THE COST OF GETTING BACK INTO SHEEP

**A financial analysis of increasing sheep flock size or establishing a new sheep enterprise in High Rainfall Zone 4 of Western Australia.**

**A Sheep Industry Business Innovation (SIBI) project**

A summary of determining the financial costs of increasing the flock size of three sheep enterprise types

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[](https://email.gopc.net/home/galsync@planfarm.com.au/Briefcase/newpf.jpg?ver=1)

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**The Cost of Getting Back into Sheep**

*A financial analysis of increasing sheep flock size or establishing a new sheep enterprise in High Rainfall Zone 4 of Western Australia.*

*Determining the financial costs of increasing the flock size of three sheep enterprise types.*

**Introduction**

The size of the sheep flock in WA has been in recession for the past 25 years, from a high of over 38 million head in 1990 to 14 million head in 2015. It is a logical response to the continued strength of cropping returns in that period, however recent strengthening of lamb and wool prices has seen the profitability of sheep rival that of cropping, particularly in the high rainfall areas of the state. Demand for Australian sheep products continues to be strong, and these conditions have prompted farmers to question whether there is a place in their operation for a higher proportion of sheep. To make an informed decision it is necessary to look closely at the financial implications of either investing in a new sheep enterprise or increasing the size of an existing sheep business. We have provided both a cash-based (for the sheep enterprise) and a whole farm (including opportunity cost) analysis for the following 5 scenarios of Increasing flock size from 1,000 head to 2,000 head:

1. Purchasing 1.5 year-old ewes:
   1. 350 in year 1
   2. 200 in year 2
   3. 100 in year 3
   4. 50 in year 4
2. Keeping a higher percentage of ewe lambs:
   1. 90% in Years 1 & 2
   2. 85% in Years 3 & 4
   3. 80% in Year 5
   4. 70% in Year 6
   5. 60% in Year 7
   6. 54% YIYO
3. Increasing lambing percentage from 95% to 105%:
   1. includes associated increased costs of:
      1. Fodder costs by 15%
      2. Scanning for multiples @ $0.80 per head
      3. 15% increase in paid labour (feeding, monitoring ewe condition & FOO, managing twin and single mobs separately)
      4. 10% increase in livestock expenses to cover extra lamb marking, vaccinations
   2. maintaining the same no. of lambs sold per ha
4. Retaining 6 year-old breeding ewe cohort (CFA ewes) for an extra year
5. Establishing a new 2,000 head flock through purchasing 1.5 year-old ewes:
   1. 1,100 in Year 1
   2. 400 in Year 2
   3. With a 20% annual cull rate of original ewe cohort, and keeping a higher % of ewe lambs:
   4. 90% in Year 1
   5. 70% in Year 2
   6. 65% in Year 3
   7. 54% YIYO

Each of the above scenarios was applied to the following 3 flock types:

1. 100% Self-replacing Merino flock
2. Self-replacing Merino flock with 40% Terminal Sire
3. 100% Self-replacing Composite breed flock

**Methods**

For both Merino Flock analyses, a ‘model farm’ was designed using an average of the past 3 years of data (2013 to 2015) from Planfarm Bankwest Benchmarks for the High Rainfall Zone 4. This zone was chosen because it represents the zone with the highest percentage of effective area grazed (48% average), a high proportion of income from those grazing operations, and a good number of farms contributing to the data set (~40 per year) resulting in reliable benchmarks. The same method was used to generate a model farm for the Composite Flock analysis, however there were a limited number of clients (4) to draw benchmark data from. The model Merino and Composite farms had the following characteristics:

|  |  |  |
| --- | --- | --- |
| **Flock Type** | **Merino** | **Composite** |
| Total Effective Area (ha) | 2464 | 3976 |
| Total Labour Units (Sheep) | 1.36 | 2.07 |
| Rainfall Apr-Sep (mm) | 348 | 430 |
| % Crop | 52% | 58% |
| % Pasture | 48% | 42% |
| Opening Sheep Nos | 7867 | 10612 |
| Lambs/WGHa | 3.62 | 6.2 |
| Weaning % | 90% | 128% |
| Avg Sale Price Per Hd | $78 | $89 |
| Wool Kg/Hd | 3.7 | 3.1 |
| Wool Kg/WGHa | 31 | 22.7 |
| Stocking DSE/WGHa | 8.97 | 12.63 |
| Income from Sheep Operations ($/WGha) | $422 | $640 |
| Expenses for Sheep Operation ($/WGha) | $230 | $423 |
| Sheep Gross Margin ($/WGha) | $192 | $217 |
| Sheep Gross Margin ($/WGHa/100mm GSR) | $66 | $49.4 |

