Running a whole-chain resource efficiency project

Preventing waste and improving efficiency through collaborative working across the value chain

Toolkit for fresh produce

Start-up guide
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- Engaging suppliers
- Collaborative working
- Forming a team
- Value stream mapping
- What is customer value?
- Scoping a project
- Lean tools tip sheets
- Product action finder
What is a whole-chain project?

A whole-chain resource efficiency (WCRE) project uses a problem-solving approach to reduce waste and losses and improve resource efficiency across the entire product value chain – from farm to fork. This approach helps you focus your efforts on the most significant opportunities. It considers all forms of waste: product & materials waste; water; energy; time; space – and money.

Why do it?
Reduce costs & risk, increase competitive advantage, drive innovation, foster collaboration with suppliers and across functions.

“There were people working in this organisation for 10 years who had never met and never discussed this issue before”
“There were a lot of hotspots we didn’t think were significant.” Rob Hull, Fruit and Veg Operations Manager, Co-operative Farms

WRAP estimates the value per tonne of food waste at manufacture to be £950/t and at grocery retail to be £1200/t

How does it work?
Use this toolkit as a guide to implementing a whole-chain project. Choose partners & products carefully. Focus on the ‘size of the prize’ to motivate the team. Agree in principle how to share out the resulting benefits (pricing, product share, NPD etc..)

What do we need to invest?
Top level executive support, long-term vision, forward-thinking partners, a dedicated project co-ordinator (intern or graduate is very cost effective) and a willingness to share data & learnings and take action.

How can we use it?
To help respond to changing customer value propositions, to achieve industry sustainability targets, to highlight CSR achievements, to keep improving. Putting a cost on problems, however complicated, is a catalyst for driving change, and convincing whole sections of a value chain of the value of their involvement.

“The whole-chain approach has made an important difference even to companies at the forefront of sustainability”
Inder Poonaji, head of safety, health, and environmental sustainability, Nestlé

“We decided to produce a standard for integrating this approach in our existing lean prioritisation processes”
Jason Davies, WCRE Project Co-ordinator, Nestlé
The resource maps for fresh produce, undertaken previously by WRAP, show the headline opportunities for minimising product waste and losses in particular, across the chain. It is clear that product waste is distributed throughout the value chain in most cases, lending itself to solutions that span different functions.

Waste reduction projects undertaken by the Food Chain Centre in 2005-2007 produced a set of ‘Whole chain key performance indicators’ for fresh produce and found significant potential for improvement – around 20% cost savings on average.

Tesco has developed a new metric to review the total food waste of some of the most frequently purchased food items in stores. By looking at the whole value chain, they can pinpoint where to take tailored action and help make a long-term difference. Initial analyses show losses from 20% to over 60% across fresh produce value chains. See: [http://www.tescoplc.com/files/pdf/reports/tesco_and_society_2013-14_halfyear_summary.pdf](http://www.tescoplc.com/files/pdf/reports/tesco_and_society_2013-14_halfyear_summary.pdf)

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**Summary of resource maps detailing percentage loss and waste for eleven different fruits and vegetables through the value chain**

<table>
<thead>
<tr>
<th>Product</th>
<th>Field loss (Central range)</th>
<th>Grading loss</th>
<th>Storage loss</th>
<th>Packing loss</th>
<th>Retail loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strawberry</td>
<td>2-3%</td>
<td>1%</td>
<td>0.5%</td>
<td>2-3%</td>
<td>2-4%</td>
</tr>
<tr>
<td>Raspberry</td>
<td>2%</td>
<td>No data</td>
<td>No data</td>
<td>2-3%</td>
<td>2-3%</td>
</tr>
<tr>
<td>Lettuce</td>
<td>5-10%</td>
<td>No data</td>
<td>0.5-2%</td>
<td>1%</td>
<td>2%</td>
</tr>
<tr>
<td>Tomato</td>
<td>5%</td>
<td>7%</td>
<td>No data</td>
<td>3-5%</td>
<td>2.5-3%</td>
</tr>
<tr>
<td>Apple</td>
<td>3-9%</td>
<td>5-25%</td>
<td>3-4%</td>
<td>3-8%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Onion</td>
<td>3-9%</td>
<td>9-20%</td>
<td>3-10%</td>
<td>2-3%</td>
<td>0.5-1%</td>
</tr>
<tr>
<td>Potato</td>
<td>1-2%</td>
<td>3-13%</td>
<td>3-5%</td>
<td>20-25%</td>
<td>1.5-3%</td>
</tr>
<tr>
<td>Broccoli</td>
<td>10%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
<td>1.5-3%</td>
</tr>
<tr>
<td>Avocado</td>
<td>No data</td>
<td>30%</td>
<td>5%</td>
<td>3%</td>
<td>2.5-5%</td>
</tr>
<tr>
<td>Citrus</td>
<td>No data</td>
<td>3%</td>
<td>No data</td>
<td>0.1-0.5%</td>
<td>2-2.5%</td>
</tr>
<tr>
<td>Banana</td>
<td>No data</td>
<td>3%</td>
<td>No data</td>
<td>0-3%</td>
<td>2%</td>
</tr>
</tbody>
</table>

