KTIF Project Name: Skinny Milk Project

KTIF Project Ref. No: KTIF/005/2015

Final Report

July 2019

The European Agricultural Fund for Rural Development: Europe investing in rural areas

MILK SUPPLIERS ASSOCIATION

Contents

Project title and SAOS

Project title

1. Skinny Milk Project.

Applicant – SAOS

2. Established in 1905, Scottish Agricultural Organisation Society (SAOS) are Scotland's experts on farmer co-op's and supply chain collaboration and provide a range of specialist information, development and consultancy services aimed at shaping the future of farming and food in Scotland. Our purpose includes strengthening the profitability, competitiveness and sustainability of Scotland's farming, food and drink and rural economies through the promotion of co-operation and collaboration.

3. SAOS is a not-for-profit development organisation owned by its membership. As a membership organisation SAOS is committed to driving growth within agri and food co-operatives and stimulating collaboration within their supply chains.

4. Innovation and co-operation is at the heart of our objectives to achieve added value and production efficiency as is our proven role in smart project management and industry initiatives.

Executive summary

5. An operation group involving participants with experience of project management, dairy farming and lean management alongside a co-operative of 128 dairy farmers was established to pilot the use of lean management techniques on 30 dairy farms based in South West Scotland. The aim of the project was to provide farmers with a new lean management based approach to explore the potential for ongoing improvement and to stimulate positive changes on the farms that participated. Due to the innovative nature of the work the project received 100% funding from the Knowledge Transfer and Innovation Fund (KTIF).

6. Lean thinking describes an approach to business that aims to deliver more and more with less and less human effort, less equipment, less time and less space while coming closer and closer to providing customers with exactly what they want. It involves identifying and eliminating all forms of waste on the farm and focusing instead on what delivers value for customers, in this case a creamery making cheese.

7. Of the 30 farms that participated, 26 said that they would be implementing changes to improve business performance. Due to the timeframe of the project, it was not possible to quantify the overall impact that will be achieved.

8. Feedback from the farmers who participated was mostly positive. One comment summed up the feedback as follows; *"The discussion stimulated by the mapping day*

was very useful and helped to highlight a range of actions which provided an opportunity to improve performance. The whole exercise was extremely valuable and I would recommend it to anyone.

9. The farm recommendations covered two main areas. Firstly, the implementation of new financial recording systems. This in itself will not achieve any savings but is a fundamental component to provide a basis for measuring and monitoring performance. It will ensure a foundation for rational and informed decision making to prioritise and implement ongoing improvements based on financial returns. The second area of recommendations covered changes to operational practices to make productivity gains or efficiency savings, e.g. make better silage, reduce purchase feed, reduce machinery and power costs etc. Potential gains of 6.6 pence per litre (ppl) were identified. Even if only half of these gains were realised across the 30 participating farmers, it represents a benefit of £2.3million.

10. A key challenge faced by the project was the poor quality of the financial and other data available; only six of the farms visited prepared budgets and kept computerised records. This is an important finding as it indicates that there will likely be many others in the sector who similarly do not have the systems in place to regularly measure and monitor business performance.

11. The recommendations arising from this project encompass:

- The need for farmers to regularly produce management accounts
- The need for farmers to hold regular family business meetings using management accounts to review and improve performance
- The desirability of bespoke computerised account packages for dairy farms
- The desirability of rolling out lean management training to other sectors of agriculture
- With changes to farm support, the ability of the Scottish Government to encourage more farmers to improve their financial and business management skills

Project description

Background

12. The Milk Suppliers Association (MSA) is a group of 128 dairy farmers based in South West Scotland. They supply approximately 210 million litres of milk to a creamery in Stranraer owned by Lactalis. Since 2012, milk markets have been volatile and milk prices have not always cover the costs of production. In addition, there was a lack of understanding about supply management at farm level. Imbalances of supply and demand put further pressure on prices. Traditional methods of encouraging farmers to make improvements did not appear to be working fast enough so the project looked at piloting an innovative and interactive farm focused lean management approach. Delivered on a one to one confidential basis and supported by experienced dairy farm

managerial expertise, the aim was deliver benchmarked and costed improvement plans using proven modern management techniques.

13. The project was innovative for a number of reasons. Firstly, a supply chain approach has rarely been used on farm but has been widely employed in other industries delivering repeated efficiency savings. Secondly, the interactive approach involves 'learning by doing', in other words addressing a problem with the help of a simple management process and establishing an approach to tackle similar projects in future. Thirdly, working alongside a single farm brings the ability to focus on what is important for the customer, Lactalis, and thus the competitiveness of the individual farm.

14. The project was justified on the basis of a number of factors:

- On commencing the project, milk prices were below the costs of production
- EU support and production control has been removed from the sector through the withdrawal of quotas making it likely that price volatility will continue and may even increase
- A need to more accurately match farm output with the processing capacity of the creamery at Stranraer
- The project complemented previous support activities for the sector through initiatives such as Monitor Farms and Whole Farm Reviews that provided a technical approach to improvement
- The project contributed to the five EU RDR and SRDP priorities and the five Scottish Government National Performance Framework Strategic Objectives

15. Funding was principally needed due to the severe financial pressures faced by the industry caused by low milk prices. In addition, the proposed approach was innovative, and it was not known if it would deliver the desired outcomes as the methodology was not proven in the sector. This combined with a farmer culture of not paying for external advice justified the need for funding.