In order for the analysis to examine the cost of increasing flock size from 1000 head to 2000 head, the size of the model farm needed to be scaled down to 650 ha for the Merino enterprise, and 750 ha for the Composite enterprise, keeping all other production parameters and cost structures ($/WGha) the same. It was assumed for all flock expansion scenarios that the “before” farm started with a lower % of effective area grazed, and that the “after” farm had the same % grazed area as the model farm. For example, the Merino model farm had a stocking rate of 8.97 DSE, and 48% of the effective area was grazed. Therefore, in the analyses the grazed area started at 24% of the effective area (1,000 head), and was increased to 48% (2,000 head) while maintaining a DSE of 8.97 throughout the expansion period. The cropping area was proportionately decreased.

The only adjustments that were made to the model farm prior to the scenarios being run were:

1. For the Merino enterprise and Merino with 40% terminal sire enterprises, the pasture costs per WGHa were increased from $4.15 to $42.15. It was assumed that cropping fertiliser costs were not being fairly attributed to pasture areas, and so a figure of $38 was calculated using current costs for single superphosphate & spreading, at a maintenance rate of 90kg/ha/year for 9 DSE (0.9kg P / DSE), and added to the $4.15 per ha figure from the benchmarks.
2. It was assumed for all scenarios that all wether lambs were sold, rather than being kept for sale as shippers. Therefore, the percentage of ewes in the model farm is higher than that of the average farm in HRZ4.

There were a number of assumptions made. These assumptions were kept the same for all scenarios of a given flock type as far as practicable:

1. Ewes mated 5 times, with first mating at 1.5YO and culled-for-age at 6.5YO
2. Loss rates at 5% per year for each class of sheep
3. Average lambing % for maiden Merino ewes 75%, average lambing % for 3-6YO Merino ewes 95%
4. In order to maintain a stable year-in-year-out (YIYO) flock structure, 54% of ewe lambs in the 100% Merino Flock were kept each year as replacement breeders, 90% of Merino ewe lambs in the 40% TS flock were kept, and 38% of composite ewe lambs were kept
5. Stocking rate maintained at 9 DSE/WGHa across the period of expansion for both Merino flocks, and 12 DSE/WGHa for the Composite flock
6. All replacement rams bought in at a cost of $800 each and joined at 2%.
7. Replacement 1.5YO Merino breeding ewes bought in at a cost of $120 each, and 1.5YO Composite breeding ewes bought in at a cost of $140 each.
8. Owner-operator labour has been included in the economic cost & break even analysis for all scenarios. It is calculated by the standard formula used in the Planfarm Bank West Benchmarks data of $50,000 per annum plus 1% of Total Farm Assets under management. The average benchmark figures of the 2013 to 2015 seasons from the H4 zone have been used in this case and is calculated as $58 per effective hectare.
9. Interest on working capital 6% and CPI increase of 2.5% applied to all costs.
10. Inclusion of capital - for the ‘expansion’ scenarios, a $25,000 investment in the first year to upgrade yards, fences, water & shearing shed to cope with the increased number of sheep.

For a ‘new’ enterprise, a $73,000 upfront investment was required to purchase a new set of portable yards, reinstate / fix fencing, install or upgrade water infrastructure and complete significant repairs to shearing shed (assumed that shearing shed was already existing on the property).

1. Methods of flock expansion were not only focussed on profitability, but also the quickest way to establish a new, stable flock structure. Hence, for example, why 100% of ewes are not bought in the first year, because if they were, all the ewes would reach culling age at the same time, leaving you with a significantly depleted flock in the 6th year.
2. A cropping rotational analysis was completed using Planfarm’s rotation analysis tool which provides an operating margin for a specific rotation. In all scenarios, a simple cropping rotation of equal proportions of canola/wheat/barley was used to derive a crop operating margin (after owner labour). This analysis also uses Planfarm Bankwest benchmark figures for the H4 rainfall zone with regards to average yields and cropping costs from the past three years.