*NB. For presentational purposes the stages in the supply chain are shown sequentially. In practice, harvested product will either be graded and packed for immediate sale or where appropriate stored and then graded and packed. As a result the data for all stored products cannot be used cumulatively.*

[http://www.wrap.org.uk/content/resource-maps-fruit-and-vegetables](http://www.wrap.org.uk/content/resource-maps-fruit-and-vegetables)
Common issues in fresh produce value chains

Previous whole-chain projects have identified a number of common issues that can occur in almost all fresh produce value chains. These issues are not new; in fact, many are perennial problems where solutions are hard to find. Where traditional approaches have failed, a cross functional approach to looking afresh at such issues may provide the breakthrough to delivering solutions and the approach in this guidance can support you to make that happen. Much of this is based on continual improvement such as Lean.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Impact on value chain</th>
<th>Possible solutions</th>
</tr>
</thead>
</table>
| Pack out % low (out of size spec, rots, etc..) | • Secondary markets needed for sub spec products  
• Poor on-shelf availability for customer if weather etc. affects quality  
• Production costs of managing grade outs | • Adjust processing flows/ techniques  
• Communicate customer value to the grower, and natural product variations to customer  
• Liaise regularly with retailer to work out flexible specs when supply is low |
| Unharvested product (left on tree, in ground, etc.) | • Extra costs for growers, lost revenue  
• Growers over-produce to meet high specs so waste and losses are inevitable | • Innovation – look at varieties, do they meet customer demands?  
• Give growers better information and long term security to avoid overproduction  
• Will more stable pricing for suppliers lead to willingness for them to invest in new technologies?  
• Changing commercial /sourcing practices where this is possible.? For example, moving to whole crop purchase approaches.  
• Secondary Markets |
| Long lead time (farm to fork) | • Shorter shelf-life in stores = less satisfied customers  
• Some products may not make it to shelves = high food waste  
• Excess inventory = production overhead & costs  
• Shorter in-home life = high food waste | • Improving product and information flows, maximising shelf-life  
• Better demand forecasting to avoid growers overstocking to prevent going short on unexpected orders |
| Poor demand management and order planning / management (waste during promotions or sudden short supply of product) | • Low service levels  
• Losing customer loyalty if product not available  
• High waste levels in distribution if orders not as expected  
• Demand amplification across the value chain | • Is the right information getting through at the right time, to the right people?  
• Are different parts of the chain acting on this information together/collaboratively?  
• Better communication throughout the value chain: retailer to communicate demand patterns quicker to growers; growers to better predict & communicate crop failures/shortages |
2. Project guidance: Preparation stage

- Collaboration
- Assembling a team
- Understanding customer value
- A problem-solving approach
Collaboration between value chain organisations offers greater opportunity to optimise efficiencies than specific site-level projects. “Successful CPG [consumer packaged goods] collaborations that involve two or three separate initiatives in a category deliver a return that's equivalent to a profit uplift of 5% to 11% in the affected category, through a combination of increased sales and reduced costs.” (GMA, 2010)

What is collaboration and cross-functional working?
Collaboration changes the relationship between people working in different functions within a company, as well as between a company and its suppliers. Top performing companies are seeking to move away from price-dominated approaches and are proposing very different ways of working: offering suppliers greater long-term security in order to work together to reduce value chain costs. Forming these deeper relationships allows a supplier the opportunity to invest for the future, and align themselves more fully with a key client or clients.

What are the measurable benefits?
Looking at resource efficiency across the value chain can unlock valuable opportunities for exploiting synergies between value chain companies – opportunities which otherwise remain hidden. The Food Chain Centre (2007) examined 33 value chains from farm to fork and found that, on average, 20% of costs in the food chain add no value and could be reduced or eliminated. 19 companies provided quantified business benefits – collectively these totalled £7m direct savings and £6.7m estimated benefits for others in the chain. Waste prevention case studies can be found on WRAP’s website.

