

# Supply chain collaboration saves over £370,000 per year across a single product line

## Benefits

MyFresh, working collaboratively with onion-grower Hay Farming, saved over £370,000 per year, by improving resource efficiency in onion ring production throughout MyFresh’s supply chain. MyFresh supplies whole-rings for onward processing as battered frozen rings or for use in foodservice markets. Onion rings are a premium product, compared to standard diced onions, which MyFresh also produces onsite.



Rings were previously manufactured by being pressed from diced onions, but are now produced whole, **representing a new premium market for onion processors**. MyFresh has needed to re-examine the supply chain in light of this change. Intake specifications, quality control (QC) methods and line set-up had been kept the same as for the standard ‘diced’ product, with the only change being the extension of the line, with ring-slicing and separating as new final steps. Unlike dicing, the raw material yield on onion rings is dependent on the size of onion. By assessing what the ideal whole onion specification was, and how to deliver this, the yield of ring production increased significantly, reducing energy, labour and material resource inputs.

### Project results:

- Yield increased by 10% through reducing size variation (right-sizing) and maintaining quality of raw material, saving £370,000 per year in labour and material costs;
- Throughput increased by 28% by right-sizing the intake material;
- Load temperatures reduced by 2-3 °C, through supply chain co-operation; a potential saving of £1,800 in yearly energy costs; and
- Better planning of plenum (controlled atmosphere storage) use could save up to £5,600 in yearly energy costs.

### Key opportunities included:

- Understanding that size variability is as significant as quality in onion intake;
- Investigating what the supply chain can do to influence this variability
- Finding solutions so that the optimum specification of onion is used for the premium ring line;
- Considering a change to procurement strategy to avoid pure ‘price point’ trading;
- Communicating temperature load requirements to growers to avoid cooling more than necessary; and
- Re-engineering production to deliver to customer pull, not supplier push.

## Benefits

Measuring onion variability

Influencing variability of onions in the supply chain

Reducing waste and energy

### Identifying significant variables

The project workshops identified onions that were being sent down the premium onion-ring line that would never meet the required output spec, particularly onions outside the optimum 75-85mm size range. Incoming loads had a wide spread of sizes and defects: a third of onions in March-May 2013 were out of spec. on quality and half in June-Sept were out of spec on size. This directly lowered yield rates on the onion ring line, due to inefficiencies such as:

- Manual intervention needed to re-orientate small bulbs in machines (using more labour);
- Notching large onions too deep or small onions not enough, leading to diversion to dicing, or manual rework (using more energy and labour)
- Miss-alignment with holes in slicing machine, leading to poor throughput and therefore higher energy use per batch; and
- Poor ring-slicing and separation from smaller and/or softer onion types leading to diversion to dice/rework at final production phase (waste of embedded energy, labour)

### Analysis: correlation of variables by supplier, variety and type

Reducing variability first required analysis of data to understand the relationship between suppliers, varieties and locations. A matrix was used to map each grower into the relevant box in figure 1. The long-term aim is to move growers into the 'green' (lower left) section, where both quality and size are within spec.

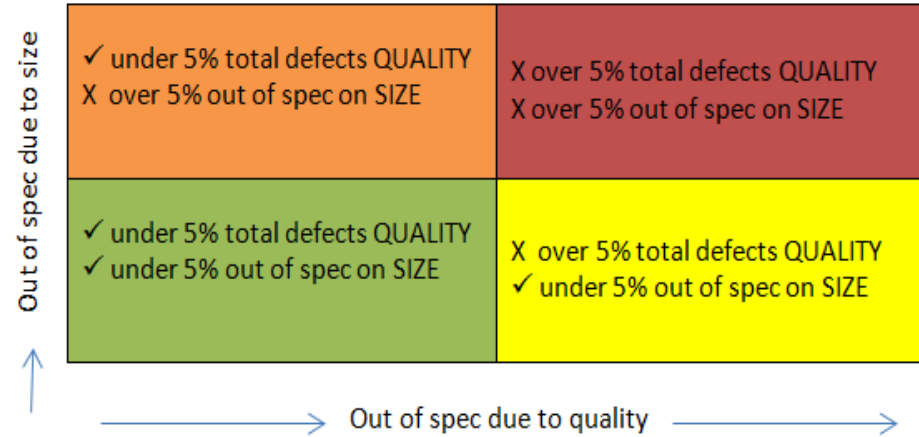
Additional analysis also showed which sizes, varieties and suppliers were most prone to 'doubles' in onions; and the key seasonal trends, explained in the next section.