**Economic Analysis**

For each scenario, a breakeven economic analysis has been provided for both the whole farm and for the livestock enterprise. This analysis accounts for lost income that was being generated by the business prior to the expansion period, increased direct costs and uses a cost for unpaid owner-operator labour. The analysis also estimates a peak debt requirement for each scenario which is driven by additional operating expenses and lost income compared to the status quo.

In addition, an economic analysis of the effect on whole farm operating profit over a 10 year period was completed, predominantly to determine the effect of these potential changes on the whole business compared to the current ‘Status Quo’ situation. The limitation of this analysis is that there is no allowance for productivity growth in the livestock enterprise and only a minor (1.5%) increase in productivity growth in the cropping enterprise. There is also no allowance for poor seasons. What it does attempt to show is what effect that changes to enterprises over a period of 10 years has on the whole farm operating profit and where these sit compared to the current status quo situation.

**Results**

**100% Self-replacing Merino (MO) flock selling Merino lambs**

The most cost effective method for expansion of a pure Merino flock from 1,000 head to 2,000 head according to this analysis is through increasing lambing percentage from 90% to 105%, while maintaining the same number of lambs sold per hectare (Table 1). This method had an estimated peak debt of $25,495and a pay-back period of 4 years. An original analysis was performed whereby the lambing percentage was increased to 105%, but the proportion of ewe’s lambs kept was maintained at 54%. This scenario was not feasible as the timeframe to reach a stable 2,000 head flock structure was 20+ years.

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| **Expansion scenario** | **Estimated Peak Debt** | **Year that Whole farm break-even is reached** | **Peak Livestock Enterprise Cash Cost** | **Year that Livestock Enterprise break-even is reached** | **Year that 2,000 head flock size is reached** |
| Buying 1.5YO ewes | $78,848  (Year 2) | Year 5 | $56,868 (Year 1) | Year 4 | Year 5 |
| Keeping a higher proportion of ewe lambs | $44,234  (Year 3) | Year 7 | $37,301 (Year 1) | Year 5 | Year 9 |
| Increasing lambing from 90% to 105% | $25,459  (Year 1) | Year 4 | $27,259  (Year 1) | Year 4 | Year 7 |
| Retaining CFA (6.5YO) ewes for an extra year | $24,365  (Year 1) | Year 4 | $21,381  (Year 1) | Year 3 | >20 years |
| Establishing a new 2,000 head flock by buying 1.5YO ewes: | $287,209 (Year 2) | Year 11 | $207,768  (Year 2) | Year 6 | Year 5 |

**Table 1: Results of a 100% Self-replacing Merino flock with Merino lambs**

The assumption of being able to increase lambing rate to 105% was taken from work performed by Dr Andrew Thompson (Murdoch University) on the actual improvements of lambing percentage by participants of the Lifetime Ewe Management course. A cull rate of 5% per year for selling dry ewes after scanning was applied to all ewe classes except maidens, as was a decrease in ewe mortality from 5% per year to 3.5% per year.

With a one-year longer break-even period and a three times higher peak debt, was the option of purchasing 1.5YO replacement ewes on a sliding scale. Using this method, the estimated peak debt reached would be $78,848 with a payback period of 5 years and a livestock enterprise cash cost of $56,868. However, using this expansion method significantly reduced the time taken to reach the 2,000-head flock size (5 years vs 7 years for increasing lambing %). This would be a feasible option for farmers who have access to capital, are not confident in their capacity to increase lambing percentages to 105%, or who are wanting to reach the increased flock size quickly. Availability of 1.5YO Merino ewes over the past 3 years has not been a limiting factor, however in a good season (such as 2016), availability may be reduced and/or prices pushed higher due to increased demand.

The expansion method of increasing flock size by retaining a higher proportion of ewe lambs had a relatively low estimated peak debt of $44,234, and a significantly longer pay-back period of 7 years, although peak livestock enterprise cash costs were lower at $21,381. This is due to a combination of reduced numbers of lambs sold per ha, and a higher proportion of non-producing hoggets in the flock structure during the expansion period.