Enabling true collaboration
Despite the appealing benefits of collaborative working, it can, for many, be a difficult task to achieve; it appears full of stumbling blocks and sometimes the effort applied may not seem to justify the end result. Reasons for this usually revolve around issues of distant relationships with suppliers, trust, resource (time, personnel) and fairness in proportioning workload and end savings. Often companies are entrenched in current ways of working, but once this is overcome the benefits are clear. It is important to set the project up well, being mindful of potential pitfalls in advance, in order to produce results which are more significant than stand alone internal/site initiatives. We therefore offer the following best practice guide on setting up a collaborative project so that it has the best chance of success.

Key points:
- Choose value chains where existing relationships between value chain organisations are strong, or where vertical integration within a value chain is well established
- Acknowledge possible cost/contractual issues at the start and work out how to avoid these becoming a barrier
- Choose leaders and teams carefully
- Appoint and allocate the right resources
- Ensure top level commitment

Engaging suppliers in a WCRE project guide

Introduction  Getting started  Implementation  Future steps
Assembling a team

Forming a cross-functional team within each organisation to deliver the project requires strategic and, often, creative thinking. Resourcing projects is a potential barrier for a company of any size. A key learning from previous whole-chain projects has been the use of new graduates on a graduate training scheme to co-ordinate and manage the day-to-day project tasks, under the supervision of a more experienced manager supported by a top level commitment. This can overcome issues of time constraints for busy staff, neutralising ‘silo working’ mistrust of other functions etc. Feedback from organisations has been overwhelmingly positive on such an approach including benefits to the graduate. For companies without such graduate schemes, creative alternatives (such as Masters students needing projects for thesis work), can be explored in the forming teams guide.

It is important to have representatives from a value chain partners and from different functions within each of those. A whole-chain approach needs support from senior management in all the value chain companies in a way that a site-level initiative may not to the same extent. The box here highlights one way of setting up a project so that it has the right level of governance to effect change (other equally effective approaches can also be used).

Agreeing how potential benefits of a project can be shared out between value chain partners is a new concept and can present challenges. However, many companies have found that discussing this early in the project is beneficial. Greater detail is in the Collaborative Working guidance, which discusses benefits-sharing via cost/price reductions, increased share of product ranges, investment in new products, agreement to trial new ranges.

The CEOs of both Nestlé and ASDA talked directly over WCRE projects, such was their belief in the direction of the work and the value of collaboration.

Think creatively here: graduate placement? Intern? Masters/Business student? Or day release/CI teams supported by external resource?
Understanding customer value

• Customer value can be based on many things, such as size, taste, appearance, pack size, variety, ethical origins. Knowing what the customer wants to buy and how important these aspects are is key.

• When undertaking a mapping exercise, customer value in a ‘Lean’ sense is traditionally recognised by asking ‘would the customer be willing to pay for this’? If yes, it is value, if not, it is waste or loss and can be eliminated thereby saving resources whilst not affecting customer satisfaction.

• It is important that all actors in the chain have the same understanding of customer value, and that the message is not weakened down the chain. One study reports that 95% of retailers track customer value, yet this understanding is not passed down the chain, with only 10% of chains ever taking any action based on this information.

• In fresh produce, there is the unique opportunity to influence customer value by educating on the natural variability of products. A drought may produce small fruits, but of usual eating quality for example. There has been much success in communicating how uncontrollable factors such as weather events can determine the produce on shelf.

• Retailers know it is vital to understand their customers and they invest heavily in loyalty cards and other means of tracking value. Yet this is a poor investment without the whole value chain being able to make changes as a result. Putting customer value at the heart of any improvement project is crucial – the potential to please customers, increase sales, improve value chain communication and efficiency and gain advantage over competitors depends on it.

Deeper exploration of all the above can be found in the Customer Value guidance sheet.
A problem-solving approach to project implementation

After the focus on commitment and teams, the project moves onto the more practical tasks often associated with ‘Lean’ practices. Mindful that many organisations will have their own approach to continuous improvement techniques (‘Lean’), this guide does not seek to replace such practices, but rather dovetail with them and enable them to be used within a collaborative environment. If step-by-step information is helpful, then a full guide to waste prevention tools and techniques can be accessed on the WRAP waste prevention website [http://www.wrap.org.uk/content/waste-process](http://www.wrap.org.uk/content/waste-process)

**Key learnings from previous projects**

- The steps needed are: problem definition, value chain mapping exercise, hotspots analysis, root cause analysis, solution generation, trialling solutions and embedding changes. It matters less what techniques you choose to use, and more on the robustness of the outputs.