### Reducing number of doubles

Double-centred onions have a major impact on ring yields, yet are not noticeable until the onion has been notched, topped and tailed, deskinned, and sliced. Rejected product at this point requires rework. Reducing the prevalence of doubles means yield and throughput go up; and energy and labour costs go down.

The analysis revealed the varieties, suppliers and sizes most likely to produce doubles. MyFresh now knows that under 85mm onions produce fewer than 3.5% doubles; yet 90-105mm onions have as many as 13% doubles. Having this information means that actions to reduce the impact of doubles could be more effectively targeted.

Figure 1.



Matrix identifies what aspects to work on with individual growers

### Reducing size variability

Armed with robust analysis, the team then looked at solutions: what could be changed to minimise variability of incoming raw materials? If production teams could be more confident of the accuracy of incoming sizes, then machinery and production lines could be set up more effectively, and with less rework.

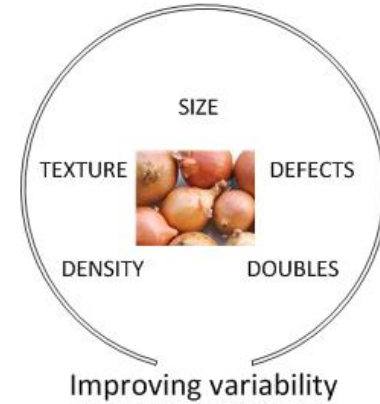
### Grading accuracy

A priority was to understand why growers were unable to accurately predict or control the sizes they sent to MyFresh. Discussion at the workshops highlighted that Hay Farming QC uses a different grading method and sieve shape than MyFresh QC, suggesting a misalignment of output sizing ranges. Hay and MyFresh will now align methods and sieve shape to improve the consistency of the grading systems.

With other growers, the data allowed MyFresh to recalibrate expected sizes, if there is a consistent discrepancy in sizing.

### Procuring the right onions for the right product

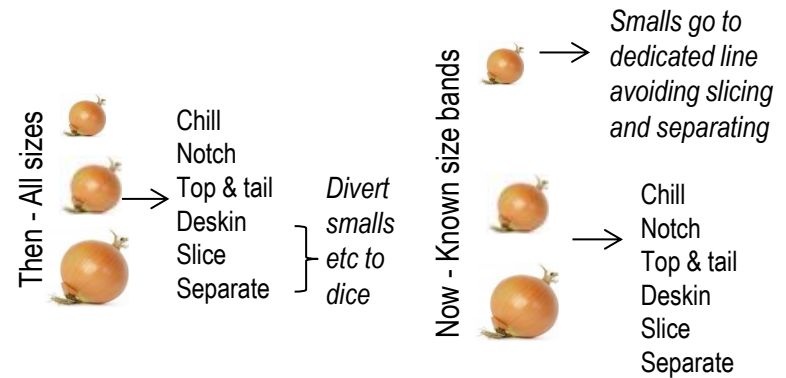
A solution to minimising resource-intensive rework was the introduction of a dedicated line for dicing. Onions outside the ideal ring size range could avoid the slicing/separating operations that added no value, impacted heavily on the throughput of the line, and used unnecessary energy and labour. As incoming onions become more predictable in sizing, this will more efficiently manage a grower's whole crop – small and large onions to dicing, mediums to premium ring production. Once this is working well, there is the opportunity to reconsider the purchasing strategy, to vary price paid for onion type and size supplied. This is a move away from 'pure' price-point trading, where a high proportion of the onions are not the type needed for efficient, profitable production of higher-value rings.



