larger area to crop and reducing the available pasture to livestock is in the event of below average seasonal rainfall. The amount of pasture grown is not sufficient to maintain the livestock and additional supplementary feeding is required or in the worst-case livestock need to be sold.

Therefore what are the monetary impacts of increasing the area sown to crop in a below average season? There are two base case scenario's. In scenario one, in the event of a poor or late start to the season the decision is made not to sow the additional area. It is preferable to be in a position to be adaptable and adjust the area sown only if the seasonal indicators such as year to date received rainfall deciles are positive. Therefore if the seasonal rainfall decile is a 2 or 3 or there is a late start to the season and the additional area is not planted then the monetary risk is \$0.00.

In scenario two, after a promising start to the season and the additional area is sown but the spring is below average triggering measures to be put in place to manage the feed risk and safeguard livestock production. A potential strategy is to graze the additional area and forego the grain production. With fertiliser rates reduced due to seasonal indicators the monetary risk associated with the 40Ha of crop is indicatively \$300/Ha (\$140/Ha fertiliser, \$55/Ha chemicals, \$45/Ha seed, \$60/Ha machinery) or a total of \$12,000.

Summary

The benefit cost analysis is very encouraging in favor of employing dual purpose crops into a mixed farming operation in the Great Southern region of Western Australia. In the scenario examined in this case study the benefits are an increase in total revenues of \$52,500 while the cost risk is limited to \$12,000 or a 4 to 1 net benefit. The additional benefit around dual purpose crops which is difficult to capture in terms of a monetary value is that the additional area should only be sown if the seasonal indicators are positive therefore reducing the cost risk.

A further benefit to planting oats as a dual purpose crop in the high rainfall zone is that crops like oats can be sown early and capture the warmer growing conditions in May without the risk of the heavy crop falling down in late spring / early summer. By grazing the crop in June/July the height and weight (total biomass) of the crop is reduced and the oats remain standing improving their harvestability.

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