- Funnel the issues from a wide, general problem to clearly defined root cause

- Focus on spending a third of the time on problem definition, a third on analysis and a third on solutions. Many organisations find the end results have greater value when the problem is correctly defined and analysed. This avoids ‘superficial’ solutions that do not tackle the root causes.

- Do not forget to map information flows down the chain as well as physical flows up the chain – forecasting, demand amplification and promotional activity rely on timely exchange of relevant information. Poor communication is often the cause of waste in fresh produce chains.

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**Problem definition** → **Mapping exercise** → **Hotspot analysis** → **Root causes** → **Solution generation** → **Trialling solutions** → **Embed changes**

**Information flow** → **Physical product flow**

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Project guidance: Implementation stage

Initiation: project group meeting
Step 1: Problem definition: mapping the chain and data gathering
Step 2: Root cause analysis - project group workshop
Step 3: Solution generation - project group workshop and action planning
Step 4: Trialling & evaluating solutions
Step 5: Embedding and rolling out change
Initiation: Project group meeting

The starting point is to bring together the team you have identified, including a representative from senior management. It is unlikely that people will know everyone else there and suppliers/partners may feel unsure about this new style of working with their customer. Aim for an open and informal environment from the start. This is not always easy due to sensitivities involved and further advice on achieving this can be found in the guidance document on collaborative working.

Suggestions for this first meeting include:

- **Stating the aims of the project**, especially if it is a new approach
- **Why this will benefit the organisation** – an address from a senior director is invaluable here to set a ‘vision’
- **Flag any potential collaboration issues** (time, cost, sensitivities) – reassurance from directors on fairness, long-term strategy etc. is important at this point, to bring suppliers on board and give them confidence to work openly. Some elements will probably be too commercially sensitive to share, and this should be respected (see collaborative working for more details)
- **Discussion on proposed scope and boundaries of the project** (see guidance document on scoping a project for details)
- **Introduce the co-ordinator(s)**, if appropriate, and the role they will play
- **Allocate time to a data gathering and subsequent Value Stream Mapping (VSM) exercise** (co-ordinator and project manager to do walk throughs, team members to help in their areas).
- The very fact of bringing different functions together in a room for the first time may uncover some very obvious ‘quick wins’. Previous WCRE projects have identified and implemented such changes early in the project, leaving the tougher/hidden issues to be looked at using more detail and analysis during the main body of the project. The only caveat is that the ‘quick wins’ must be clearly beneficial, with no risk that, by implementing changes, waste will be generated, or more resources consumed, elsewhere in the value chain. Any successes from these quick wins should be communicated to the project team, as encouragement.

A checklist is available to help guide the first meeting

After the meeting, the co-ordinator should draw up a project charter to formalise discussions. A template can be found here.
Defining the problems begins with the Value Stream Mapping (or similar mapping) exercise to generate a ‘current state map’ (i.e. what is currently happening).

**Value stream mapping is a technique used to visualise what actually happens to a product in a value chain**, which can often be very different from what people perceive to happen. Mapping a product chain will challenge you to identify activities that add value, and those that do not and are therefore wasteful. Working to eliminate these wastes and losses in the chain will optimise processes, reduce costs, increase competitiveness and raise customer satisfaction.

Many organisations have their own ‘Lean’ working approaches, and are comfortable carrying out this exercise. For those who would like step-by-step guidance, look at the Value Stream Mapping Guidance Sheet.

Mapping the stages will allow you to consider some of the following issues, for example:

- Are high volume ingredients delivered in small volume packaging?
- Does weather influence out of spec grade-outs?
- Does the message get right down the chain in time?
Step 1: Defining the problem: Mapping the chain (2)

Key points:

- Do not forget to map information flows, as inefficient communications up and down the chain can often result in waste.

- **Categorise steps as those that add value, or don’t.** This is an important task, and is not always clear cut. If you are not sure, look at our [Customer Value](#) Guidance Sheet for more support.

- It is important to get the map as close to what is actually happening as possible – do not focus on how it is supposed to work, or how it used to work, or how it might work tomorrow.