**Graph 1: Breakeven analysis of the livestock enterprise for a 100% Self -replacing Merino flock.**

Retaining 6.5YO ewes for another year of lambing was the lowest cost option, however it is not a feasible method for doubling flock size because the time taken to increase numbers is too slow (>20 years to reach 2,000 head). This would be a potential low-cost option for producers looking to increase their flock size by 20-30%, but not for those looking to double in size. Analysis of this expansion method has not been repeated for the other two flock types, as it was evident that this is not a feasible method for doubling flock size.

Establishing a 2,000 head Merino flock through purchasing 1.5YO ewes had a n estimated peak debt of $287,209 with a payback period of 11 years, and a livestock enterprise cash cost of $207,768. A combination of the above flock expansion methods was used to bring numbers up to full production quickly and cost-effectively. This included purchasing 1,100 x 1.5YO ewes in the first year, and 400 x 1.5YO ewes in the second year; employing a 20% cull rate to the initial cohort of ewes to improve genetics and create a stable flock structure; and keeping a higher proportion of ewe lambs in years 1-3.

The analysis of the effect on cumulative operating profit of the whole farm business shows that the only scenario that is significantly less than the status quo situation is the New Enterprise. This is not surprising given the loss in income from reducing cropping area along with the high capital costs of purchasing ewes over the first three years. The scenario of Buying 1.5 YO ewes eventually catches up to the lower cost scenarios by year 9.

**Graph 2: Cumulative Farm Operating Surplus analysis of the farm enterprise for a 100% Self -replacing Merino flock.**

**Self-replacing Merino (MO) flock with 40% Terminal Sire (TS)**

The lowest cost option for increasing a Merino with 40% TS flock size from 1,000 head to 2,000 head was by increasing lambing percentage from 90% to 105%, and retaining 100% of Merino ewe lambs for the first 7 years. This method of expansion had a relatively low estimated peak debt of $20,965 with a break-even period of 5 years and low cash costs for the livestock enterprise of $21,777. However, there was a major drawback to this method, which was that the flock size did not reach 2,000 head until year 11, which may be too long for most farmers to wait given the current strength of the lamb and wool market. Many would be seeking to take advantage of prices while they remain high. The reason that this expansion strategy took so long to reach 2,000 head was that in a 40% TS enterprise, you need to be retaining 90% of your Merino ewe lambs as replacement stock year-in-year-out to maintain a steady flock size. As a result, there is little room to move in terms of keeping a higher proportion of ewe lambs as we did in the 100% Merino flock analyses (by maintaining number of lambs sold per ha while increasing lambing %, we also increased the % of ewe lambs kept).

Buying 1.5YO ewes provides an expansion option with a reasonable timeframe to reach 2,000 head (5 years), but a significantly higher estimated peak debt of $80,300, a break-even at year 6 and a livestock enterprise cash cost of $57,928. As with the 100% Merino flock, this would be a feasible option for farmers who have access to capital and/or are not confident in their capacity to increase lambing percentages to 105%, or who are wanting to reach the increased flock size within a 5-year timeframe.

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| **Expansion scenario** | **Estimated Peak Debt** | **Year that Whole farm break-even is reached** | **Peak Livestock Enterprise Cash Cost** | **Year that Livestock Enterprise break-even is reached** | **Year that 2,000 head flock size is reached** |
| Buying 1.5YO ewes | $80,300  (Year 2) | Year 6 | $57,928 (Year 1) | Year 4 | Year 5 |
| Keeping a higher proportion of ewe lambs | $24,264  (Year 1) | Year 5 | 25,518  (Year 1) | Year 6 | > 20 years  Not a feasible time-frame |
| Increasing lambing from 90% to 105% | $20,965  (Year 1) | Year 4 | $21,777 (Year 1) | Year 3 | Year 11 |
| Establishing a new 2,000 head flock | $316,033 (Year 2) | Year 10 | $200,717 (Year 1) | Year 5 | Year 4 |

**Table 2: Results of a Self-Replacing Merino flock with 40% Terminal Sire**

For the 40% TS flock, retaining a higher proportion of ewe lambs was not a feasible expansion strategy because, as mentioned above, the YIYO model already required 90% of Merino ewe lambs to be kept as breeding stock, giving little room to increase the numbers. Even when increased and maintained at 100% of Merino ewe lambs kept as breeding stock, the flock size had not reached 2,000 head after 20 years.