Operational group

16. The project was delivered by an operational group which involved four stakeholders:

- The MSA who; promoted the project, encouraged farmers to participate and circulated case study examples to share best practice
- SAOS who; provided overall project management helping to recruit the farms, organised the delivery partners (Cara Consultants and LeanTeamGB), drafted case studies, obtained and evaluated the feedback analysis and farm reports, commissioned and published project information on the MSA website and compiled this report at the end of the project
- Cara Consultants who; provided suitably qualified individuals with experience of dairy farming to undertake the fact finding visits to the participating dairy farms and understand their circumstances prior to the individual farm supply chain mapping day. They also participated at the mapping day and then produced individual

confidential farm reports

- LeanTeamGB who; provided suitably qualified individuals with experience of lean management to participate in the project and lead the individual farm supply chain mapping days. They also provided all of the tools and templates on which to develop farm improvement plans and train the individual farmers in lean techniques

Farmer participants

17. 30 farmers participated in the project (see appendix 1). In every case, the dairy element of the farm represented the main enterprise. The table below identifies the farm classification alongside the number of units.

Farm type	***Number of farms***
Specialist dairy farm	15
Mixed livestock farm with dairy beef and sheep	6
Mixed dairy & arable farm	4
Mixed dairy & beef farm	3
Mixed dairy beef and arable farm	1
Mixed dairy and pig farm	1
Total number of farms	30

18. In terms of cow numbers, the average size of herd participating in the project was 384 cows. The smallest herd contained 60 cows and the largest 1,388 cows.

19. In terms of systems, the farms visited utilised a number of production methods as summarised in the table below.

Production system	***Number of farms***
Farms housing cows and milking all year round	7
Farms seasonally grazing and housing cows and milking all year round (some of these farms had a spring output peak)	18
Farms seasonally grazing and housing cows and milking all year round but with an autumn output peak	1
Fully pasture based seasonal method of production (dry cows from December to mid-February)	4
Total number of farms	30

20. The average herd size of the sample was 384 animals producing a corresponding averaged yield of 6,746 litres/annum. The average yield data was calculated by taking the milk output specified on individual milk statements and dividing it by the number of cows on the farm. Further averaged financial information is available (see appendix 2).

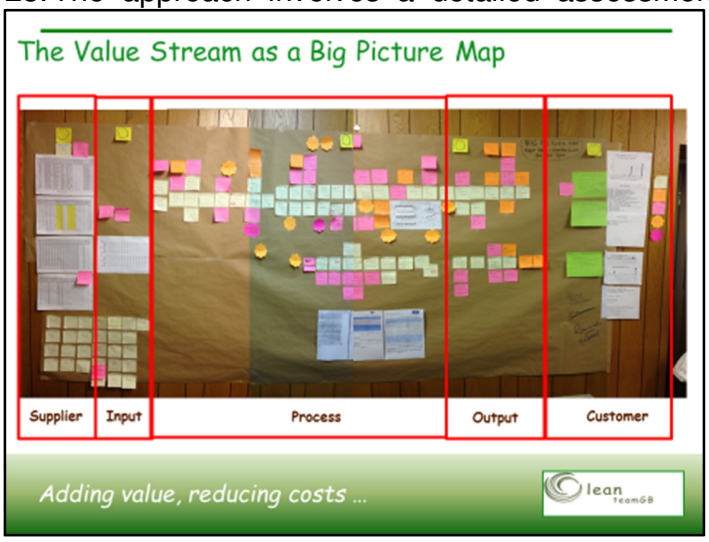
Lean management on dairy farms

21. Lean thinking describes an approach to business that aims to deliver more and more with less and less human effort, less equipment, less time and less space while coming closer and closer to providing customers with exactly what they want. It involves identifying and eliminating all forms of waste on the farm and focusing instead on what delivers value for the customer, in this case a creamery making cheese. Although lean originated in car manufacturing, it has been applied extensively in the food industry. Lean has proven to be very adaptable because it is based around a sound set of principles that relate to the organisation of work. The principles include:

    - Specifying value by product – not from the perspective of individual farm but from that of customers – known as Critical Customer Requirements (CCR's)
    - Distinguishing between the actions necessary to create that value and those that just add cost
    - Making product flow through the chain with minimum interruptions
    - As closely as possible producing at the rate at which customers can process (helped by accurate milk forecasting)
    - In pursuit of perfection – keep reconfiguring the chain to become ever more efficient and responsive

22. This team based approach involves 'learning by doing', in other words addressing a problem with the help of advisors and building the skills to tackle similar projects in future. Cara Consultants and LeanTeamGB did not act as typical consultants but instead helped the businesses involved find their own solutions. In this way they were able to encourage teamwork as well as train the individuals that took part, and embed the process on-farm. The aim is to capture what is actually happening on the farm not what is supposed to happen.

23. The approach involves a detailed assessment of all the processes on the farm including collecting data on performance. It focused on operations and financial information. This information, collected by the team (which included the farmer his/her family and relevant members of staff), was summarised on a big picture map. A typical map is shown below.



24. Waste hotspots were highlighted with pink squares on the map. A Plan-Do-Check-Action (PDCA) document was then drafted to prioritise and eliminate the waste. An example PDCA report is attached in Appendix 2.