- **Physically walk the chain where possible,** to capture what actually happens – as opposed to what processes dictate. This can also identify ‘quick wins’ that can be implemented straight away.

- Use the Value Stream Map to identify where waste and resource hotspots may occur and so provide focus for further data collection (Step 3). For example, physical losses may be significant and concentrated within some process stages.

- Consider adding an ‘ideal state map’ – a ‘no holds barred, what could it look like’ scenario, if there were no limitations. It can provide an overall vision to work towards.

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![Value Stream Map](image-url)
Step 1: Defining the problem: Data gathering (3)

A key post-mapping task is to gather all available data relating to material/product losses, significant resource consumptions and associated costs. This will be used to define the ‘problem’ and identify ‘hotspots’ for action: activities which result in the greatest material losses - or potential inefficiencies through high resource consumption (e.g. energy, water, labour, etc.).

This is often a time-consuming task, but vital to the success of later stages in the project. This data may not be readily available, or be in the appropriate format, and needs an investment in time to collate. Common issues and solutions to data collation are discussed on the following page. One organisation which ran a WCRE pilot project is now seeking to roll it out on a wider scale and has dedicated a six month period solely for data collection, such is the desire to work from long-term, actual data rather than estimates or extrapolated values. This may not be appropriate for a first WCRE project, but does show the value others place on robust data.

The output of this part of the exercise builds on the mapping exercise: quantified information showing what is actually happening to your product, where significant consumptions and losses occur, where actions add value and where they don’t. Quantifying the cost per annum is key to both prioritisation of hotspots and allocation of budgets to develop and implement solutions. However, where there is insufficient data to quantify a hotspot, this should be noted as a data gap – and filling this gap may become a future action/solution.

Tools that can help with this Step:

- Fresh Produce Problem Definition Screening Tool
- Problem Definition Template

At the end of this stage, you will ideally have a list of hotspots, with quantified consumptions, losses and costs. The table below, once real values have been inserted, shows how a Problem Definition template can point to hotspots.

<table>
<thead>
<tr>
<th>No</th>
<th>Hotspot</th>
<th>Supply chain stage</th>
<th>Process</th>
<th>Losses/potential inefficiencies</th>
<th>Units</th>
<th>Resource type</th>
<th>Cost per unit (£)</th>
<th>Cost per annum (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adverse weather (ie. hail)</td>
<td>Grower</td>
<td>Growing</td>
<td>xxxx</td>
<td>tonnes</td>
<td>Raw material</td>
<td>xxx</td>
<td>xxxxxx</td>
</tr>
<tr>
<td>2</td>
<td>High grade-out of product</td>
<td>Packer</td>
<td>Grading</td>
<td>xxxx</td>
<td>tonnes</td>
<td>Raw material</td>
<td>xxx</td>
<td>xxxxxx</td>
</tr>
<tr>
<td>3</td>
<td>Split/damaged product</td>
<td>Packer</td>
<td>Packing</td>
<td>xxxx</td>
<td>tonnes</td>
<td>Product waste</td>
<td>xxx</td>
<td>xxxxxx</td>
</tr>
<tr>
<td>4</td>
<td>Overstock to avoid 'going short' on orders</td>
<td>Packer/wholesaler</td>
<td>Distribution</td>
<td>xxxx</td>
<td>tonnes</td>
<td>Product waste, storage energy</td>
<td>xxx</td>
<td>xxxxxx</td>
</tr>
</tbody>
</table>

Eg. Biggest tonnage loss

Eg. Biggest financial loss

Introduction | Getting started | Implementation | Future steps
Step 1: Defining the problem: Data gathering (4)

Previous projects have raised important questions and challenges relating to data gathering, which are outlined below.

**Which metrics?**

- Data can be stated in **financial, percentage or volume terms**; for example, out of spec product or waste product from grading lines may be £x or X tonnes. Ideally, gather data in both forms, and split it down as far as possible - e.g. £x lost due to under size and over size product, £x lost to rots etc..
- Typically % values are useful for benchmarking – normalising values to enable monitoring over time. £ values enable justification of investment, and business priorities. Tonnages are useful to show absolute improvements.
- **When quantifying £ values, gain a complete picture** by considering the cumulative labour, resource, product/packaging and management costs associated with losses – as well revenues for different fates (e.g. product sold to secondary markets or to animal feed).
- **Aim to gather data on all the key metrics** and potential consumption or loss ‘hotspots’ – product waste, water, energy, greenhouse gas emissions etc..
- **Also capture ‘reason codes’** (e.g. from ERP systems) e.g. “promotion”, “minimum order quantity”, “sales below forecast”, “season exit stock, out of code, reduced price or damaged”.