Establishing a new 2,000 head MO with 40% TS flock had an estimated peak debt of $316,033 with a whole farm break-even reached at year 10 and a livestock enterprise cash cost of $200,717. A combination of flock expansion methods was used to bring numbers up to full production quickly and cost-effectively. This included purchasing 1,300 x 1.5YO ewes in the first year, and 600 x 1.5YO ewes in the second year and employing a 20% cull rate to the initial cohort of ewes to improve genetics and create a stable flock structure. The stable flock structure was reached in Year 4.

**Graph 3: Breakeven analysis of the livestock enterprise for a Self-Replacing Merino flock with 40% Terminal Sire**

**Graph 4: Cumulative Farm Operating Surplus analysis of the farm enterprise for a Merino flock with 40% Terminal Sire.**

As for the 100% SR Merino Flock, the analysis of the effect on cumulative operating profit of the whole farm business shows that the only scenario that is significantly less than the status quo situation is the New Enterprise. This is not surprising given the loss in income from reducing cropping area along with the high capital costs of purchasing ewes over the first three years. The scenario of Buying 1.5 YO ewes eventually catches up to the lower cost scenarios by year 9. Again, the scenario of increasing lambing percentage eventually surpasses the status quo scenario for cumulative whole farm operating profit by year 9.

**100% Self-Replacing Composite breed flock**

The most cost effective method of increasing a 100% Composite breed flock from 1,000 head to 2,000 head was the purchasing of 1.5YO ewes or increasing lambing percentage from 12%8 to 140%, both achieving a whole farm break even in year 5. The purchasing of 1.5 YO ewes is obviously a higher cost option in the initial years. The estimated peak debt of this method was $82,129 with a pay-back period of 5 years and a livestock enterprise cash cost of $59,030. The time taken to reach 2,000 head was 5 years.

Increasing lambing percentage from 128% to 140%, while maintaining the number of lambs sold per hectare at 4.96 (as per the model farm), had the lowest estimated peak debt of $27,172 and a livestock enterprise cash cost of 29,412. However, it took significantly longer to reach the 2,000 head flock size (10 years). Caution should be exercised when interpreting this scenario, as there would be few producers who could sustainably lift and maintain their weaning rate at 140%. To achieve such a result substantial effort, time and resources would likely be needed, as would a potential reduction in stocking rate, which has not been factored into the analysis. In addition, the 10-year timeframe to reach 2,000 head would likely make this expansion method unfavourable to most producers.

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| --- | --- | --- | --- | --- | --- |
| **Expansion scenario** | **Estimated Peak Debt** | **Year that Whole farm break-even is reached** | **Peak Livestock Enterprise Cash Cost** | **Year that Livestock Enterprise break-even is reached** | **Year that 2,000 head flock size is reached** |
| Buying 1.5YO ewes | $82,129  (Year 2) | Year 5 | $59,030 (Year 1) | Year 4 | Year 5 |
| Keeping a higher proportion of ewe lambs | $71,039  (Year 3) | Year 6 | $55,635 (Year 2) | Year 5 | Year 6 |
| Increasing lambing from 128% to 140% | $27,172  (Year 1) | Year 5 | $29,412  (Year 1) | Year 5 | Year 10 |
| Establishing a new 2,000 head flock | $317,331  (Year 2) | Year 9 | $214,199 (Year 2) | Year 5 | Year 5 |

**Table 3: Results of a 100% Self-replacing Composite flock.**

Unlike the previous two flock types, the scenario of keeping a higher proportion of ewe lambs resulted in a significantly shorter period to reach a stable 2,000 head flock. Because of the high lambing rate of the Composite model farm (128%), the YIYO proportion of ewe lambs kept for replacement breeding stock is relatively low at 38%. Therefore, there is significant potential for increasing the proportion of ewe lambs retained, compared to either of the Merino enterprises which had a higher YIYO ewe lamb retention rate. The estimated peak debt of this expansion method was $71,039 with a break-even period of 6 years and a livestock enterprise cash cost of $55,635. This is a simple, low-cash-cost expansion method that would be achievable by all Composite sheep producers, regardless of skill, experience or time to allocate to the sheep enterprise.