The project process

25. The project followed a structured delivery process in order to provide the farm mapping training, i.e:

Stage one - farmer recruitment
Highlighting the opportunity for farmers to participate in a pilot project to apply lean management techniques to a dairy farm to improve the competitiveness of their businesses. Information was sent to MSA members via letter and email and farmers were invited to call Hamish Walls to find out more information about the project and to indicate their willingness to participate. As the project proceeded presentations to farmers were made to feedback the key findings from the project. This included a summary of main recommendations made by the operational group partners to the farms which had participated. The recruitment phase of the project carried on until 30 farmers had been recruited.

Stage two – first farm visit
Pre-mapping meeting to find out about the key challenges facing the farm. During this visit as much financial information was gathered encompassing end of year financial accounts and milk payment statements. Other benchmarking data was sought but as highlighted later in the report was not always obtained.

Stage three – big picture map meeting
Drawing up big picture map as highlighted in paragraph 23. The process involved family members and where possible, key members of staff. The main challenges and opportunities for savings were identified. This discussion format was straightforward and allowed everyone to participate. It also provided a methodology which farmers could subsequently use themselves to obtain ongoing improvement.

Stage four – feedback report
Production of a feedback report for the farmer to confirm the key challenges and to report the key strategies and plans to achieve an improvement in performance. A typical feedback report is provided in Appendix 3.

Stage five – post visit feedback
Follow-up phone call to obtain feedback from the farmer. The feedback sought included:

- Feedback on the effectiveness of the consultation, the mapping exercise and the facilitators
- If the work met their expectations

- What farmers liked best about the project work and that they thought they might change
- The usefulness of the report
- If they had implemented any recommendations
- If they would undertake a mapping session again in 3 years' time

26. The feedback is provided in paragraphs 45 - 46.

Finance

27. To deliver the programme a grant application of £143,120 was made to the Knowledge Transfer and Innovation (KTIF) Fund. This grant source is jointly funded by the Scottish Government and the European Union. 100% funding was secured as the project involved some benchmarking and the delivery of an innovative 'lean' approach not yet proven in the industry.

28. Year one expenditure was as follows:

Item Description Guideline only	Total Expenditure Approved (total eligible project costs at 100%)	Total Amount this claim (i.e. at 100%) Year 1	Grant Element being claimed (100% for Innovation projects)
Project management costs & case studies	£42,840.00	£13,953.75	100%
Individual farm mapping Fees for speakers/facilitators	£92,880.00	£34,191.64	100%
Materials costs website	£7,400.00	£4,350.00	100%
Totals	**£143,120.00**	**£52,495.39**	

29. The total claimed in year one was £52,495.39. There are some minor differences between the costs. This is because the costs and time were estimated as part of the original grant application. In addition, an invoice from one of the consultants delivering the project covers and additional three farm supply chain interventions over and above the ten programmed for year one.

30. Year two expenditure was as follows:

Item Description Guideline only	Total Expenditure Approved (total eligible project costs at 100%)	Total Amount this claim (i.e. at 100%) Year 2	Grant Element being claimed (100% for Innovation projects)
Project management costs & case studies	£42,840.00	£16,279.80	100%
Individual farm mapping Fees for speakers/facilitators	£92,880.00	£38,590.20	100%
Materials costs website	£7,400.00	£0.00	100%
Totals	***£143,120.00***	***£54,872.62***	

31. The total claimed in year two was £54,870.62. There are some differences between the costs. This is because the costs and time were estimated as part of the original grant application. It is taking longer to deliver the project than anticipated. In addition, the invoices from LeanTeamGB (ARC) cover 11 farm supply chain mappings and Cara cover 13 farm supply chain mappings. The estimate in the project application was for 10 farm supply chain mappings per year. In total 24 have now been delivered. The project is currently being delivered ahead of schedule.

32. Year three expenditure was as follows:

Item Description Guideline only	Total Expenditure Approved (total eligible project costs at 100%)	Total Amount this claim (i.e. at 100%) Year 3	Grant Element being claimed (100% for Innovation projects)
Project management costs & case studies	£42,840.00	£9,747.90	100%
Individual farm mapping Fees for speakers/facilitators	£92,880.00	£18,005.40	100%
Materials costs website and final report	£7,400.00	£2,400.00	100%
Totals	***£143,120.00***	***£30,153.30***	

33. The total claimed in year three was £30,153.30. There are some differences between the costs. This is because the costs and time were estimated as part of the original

grant application. At the end of year three of the project, the most significant difference (£2,858.55) was in the annual costs of delivering the project. As it proceeded, the efficiency of project management improved as the stakeholders became more organised in managing themselves. In addition, the process of drafting the feedback reports and case studies for farmers became more familiar and efficient. Another difference (£2,092.14) was in the cost of delivering the farm mapping day visits. A final difference (£650) was the cost of delivering the one off elements of the project which encompassed the delivery of a website and the drafting of a final report. The website was less expensive to develop. The total savings in delivery amounted to £5,600.69 over the three year project or £1,867.89/year.