**Where can data be found?**

Data can be gathered from a range of sources and all routes to data should be exhausted e.g. business systems (e.g. procurement systems, customer complaint data), off line spread sheets (e.g. QC sheets, KPI measurements), supplier/service provider data.

**What if we don’t have the data?**

Sometimes you will not have the right data, or it will not be in the right format. Time needs to be allowed in the project to work through this: the investment in time will be repaid by the more accurate results in later stages. Focus on likely hotspots and collect new data on-site if needed.

**Tools that can help with this Step:**

- **Checklist for typical data relating to fresh produce waste measurement**
- **Screening Tool** containing default values for some variable and fixed inputs that will clarify value chain hotspots for fresh produce. Previous WCRE projects have found this to be a useful as a means of collating data into a meaningful form. It is easily adaptable for other fresh produce projects.
- **WRAP’s ‘lean’ implementation tip sheets**.
Step 2: Root cause analysis: Project group workshop

Circulate the findings from the Problem Definition stage to the project team and set up a second meeting to undertake root cause analysis. At this point the cross-functional and cross-project team is brought together to brainstorm likely root causes – it may not require all members, but at the very least there needs to be team members from the priority ‘hotspot’ areas identified in the earlier analysis.

Really use the strengths of cross-functionality here – allow members to suggest that, for example, the problem of high waste levels in one area may be as a direct result of decisions taken or actions performed elsewhere in the chain. This root cause analysis can be run in a morning workshop format, with the solution generation following in an afternoon slot. It is important to keep a strict distinction between the two, however; avoid creeping into discussing solutions in this session, as you may not have got to the bottom of the cause yet.

A cause and effect or fishbone diagram categorises issues and helps see where to target solutions

The 5 “W’s” technique will drill down to the detail and define the problem. For example, you may note that giveaway is high on a certain production line. Using the questions below, you can further define the problem so that it becomes manageable and achievable.

**Who** – Who does the problem affect (production, customer etc.)?

**What** – What are the boundaries of the problem (what impact does it have, what part of the organisation will benefit from the fix?)

**When** – When does the issue occur (constantly, at certain times)?

**Where** – Where does it occur (certain line, certain process, certain product)?

**Why** – Why does this problem need fixing (losing money, poor quality)?

**Tools that can help with this Step:**

- WRAP’s ‘lean’ implementation tip sheets: [Brainstorming techniques; Cause & effect analysis tools](#)
Solution generation is part two of the workshop analysis and should be carried out in a separate session. Encourage the team to focus first on behaviour and process changes, such as consider raw material specs, customer specs, SOPs, communications etc., rather than capex and engineering fixes, as it is the former which tend to give greater low-cost, high-return impacts. Remember too, that there may be both hidden costs and potential savings, masking implications for labour inefficiencies, water use and energy efficiencies etc.. Use your root cause analysis to check you have the right people attending.

If you hold regular CI (Continuous Improvement) events, make sure you check the learnings from these previous projects so unsuccessful solutions arising out of these are not pursued once again.

Be sure to harness the benefits of the collaborative, cross-functional team. Encourage all members to consider the impact of any solution in their day-to-day work. For example, an idea may ‘solve’ the waste problem in one area but create more problems in another, negating the impact of the solution. At the end of the session, you ideally will have a list of hotspots with lots of different ways of solving the problem and reducing waste:

<table>
<thead>
<tr>
<th>Proposed Solution(s)</th>
<th>Point of Intervention</th>
<th>Potential annual savings (Units)</th>
<th>Potential annual savings (£)</th>
<th>Cost of implementation (£)</th>
<th>Opportunity payback in years</th>
<th>Ease of implementation (1 = Easy and 5 = Difficult)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Tools that can help with this Step:** Solution generation templates; Brainstorming tip sheets

This table will align with the ‘problem definition’ table previously, for example:

<table>
<thead>
<tr>
<th>No</th>
<th>Issue</th>
<th>Source</th>
<th>Severity</th>
<th>Process</th>
<th>Losses/growth stages</th>
<th>Resources</th>
<th>Current Cost</th>
<th>Cost per unit (£)</th>
<th>Proposed Solution(s)</th>
<th>Point of Intervention</th>
<th>Potential annual savings (Units)</th>
<th>Potential annual savings (£)</th>
<th>Cost of implementation (£)</th>
<th>Opportunity payback in years</th>
<th>Ease of implementation (1 = Easy and 5 = Difficult)</th>
</tr>
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**Introduction**  
**Getting started**  
**Implementation**  
**Future steps**
The **Action Plan** lists, by function:
- Potential solutions (taken from the previous meeting)
- What needs to be done to trial the solution
- What KPIs will be measured (in controlled environment) e.g. waste/yield losses, on-shelf availability
- People carrying out the action
- Date of the trial or pilot.