#### Key changes:

- Dedicated line for smalls to dicing, avoiding rework
- Alignment or recalibration of QC methods/sizing
- Reducing intake of over 90mm to avoid doubles

A longer term aim is working with growers to prevent the presence of doubles in onions.



Benefits

Measuring onion variability

Influencing variability of onions in the supply chain

Reducing waste and energy

## Energy

The project also identified opportunities to reduce energy used in cooling onions. All onions must be cooled in the plenum (controlled atmosphere storage) to 6°C before processing, but the growers must bring loads back to ambient in order to grade cleanly. Although efficiency of grading and processing means this heating and cooling is unavoidable, there is opportunity to limit unnecessary cooling. For example, Hay was unaware that MyFresh actively preferred cooler loads, and that as little as 2-3 °C cooler is significant. Hay will therefore now keep the product as cool as possible after removal from store before despatch – for example, not leaving loads standing in the sun. MyFresh will also develop a best practice guide to let all suppliers know that, on receipt, cooler is better.

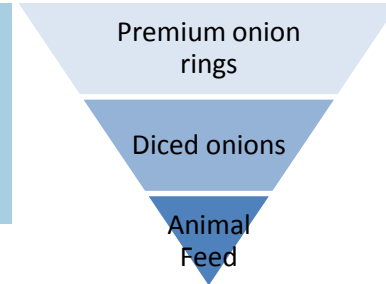
Additional savings could be made through better use of the plenum. Rather than assume every load needs chilling for 7 hours, there is scope to use some winter loads directly from the yard, and to only chill other loads for half the time if the load temperature does not warrant it.

Not leaving loads out too long in the sun, and avoiding yard-queuing at MyFresh is estimated to reduce the temperature of loads in summer months by 2-3 °C. This could save around £1,800 of electricity per year. Planning plenum use to avoid chilling already cool product, and halving the amount of time in the plenum for some loads could save up to £5,500 per year.

## Yield

The growing market for premium onion rings has created a 3 tier hierarchy: The premium onion ring is top of the hierarchy, dicing second and any part of the onion not used for rings or dicing goes to animal feed. There is no waste in the value chain. The aim is to increase materials use by maximising the yield of premium product.

As a result of this project: 10% more onions were used for premium rings than previously. Fewer onions were sent to animal feed. Better material use lowered energy, labour and improved profitability.



## Collaboration

The project focused on developing supply chain interactions based on value, and finding consistent ways of delivering this value. Interventions that secure the highest ring-yields show the benefits of collaboration versus price-point 'spot' buying.

Moving towards a different procurement strategy is always challenging, and collaborative projects provide a test bed for such approaches, demonstrating the business case and developing greater levels of trust.

This project highlighted the need to identify ways of growing the best type of onion for ring production. The team is therefore pursuing some longer term opportunities, such as growing onions with higher density and fewer double centres, which will lead to greater resource efficiency in storage and processing operations.

## Project method

Onions used by MyFresh for whole-ring production are grown at locations in England by both Hay Farming and other strategic partners. A 'lean' approach enabled the team to look strategically at resource use across the whole chain. Value-stream mapping was used to follow onion rings through all the stages of the value chain, detailing levels of resource consumption, waste and other losses, and the costs involved at each stage.