34. The accumulate project spend over three years was as follows:

Item Description Guideline only	Total Expenditure Approved (total eligible project costs at 100%)	Total Amount this claim (i.e. at 100%) Years 1, 2 & 3	Grant Element being claimed (100% for Innovation projects)
Project management costs & case studies	£42,840.00	£39,981.45	100%
Individual farm mapping Fees for speakers/facilitators	£92,880.00	£90,787.86	100%
Materials costs website and final report	£7,400.00	£6,750.00	100%
Totals	***£143,120.00***	***£137,519.30***	

Project aims and objectives

35. As set out in the application, the aim of the project was to improve and secure the viability of the participating farmers and the wider MSA milk field by creating more resilient businesses with embedded capacity for ongoing improvement. The project started in April 2016 and took 3 years to complete.

36. The key objective of the project was to introduce the principles of lean management into the dairy sector through the delivery of a pilot project and thereby:

- Provide farmers with a new approach to undertake their own lean management reviews and thus the opportunity for continuous improvement
- Improve farmer understanding of Critical Customer Requirement's (CCR's) and their ability to achieve them thus benefiting their customer
- Improve the accuracy of milk forecasting to enable more efficient processing and marketing

- Share the knowledge established in the course of the project with the wider MSA membership
- Reduce the costs of milk production on the participating farms by 1.4ppl

Project outcomes

How the aims/objectives were achieved

37. The first aim of the project was to provide farmers with a new approach to undertake their own lean reviews to create an opportunity for continuous improvement. The project was targeted to undertaking 30 individual farm supply chain projects over three years out of which 75% would have implemented changes to improve the competitiveness of their businesses. 26 (86%) of the respondents said they would be implementing changes to their businesses. 4 farmers said they would make no changes.

38. Due to the timeframe of the project it was not possible to determine how many of the individual recommendations would be implemented by the farmers and thus the overall impact of the delivery of the project. What can be concluded is that many of the farmers who participated in the project had made changes and were in the process of implementing more to improve performance. The recommended changes that were made are highlighted in paragraph 58.

39. A second aim of the project was to help farmers understand CCR's. With this project teaching farmers about the concept of CCR's was to help them understand that customers will only pay what is valuable for them. In this case the cheese maker Lactalis values and will pay for:

    - Butterfat content
    - Protein content
    - Somatic cell count – down to a certain point, lower levels are desirable
    - Bactoscan – down to a certain point, lower levels are desirable
    - Specifying and delivering pre-determined volumes of milk over monthly and annual time periods through better milk forecasting

40. In addition to identifying what customers will pay for, a key concept highlighted in the project was what customers will not pay for, i.e. what is waste (reference paragraph 21). In this case, potential areas to target where identified through higher than average costs. This then provided a basis to target actions to improve efficiency.

41. The changes implemented where shaped by the recommendations made for individual farms and highlighted in the PDCA reports. They encompassed major changes in farming policy, e.g. exiting the dairy industry or changing a milk buyer to adopting new practices to improve business management and operational efficiency, e.g. preparing management accounts and using external sources of expertise to improve performance (for further details see paragraph 58).

42. A third aim of the project was to improve the accuracy of milk forecasting. This complemented farmer understanding of CCR's in particular the delivery of specified volumes of milk over monthly and annual time periods. During the course of this project Lactalis supported this aim introducing a farmer portal through which farmers can make and amend milk forecasts on a monthly basis. Milk production is a natural process and output is influence by environmental factors. Despite this, rates of milk forecasting have increased across the milk field and accuracy has improved. Monthly and annual milk forecasting now regularly achieves an accuracy within a 4% tolerance.

43. A fourth aim of the project was to share the knowledge established in the course of the project with the wider MSA membership. This was done in a variety of ways and is highlighted in the communication and engagement section (see paragraphs 59 - 61). One target the project set out to achieve was receiving 280 visits to the MSA website to examine case study material (see appendix 4) over three years. 410 users visited the website in a ten month period from June 2018 to March 2019. Website visits and activity are ongoing.

44. A final aim of the project to highlight methods to lower the costs of production on the participating farms by 1.4ppl (from the 75% that have implemented changes to improve their competitiveness). With one outlier removed from the data, the average saving identified was 6.6 pence per litre (ppl). This figure is within the 10.5ppl cost figure which AHDB highlight as the difference between the top and bottom 25% of all year round (AYR) calving herds (ref AHDB Dairy Performance Results 2017/18). In spring calving herds AHDB quantify the difference in costs between the top and bottom 25% as 8.4ppl (ref AHDB Dairy Performance Results 2017/18). Even if only half of these 6.6ppl gains were realised across the 30 participating farmers, it represents a benefit of £2.3million.

45. The extent to which the participating farmers were able to achieve the savings identified was influenced by two factors. Firstly, how many of the recommendations they actually adopted and secondly, the ease with which the recommendations were able to be implemented. As earlier highlighted due to the timeframe of the project, it was not possible to determine how many of the recommendations and thus the extent of the savings achieved.

Positive feedback

46. The project was targeted with obtaining positive feedback from 75% of the farmers participating in the project. 25 farmers (80%) provided positive feedback.

    Comments included:

    - *"I really liked the whole idea and principles of the work undertaken on the farm. It was well delivered, it helped to formalise our thoughts and it confirmed that our*

direction of travel was correct. The process is one which we can use again to review and improve other parts of the business".