The more precise the information on the plan, and the tighter the scope and time boundaries, the more chance there is of the trials going ahead.

The action plan is most effective when the solutions are prioritised by opportunity. The following template is a useful way of categorising the solutions from the workshop. The ‘quick wins’ are those in the high impact-easy implementation box, for example.

<table>
<thead>
<tr>
<th>High Impact</th>
<th>Low Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy</td>
<td>Difficult</td>
</tr>
<tr>
<td>Quick wins</td>
<td>Complex problems - aim to break down the problem and tackle step by step, moving each part into the High-Easy section</td>
</tr>
<tr>
<td>E.g. Switching off industrial lights during daylight shifts</td>
<td>E.g. Forecasting accuracy</td>
</tr>
<tr>
<td>Simple, easy changes to small details</td>
<td>Low priority but worth tracking, in case resource costs (e.g. water rates) shift them into the Difficult-High quadrant</td>
</tr>
<tr>
<td>E.g. Changing a label size on packaging</td>
<td>E.g. Also, QC losses - vital, low volume, but difficult to cut down on</td>
</tr>
</tbody>
</table>

This gives a clear, visual method of selecting the highest opportunities.

The top right hand quarter contains the high impact opportunities which are historically dismissed as being too difficult to tackle. Whilst some may remain ‘too difficult’ for reasons of cost, perhaps, there is an opening in a whole-chain project to take a closer look at these. A cross-functional team may be able to rethink some of the barriers to implementing solutions.

**Tool:** **Blank priority matrix template**

The project co-ordinator now draws up a comprehensive plan of action and circulates to the whole project team for comment.

**Tool:** **Action plan template**
Step 4: Trialling Solutions

The action plan details all the trials that are scheduled to take place. It is now the task of the project leader to drive commitment, and the responsibility of the team member(s) allocated the trials to carry them out. Avoid letting things stall at this stage, this is where the efficiencies start to become reality.

Each trial must take **before, during and after measurements** so that success can be demonstrated/quantified and accurate conclusions can be drawn. Correct data measurement cannot be overstated here; it means that **small trial success can be scaled up and rolled out elsewhere**. If the trial throws up unintended consequences, or insufficient improvement, then this should be noted and officially logged for future evaluation.

- **Measure** – where are you starting from?
- **Introduce the change** – specific, controlled, with all other variables remaining the same
- **Measure** – does it do what it is supposed to?
- **Compare** – does the solution introduce any new issues?

There are 3 likely outcomes from the trial:

1. **The trial meets the agreed KPIs at the agreed level and is successful.** Savings will be a level that offers acceptable ‘pay back’ time against what will need to be invested initially to change the procedures.
2. **The trial is better than the current procedure, but only just.** If only partially successful, look at what the limiters were, and/or what did not go to plan. It may be worth going back to the drawing board on this solution to make it more successful. Alternatively, discard it and repeat the process again to incorporate this learning, and to consider better solutions.
3. **The trial is unsuccessful and does not produce any benefits.** However, the learnings must still be logged so the same mistakes are not made by future teams, and to show that this solution has been considered, but ultimately deemed unsuitable.
**Step 5: Embedding change**

Crucially, **any successful solution must be implemented for the long-term** and become part of daily procedures. Standard Operating Procedures (SOPs) and Key Performance Indicators (KPIs) are commonly used to measure progress and detect slippages. These must be changed to take account of the solutions, and **to ensure waste and resource consumption does not revert to pre-project levels**. For example, if a solution has been proven to reduce packaging waste by 5%, then the KPI for packaging waste levels must be reduced by the same amount. Failure to use the new methods of working will be reflected in failure to meet the KPI, and so will be flagged up to the team.

**Celebration of success and acknowledgement of team effort** is easily forgotten, but is a key part of the project. If senior management can communicate the savings via company newsletters/sustainability/CSR reports etc., this gives the team huge satisfaction and increases commitment for further projects.