**Graph 5: Breakeven analysis of the livestock enterprise for a 100% Self-Replacing Composite flock.**

To establish a new 2,000 head Composite breed flock, a combination of expansion strategies was employed as per the previous flock type scenarios. This included employing a 20% cull rate to the initial cohort of ewes and keeping a higher proportion of ewe lambs in years 1-3. This scenario had a $317,331 estimated peak debt with a 9-year whole farm break-even and a livestock enterprise cash cost of $214,199, both occurring in Year 2. Time taken to reach 2,000 head was 5 years.

**Graph 6: Cumulative Farm Operating Surplus analysis of the farm enterprise for a 100% Self-Replacing Composite flock.**

As for the previous two flock structures, the analysis of the effect on cumulative operating profit of the whole farm business shows that the only scenario that is significantly less than the status quo situation is the New Enterprise. What is interesting in this analysis is that the cumulative operating profit of the whole farm business for any of the flock expansion strategies will not catch up to the status quo over a 10-year period.

**Conclusion**

Three flock types were analysed to determine the most cost-effective and timely method of increasing flock size from 1,000 head to 2,000 head. Three years of Planfarm Bankwest Benchmark data for High Rainfall Zone 4 was used to generate model farms for both Merino and Composite sheep enterprises. Interestingly, for each flock type a different expansion method was found to be the most favourable;

* **For the 100% SR Merino flock**, increasing lambing percentage scenario had the shortest breakeven period and reached a stable flock in 7 years. Only the Buying of 1.5YO ewes reached a stable flock in shorter time of 5 years.
* **For the SR Merino / 40% TS flock**, increasing lambing percentage scenario had the shortest breakeven period of 4 years. Buying 1.5YO ewes and a New Enterprise were the only expansion methods that allowed the 2,000-head flock size to be reached in under 10 years. Both these scenarios were highest cost options reaching whole farm breakeven in 6 years and 10 years respectively.
* **For the 100% Self-Replacing Composite flock**, increasing lambing percentage scenario had the shortest breakeven period of 5 years and at significantly lower cost, however it takes 10 years to reach stable flock structure. Only buying 1.5YO ewes had equivalent breakeven period and reached the 2,000-head flock size in a reasonable timeframe of 5 years.

In each of the three different flock structures, increasing lambing percentage was both the lowest cost and had the shortest breakeven period. However, the downfall of this strategy is the long period taken to achieve a stable flock structure of 2,000 head.

Retaining the oldest cohort of ewes for an extra year is not a strategy that can reach a stable doubling in flock size in a reasonable time frame. It is a low-cost strategy and may be an option for producers looking to increase flock size by 10-15% in a short period (less than 2-3 years).

Increasing lambing percentage was the only strategy with an estimated peak debt of under $30,000 and a whole farm breakeven period of under 5 years in all flock structures. This augurs well for current industry initiatives that encourage producers to improve livestock management with the aim of increasing lambing percentage. The downfall of this strategy in this analysis is the relatively long period required to reach a stable doubling in flock size. However, I don’t believe that this objective is common amongst producers but rather a smaller target of increasing flock size by 10-30% is more likely.

The three flock structures examining the establishment of a New 2,000 head flock with necessary sheep-handling infrastructure had an estimated peak debt of between $287,000 and $317,000 and a whole farm breakeven period of 9-11 years. Each flock structure reached the 2,000 -head flock size in 5 years or less. This also provides a relatively fast strategy for those producers and investors looking to ‘get back into sheep’ but is considered risky given current high market prices for stock.

This analysis supports the well-known fact that the sheep business is indeed a long term one. There are no quick ways to make money in sheep, unless of course selling down stock numbers during high prices is an option for producers. But that isn’t about increasing the sheep flock!

This report has attempted to provide a detailed economic analysis of increasing flock size or establishing a new 2000-head sheep enterprise in HRZ4 of Western Australia. However, decisions about farm diversification and enterprise structure are highly individual and should be guided by several influences, one of which is an understanding of the financial implications of such a decision. Producers and investors who are considering upscaling sheep production should discuss any plans for change with their farm advisor.

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