- *"The discussion stimulated by the mapping day was very useful and helped to highlight a range of actions which provided an opportunity to improve performance. The subsequent report also helped to summarise some of the key actions which we have already started to implement. The whole exercise was extremely valuable and I would recommend it to anyone, particularly if you have a young family member joining the business"*

47. Of those farmers not providing positive feedback:

- 1 consistently avoided returning any phone calls to obtain feedback
- 1 did not respond to the feedback questionnaire in a coherent manner
- 3 farmers did not provide positive feedback. For many of the participants, this was the first examination of their performance from an external source, so it is perhaps surprising that only three farmers provided negative feedback. Adopting the principles of lean management requires an open and positive culture to address the areas of underperformance which are inevitably identified. Some individuals found this challenging to handle. Paradoxically, 1 of these 3 farmers said he would be implementing changes to improve his business.

Milestones

48. As per the project application key milestones included:

- Distributing a project summary to MSA members to highlight the project and the potential for participation. This was achieved by distributing a letter to 128 MSA members alongside a one page document which described the lean process. MSA members were invited to contact Hamish Walls if they wished to participate *(completed by April 2016).* During the course of the project additional letters were sent to members highlighting the opportunity to take part. Positive feedback from participants was also reported. The letters to all members were sent in November 2019, August 2018, March 2018, January 2018, August 2017, April 2017, and January 2017
- Delivering 3 early pilot lean management individual mapping days with 3 differing farm sizes (small medium and large) utilizing three differing production systems (intensive housed, low cost grass based and composite). This was achieved by recruiting three individuals and then delivering the farm mapping process and subsequent PDCA reports *(completed by August 2016)*
- Drafting three case studies of the early pilots delivered in August 2016. A typical case study is available in appendix 4 *(completed in September 2016)*
- Publishing a simple website to highlight the activities of MSA with a separate project page publishing and promoting 15 case study examples of the work undertaken. The 15 case studies included the 3 case studies published as part of the early pilots. Producing regular case studies enabled the project to maintain a regular stream of updates to maintain farmer interest *(completed by March 2019*

and see www.msa.scot)

- Presenting the interim findings of the project to the membership at member meetings. This allowed farmers to learn about the main benefits of participating in the project and to ask questions. The 2017 meeting was attended by 45 farmer and the 2018 meeting was attended by 26 farmers *(completed in August 2017 and August 2018)*. A further report will be presented in August 2019
- Delivering 30 supply chain individual mapping days – *completed by March 2019 (the list of farms is provided in appendix 1)*
- Benchmarking and quantifying the savings made and other benefits obtained through the delivery of the project – *see later in this report*

Lessons learned

Issues and challenges

49. Feedback from Cara Consultants and LeanTeam GB who delivered the individual farm supply chain mapping said that project has been extremely rewarding for the majority of the participants. For many farmers, it was the first time in their career that they had sat down and discussed their business with an external person. Due to their conservative finances, discussions with bankers concerned overdraft needs and with accountants mandatory end of year accounts and taxation issues. The participants were often initially slightly reticent about participating but once the mapping process begun they were appreciative of what the lean programme had to offer.

50. The facilitators encouraged the involvement of family members and farm staff where appropriate. This was perhaps one of the strongest elements of the programme and highlighted the isolation and loneliness that farmers often experience. The work of the project enabled farmers to share their issues with a wider group, particularly wives and partners, who were often not that fully aware of what was going on. This was particularly so with financial issues.

51. A key challenge faced by the project was the poor quality of financial and other data available. Only six of the farms visited prepared farm budgets and kept computerised management accounts and of those only one had a formal business plan in place. Planning was poor across the board. The information used for benchmarking was derived from end of year financial accounts. These accounts are prepared for tax planning not for managing the business. For that reason the accounts, while being fiscally correct, made no attempt to break down costs so that individual enterprise performance could be measured.

52. When quizzed on the subject, farmer participants often never ask accountants to alter their financial analysis to prepare management accounts. On the other side, Cara Consultants have discussed this issue with accountants. They similarly reply that farmers don't ask accountants to prepare management accounts. They also point out that the preparation of management accounts can only happen if farmers allocate costs and income to the individual farm enterprises.

53. Bespoke computerised accounting packages are vital if modern farming businesses are to progress and understand how well they are performing. For the farms in the project with a specialist dairy enterprise the process was fairly straightforward. For others farms with beef, sheep, arable, pigs or poultry enterprises it was more challenging to make sense of the financial accounts. Protracted discussions were required between the facilitator and the farmer at the initial meeting to attempt to guess the split of costs and income – not satisfactory and time consuming.

54. A further challenge identified is that family relationships are not always harmonious. Not all the farms visited have families who are united in adopting a new common approach which is necessary to bring about much needed change. A range of reasons contributed towards the lack of a common direction, one of which seemed to be the lack of a sound financial basis on which to make decisions in conjunction with no regular forum where these issues could be discussed.

55. A final issue faced by the project is that some participants found it challenging to accept change is necessary and that external expertise has the ability to find practical solutions. Establishing the credibility of the lean process in the sector and its ability to improve businesses will take time.

Impacts

56. One of the key impacts identified for the farms visited was potential savings of 6.6ppl. Given the individual nature of the mapping days the opportunities identified for improvements are wide ranging. The recommendations were divided into two main areas. Firstly, changes to improve business management and secondly, changes to improve operational practices which were designed to make efficiency savings.