- Develop a set of indicators to measure change. **How so we check solutions are maintained?**

- Create an implementation plan, tailored to your business. **What is your approach and what are you trying to achieve?**

- Communicate changes and encourage others to get involved.

- Reinforce the benefits of the changes you have made – importantly, don’t forget to celebrate success!

- Change or develop your Standard Operating Procedure (SOP) documents to standardise and embed the new waste prevention practice.

See **Embedding Change** guidance for more information.
Learns from previous projects have given some common issues and solutions at each step of the project, summarised here.

Commonly perceived barriers and potential enablers in a whole-chain resource efficiency project:

**Identify a product chain**
- **Barriers**: Whole-chain approach does not produce any benefit over traditional approach. Stalls due to lack of support. Whole-chain approach is more complicated and time-consuming.
- **Enablers**: Identify collaborative working. Companies should have their own 'Lean' approach. People come with different expectations and attitudes.

**Plan collaborative working**
- **Barriers**: Cost of unequal sharing of savings. People won't get on (too many past issues).
- **Enablers**: Be creative about project co-ordinator; graduate trainee/intern. Focus on outputs (hotspots etc) use WRAP method or your own to get there.

**Assemble a team**
- **Barriers**: Companies have their own 'Lean' approach. People come with different expectations and attitudes. It will cost too much & people do not have time.
- **Enablers**: Prepare well, circulate agenda beforehand. Accept any data gaps and list as an action. Ensure mapping has physical & information flows.

**Identify a project method**
- **Barriers**: Partners do not have same data/use same metrics. Information flows are ignored (e.g. where are decisions held up?). Poor planning/ preparation = unclear waste definition & savings.
- **Enablers**: Map chain and list hotspots. Workshop 1: Root causes. Workshop 2: Solution generation.

**Step 1** - Liaison meeting
- **Barriers**: No buy-in by personnel/supplier – seen as a negotiating exercise. Trials too long and disrupt operations.
- **Enablers**: Action plan. Have a Project Charter to reassure suppliers.

**Step 2** - Data collection
- **Barriers**: Waste is just displaced elsewhere in chain. Actions all engineering fixes – all in production.
- **Enablers**: Embed changes. Solutions are short term and peter out.

**Step 3** - Map chain and list hotspots
- **Barriers**: Primary producers do not know what end customer wants. Root causes come back to ‘usual’ insurmountable issues.
- **Enablers**: Workshop 1: Root causes. Workshop 2: Solution generation.

**Step 4** - Root causes
- **Barriers**: Root causes are an issue of the long term. Waste is just displaced elsewhere in chain. Actions all engineering fixes – all in production.
- **Enablers**: Embed changes. Solutions are short term and peter out.

**Step 5** - Root causes
- **Barriers**: Waste is just displaced elsewhere in chain. Actions all engineering fixes – all in production.
- **Enablers**: Embed changes. Solutions are short term and peter out.

**Step 6** - Solution generation
- **Barriers**: Waste is just displaced elsewhere in chain. Actions all engineering fixes – all in production.
- **Enablers**: Embed changes. Solutions are short term and peter out.

**Step 7** - Trial solutions & report back
- **Barriers**: Waste is just displaced elsewhere in chain. Actions all engineering fixes – all in production.
- **Enablers**: Embed changes. Solutions are short term and peter out.

**Step 8** - Embed changes
- **Barriers**: Waste is just displaced elsewhere in chain. Actions all engineering fixes – all in production.
- **Enablers**: Embed changes. Solutions are short term and peter out.
This project is part of a wider continuous improvement and sustainable progress culture, and should not be seen as a ‘standalone’ effort. Previous organisations have taken the learning forward in a number of different ways:

- As a method of constantly revisiting processes in that product value chain (with the same partners) to make incremental improvements
- As a springboard to enhancing or developing a company’s own processes for applying the learning/methods to other product lines, with different supply partners
- As a valuable part of future work that should be integrated into existing Continuous Improvement systems

“We decided] to produce a procedure/tool to be used for Nestle UK for other product life cycles. [We] will produce this using a tiered approach and will relate it to the Cost of Non-Quality (CONQ)”

Nestlé UK

The PSF (Product Sustainability Forum) has a wealth of resources available on its website www.wrap.org.uk/psf which offer opportunities for, and learnings from, working together to measure, improve and communicate the environmental performance of grocery products.

Toolkit authors: WRAP in conjunction with partners Oakdene Hollins and ADAS
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