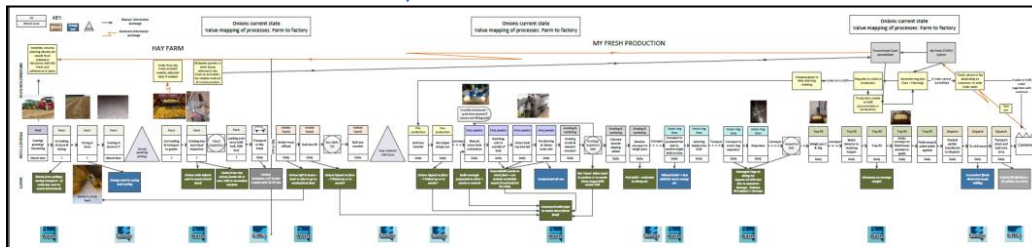
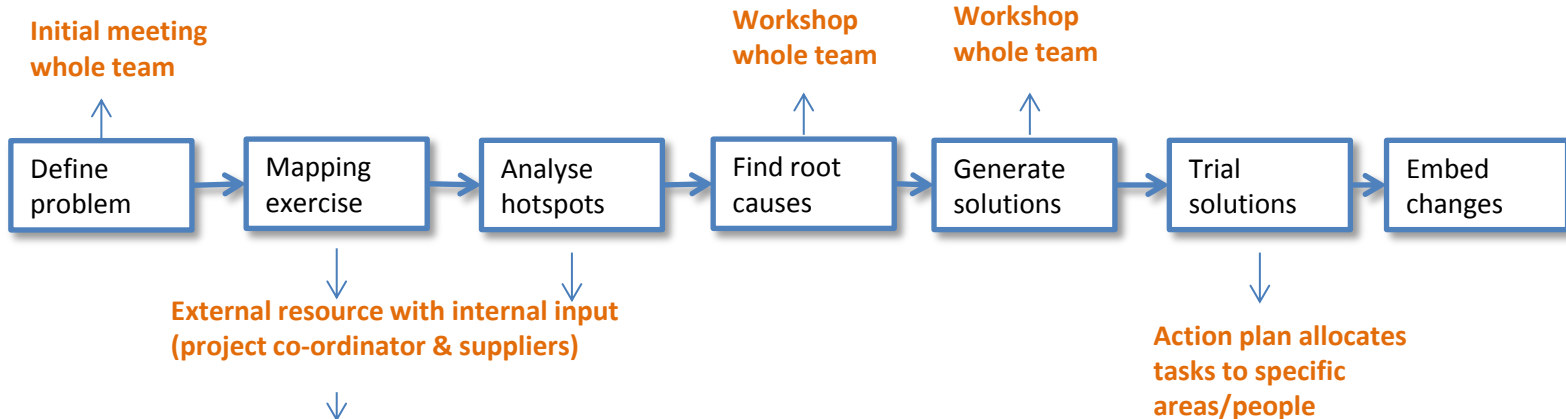
By walking the whole supply chain, identifying root causes of loss in value, and then brainstorming solutions, the team was able to agree on improvements to generate resource efficiencies.

*"It has been very instructive to look at the issues from the perspective of other parts of the value chain, and we have been able to make improvements through some simple actions."*

**Gavin Milligan, Group Sustainability Director, William Jackson Food Group**

*"We knew we could find a better home for onion that was being wasted and the project gave us the chance to brainstorm ideas with supply chain partners and put solutions in place. Now we're really pleased to say none of our onion goes to waste."*

**Julian Boothby, Manufacturing Manager, William Jackson Food Group**



*"This lean-based project enabled Hay Farming to examine in more detail the way we work with our key customer leading to some simple changes that benefit both our businesses as well as the environment."*

**Nigel Patrick, Manager, Hay Farming Ltd**

For more information on the approach and on potential support for your business, please contact [karen.fisher@wrap.org.uk](mailto:karen.fisher@wrap.org.uk)

**WRAP's vision is a world where resources are used sustainably. It works in partnership with governments, businesses, trade bodies, local authorities, communities and individuals looking for practical advice to improve resource efficiency that delivers both economic and environmental benefits.**

**Our mission is to accelerate the move to a sustainable resource-efficient economy through:**

- re-inventing how we design, produce and sell products,
- re-thinking how we use and consume products, and
- re-defining what is possible through recycling and re-use.

**First established in 2000, WRAP is a registered charity. WRAP works with UK Governments and other funders to help deliver their policies on waste prevention and resource efficiency. WRAP is a registered Charity No. 1159512 and registered as a Company limited by guarantee in England & Wales No. 4125764. Registered office at The Old Academy, 21 Horse Fair, Banbury, Oxon, OX16 0AH.**

**Find out more about our work [www.wrap.org.uk](http://www.wrap.org.uk)**