57. The recommendations to improve business management in themselves made no actual savings, but proved to be the mechanism for change. It is a fundamental principle of lean that if a process can be measured, it can be improved and managed. Understanding the lean management concept and knowing how to initiate and undertake the process was a key area of focus for the project. This provides the basis for measuring and benchmarking performance and thereafter a foundation for rational financial decision making to prioritise and implement targeted improvements. The recommendations to capture and implement the next steps for lean management included:

    - Develop a strategic plan for the business to clarify the direction of travel
    - Develop business plans and annual budgets with key performance indicators (KPI's)
    - Enable the production of monthly management accounts to measure and monitor business performance throughout the year

- Initiate management/team/family meetings so that performance is regularly reviewed using the budgets and management accounts and that appropriate action is taken to improve performance

58. The recommendations and main areas to improve operational practices and to make efficiency savings included:

- 17 recommendations to reduce purchased feed costs with an averaged saving of 2.7ppl
- 17 recommendations to reduce other variable costs excluding feed encompassing fertiliser, sprays, seeds, fuel, vet costs with an average saving of 2.7ppl
- 15 recommendations to reduce fixed costs encompassing machinery/power, property and other overheads with an average saving of 2.5ppl
- 14 recommendations to increase milk output to achieve higher rates of overhead dilution with an average benefit of 2.9ppl
- 12 recommendations to improve labour productivity, training and join a benchmarking group with an average benefit of 1.6ppl
- 10 recommendations to increase milk output from grass and improve forage quality with an average benefit of 1.9ppl

Communications and engagement

59. A number of measures have been taken to communicate the project's activities and engage members. They include:

- Letters, emails, MailerLite communications and phone calls to MSA members highlighting the availability of the project
- Development and distribution of 15 case studies identifying the project process and benefits brought about by the work
- Publication of 15 case studies on the MSA website
- Presentations made at MSA producer meetings summarising the project process and benefits brought about through participation
- Wider promotion in SAOS newsletters

Recruitment and delivery

60. Allied to the points made earlier concerning openness to external advice and support, it was at times challenging to recruit farmers to participate in the project. This was despite the comprehensive communication and engagement activities that were undertaken which included highlighting the positive feedback from participants. Any similar project that might be undertaken in future will need to consider augmenting the farmer engagement process.

61. Finally, another issue to contend with was a lack of organisation and back up available on some of the farms that participated. Visits were booked well in advance but despite that, 4 farms cancelled at very short notice. A range of reasons were provided.

Cancellations occurred the night before or even on the morning of the visit when the operational group members were on their way to the farm. Visits were rescheduled but the events were challenging to manage. The flexibility of the operational group members was helpful in this respect as was a last minute stand in farm.

Wider knowledge exchange

62. In addition to the process of engaging members, this report will be shared on the EIP-AGRI website to facilitate the wider exchange of the knowledge, expertise and good practices established in this project. SAOS (alongside the other Operational Group members) will also participate in any following discussions stimulated from this activity with farmers, researchers, advisers, NGOs, member states, businesses and other public authorities etc. This will help support the networking functions and develop new research from the practical innovative ideas which have been delivered. The aim will be to accelerate and widen the uptake of the new practices which have been established.

63. Case study examples highlighting the stages of the farmer interventions, the process involved, the potential improvements identified and the farmer comments are also available at http://www.msa.scot/projects/.

Key findings and recommendations

Financial planning

64. A significant key finding identified in the project is that 24 out of the 30 farms visited did not undertake regular financial planning, budgeting and monitoring. As a consequence they did not know their costs of production with any accuracy. Only 6 farms produced regular management accounts. This is an important finding as it indicates that there may likely be many others in the wider sector who similarly do not have the necessary systems in place to enable them to regularly measure and monitor business performance. A lack of financial monitoring is undermining good decision making and the competitiveness of dairy businesses. Farms that do not prepare and utilise management accounts are less likely to set goals and budgets and are not in a positon to compare themselves with others.

65. It should be noted that while the data is not statistically robust due to the size of the sample and the way in which farmers were selected and recruited, it does point to a large potential weakness in the industry. Feedback from Kate Ward (Farm Economics Senior Analyst) at AHDB paints a similar picture where she is aware of many farms not undertaking regular financial planning and benchmarking. Only a proper study of the sector will quantify the true extent of the skill deficit. Given the fundamental nature of the necessity for well managed businesses to carry out this task as a prerequisite for improvement, this is something the sector urgently needs to address.

Recommendation 1

66. Farmers should be encouraged to produce and utilise management accounts so that they have a basis to measure, monitor and improve their financial performance. This will allow them to evaluate their own performance year on year and to use information to compare themselves against other benchmarking projects such as monitor farms. This can be can be enabled through the provision of financial training so that farm businesses can put their own systems in place. The Institute of Agricultural Secretaries and Administrators (IAgSA) is one source of relevant training. It can also be facilitated through businesses and organisations that provide professional support for the sector such as accountants and the Farm Advisory Service. These organisations should promote their services more widely.

Recommendation 2

67. Alongside producing management accounts, farm businesses should be encouraged to hold regular quarterly business meetings to review the performance highlighted by the management accounts. This will provide a forum to discuss opportunities for improvement. While the meeting agenda and culture is being established, farmers may find it helpful to employ the services of a trusted advisor and/or independent facilitator. The Scottish Dairy Hub (see https://scottishdairyhub.org.uk/) could provide a list of suitably qualified individuals who can facilitate meetings for farmers and their families.

Computerised accounting packages

68. Bespoke computerised accounting packages are vital if modern farming businesses are to progress and understand how well they are performing.

Recommendation 3

69. The Scottish Government Pig Business Network programme has made it possible with financial support via QMS for pig famers to access computer software which has transformed many of these businesses. A similar programme for financial recording in the dairy sector could be transformational.

The lean process and costs of production

70. A second key finding is that the lean process can be successfully delivered on farm and that it helped to highlight significant potential savings for individual farms. Given the farms were from a similar geographic area and they were supplying the same milk processor, the wide variation in performance is surprising. The table in appendix 4 identifies the averaged financial feedback from the 30 participating farms.

Recommendation 4

71. Lean processes are widely adopted in other industries and this project has demonstrated it is a proven method to improve efficiencies in dairy farming. The programme could be rolled out more widely to other geographic areas and sectors in agriculture.

Profitability and support

72. Seven out of 30 farms made losses even when their single farm payment was included. A further 9 farms would have made losses if they had not received a single farm payment and other support. For many, the realisation that their single farm payment was greater than their profit was a shock again highlighting a lack of financial understanding and control. Without support, 16 out of the 30 farms would have lost money, which is more than half of the farms visited. Farm support is an essential source of farm income under current market conditions, it reduces the number of farm businesses making losses and will add enhance profitability for those making a surplus.

Recommendation 5

73. Given potential changes to the single farm payment and its importance as a source of farm income, careful consultation should be undertaken by Scottish Government towards making changes in support contributions, which would encourage farmers to demonstrate good financial control. This will incentivise greater rates of change and help the industry become more competitive.

Conclusions

74. Four key conclusions arise from this project.

75. Firstly and in the words of one of the facilitators, '*this is one of best and most rewarding programmes that I have been involved with in agriculture. It has inspired farmers to consider change and recognise that they are not performing well in particular areas. Thereafter, they have been inspired to do something about it'*. Feedback from many of farmers who participated was similarly positive so the main conclusion is that lean works for dairy farms and can be a highly effective way of delivering much needed change.

76. Secondly, from an operational perspective, lean is likely to work most effectively where good financial records are available. However even when they are not, the process opens the eyes of farmers to the urgent need for change. For some farmers the process can be challenging but there was an acknowledgment of the benefits that were achieved. The benefits included a transformation in attitude towards financial recording in addition to operational changes to achieve efficiency gains.

77. Thirdly, farmers need to be encouraged to discuss their businesses much more often. These discussions can be with individuals providing trusted professional support in addition to close family members and relevant members of staff. Sound financial recording systems backed by regular family board meetings enables a larger number of people to understand how a business is performing and to think about changes to improve performance. A problem shared, is a problem solved.

78. Finally, there is a need for greater business planning in the sector. A business plan is a very important strategic tool for any enterprise. It not only helps entrepreneurs to focus on the specific steps necessary for to make their ideas succeed, it also helps them to achieve both their short-term and long-term objectives.

Appendix 1 – Farmer Participants

79. The 30 participating farms are as follows:

- Messrs J Rome, Irongray, Dumfries, DG2 9TR
- RG Vance (Norman), Common Park, Whithorn, Newton Stewart, DG8 8EY
- P Simpson and Sons, Culscadden, Garlieston, Newton Stewart, DG8 8AD
- G&M Lammie, Low Drummore, Drummore, Stranraer, DG9 9QA
- R Austin, Barstobrick Farms, Barstobrick, Fellend, Ringford, Castle Douglas, DG7 2AT
- J Teasdale & Son, Brickhouse, Kirkbean, Dumfries, DG2 8DN
- A Shankland & Son, Langdale, Ballantrae, Ayrshire, KA26 0PB
- Cumrue Farming Partnership, Cumrue, Templand, Lockerbie DG11 1TL
- J&A Hannah Garrie Farm, Stoneykirk, Stranraer, DG9 9BX
- RD McMinn, Lochdougan, Castle Douglas, DG7 1SX
- EC & MC Peek, Drury Lane, Whithorn, Newton Stewart, DG8 8JT
- HF Vance & Co, Low Barledziew, Whithorn, Newton Stewart, DG8 8AR
- Drummond, Merslaugh Farm Ltd, Leswalt, Stranraer, DG9 0QY
- J McMiken, Arbrack Farming Co, Arbrack, Port William, Isle of Whithorn, DG8 8HY
- D McCutcheon & Son, Boghouse, Colmonell, Girvan, KA26 0SD
- Tom Hainey, South Cairnweil Farm, Sandhead, Stranraer, DG9 9JZ
- John Vance & Sons, Portyerrock, Isle of Whithorn, DG8 8JQ
- J&W Cowan Ltd, Meikle Killantrae, Port William, DG8 9PW
- J&RL Armstrong, Barharrow Farm, Gatehouse of Fleet, Castle Douglas, DG7 2BA
- Glenapp Estate Co Ltd, Glenapp, Ballantrae, Girvan, KA26 0NY
- Dourie Farming Co Ltd, Monreith Estate Office, Port William, Newton Stewart, DG8 9LB
- Messrs IF Watson, Keyshill Farm, Stair, Mauchline, KA5 HS
- W Birkett Partnership, Craigencrosh, Stoneykirk, Stranraer, DG9 9BX
- John Robertson, East Gallaberry Farm, Kirkton, Dumfries, DG1 1SY
- AF McDowall, Rerrick Park, Dundrennan, Kirkcudbright, DG6 4QT
- Messrs W & J McGill, Carsloe, Maybole, Ayrshire, KA19 7SD
- James C Picken & Co, Torrs Farm, Kirkcudbright, DG6 4XJ
- R D Young, Waterside Farm, Dunblane, FK15 9JS
- Kirvennie Farming Co, Kirvennie, Wigtown, Newton Stewart, DG8 9DQ
- Gavin Vance, Balnab, Whithorn, Newton Stewart, DG8 8HP

Appendix 2 – Averaged financial information

	Average (ppl)	High (ppl)	Low (ppl)	Difference (ppl)
Income				
Milk price	25.3	36.7	19.8	16.9
Other income	13.4	67	2.2	64.8
Total income	38.7	103.7	24.8	78.9
Variable costs				
Feed costs	11.7	40.6	2.1	38.5
Vet costs	1.4	3.8	0.8	3
Fert, seed, spray costs	1.8	6.7	0.7	6
Other variable costs	7.7	37.5	0.6	36.9
Total variable costs	22.6	66.8	12.9	53.9
Gross margin	16.1	36.9	6.4	30.5
Overheads				
Labour	3.7	13.4	0	13.4
Power	3.1	10	0.5	9.5
Property	2.1	5.5	5.5	0
Other overheads	0.6	3	0	3
Total overheads	9.5	29.4	3.6	25.8
Gross profit	6.6	11.3	0.6	10.7
Rent and finance	1.8	4.7	-0.2	4.9
Depreciation	2.8	8	0.1	7.9
Net profit (loss)	2	8.7	-5.2	13.9

80. As with any averaged data, some caution is needed with its interpretation. Key takeaways include:

- The accounts were collected over a three year period so an element of variation will be as a consequence of the project timeframe and corresponding market values
- Another point of variation will be as a result of the differing management systems used by the participating farmers, e.g. grazed, housed or a combination of both
- The data encompasses all the enterprise activities on the farms visited and includes businesses which were owned and rented or a combination of both
- Large variations in milk price reflect differences is solid output (butterfat and protein) and milk quality. At the lower end there were opportunities to improve milk quality
- Large variations in other income highlight the presence of additional enterprises on the farm which were not separated in the accounts due to a lack of management data. This underlines the need for individual enterprise costings in management accounts to measure, monitor and improve performance
- Large variations in variable and overhead costs highlight that the participating farmers utilize differing production systems but also that for some, there are significant opportunities for savings to be achieved

- Feed, labour and power costs are identified as areas where the most significant differences were found and where there are opportunities for savings – this was consistent with the findings and feedback on the individual farms
- A zero figure for labour reflects the lack any payment for an employee due to the labour being provided by a family member rewarded via other means. This is a common accounting practice but is not helpful as the cost of labour represented is a key performance indicator. All the farms visited which did not quantify the costs of family labour were encouraged to do so in their management accounts
- Variations in 'other variable costs' were often as a result of farmers purchasing cattle to expand output so did not represent such an opportunity for saving
- The average net profit achieved was 2ppl while the difference in performance varied from a high of 8.7ppl to a low of -5.2ppl. The 13.9ppl variance is in line with AHDB data which quantifies the difference between the top and bottom 25% performers for all year round calving at 12ppl (ref AHDB Dairy Performance Results 2017/18)
- It should also be noted that the average 2ppl profit margin does include income from other sources. When that is discounted, the average profit without any income from other sources, reduces to 1.3ppl
- While it is challenging to determine the exact value of a farm business and thus the capital employed, it looks highly likely that the average 1.3ppl profit will not be providing an attractive rate of return for farmers

Appendix 3 – Feedback Report (see separate document)

Appendix 4 – Example case study

General background

The farming business is a medium sized dairy where the cows are kept inside. Calving takes place on a year round basis with output being reasonably level. There is a small rise in spring which corresponds to a wee increase in cows calving. A father and son team provide most of the labour and were keen to use a new method to look at the business and find ways to improve performance.

Project delivery

Two farm visits were undertaken. The first visit established the key challenges facing the farm while the second visit considered how they might be addressed using a simple linear approach. The key challenges identified in the initial visit were:

- Dropping income as a result of falling milk prices
- Higher than average feed and power costs against benchmark averages
- The need to control and more closely manage other fixed and variable inputs if costs of production are to be reduced
- Desire to improve the technical performance of the enterprise

Improvement plan

On the second visit the key challenges were examined in more detail by describing the operational processes of the farm. This was undertaken using sticky notes in the farm office and it enabled a number of areas to be examined. Solutions were identified and an improvement plan was developed which included:

- The development of a business plan with 1 – 3 year budgets
- A target to reduce feed costs by 50% by making more use of home grown silage, tendering the feed business and by introducing total mixed rations to minimise feeding cake in the palour
- To complement the drive to reduce feed costs, advice from an independent nutritionist is being sought and milk recording is being considered to help measure, monitor and manage milk output against feed inputs
- Other inputs are also being targeted with the aim of reducing costs which include; reductions in vet and med costs and livestock sundries, tendering for insurance and electricity and finding alternative sources of loan finance

Producer comment

I was not sure what to expect, but I really liked the friendly and professional approach, I would recommend it to everyone. The process highlighted some hard facts but the feedback was fair. The work has already paid dividends and we are going to make changes.