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The Life Cycle Assessment
of Scotch Whisky

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What is a Life Cycle Assessment?

A Life Cycle Assessment (or an LCA) is defined by an International Standard¹ as the

“compilation and evaluation of the inputs, outputs and potential environmental impacts of a product system throughout its life cycle”

It is a helpful tool for evaluating the environmental impact of a product at all stages within its life cycle - from extraction of resources, through production of materials, to use and disposal.

Why perform a Life Cycle Assessment of Scotch Whisky?

The application of a Life Cycle Assessment to Scotch Whisky provides a number of benefits:

- It establishes a baseline against which continued industry efforts towards reducing environmental impact can be reliably measured.
- It identifies opportunities to improve environmental performance at various points in whisky’s life cycle, as well assessing the impact (whether positive or negative) of proposed improvements, across the whole life cycle.
- LCA design and performance is based on recognised protocols such as the ISO Standards on Life Cycle Assessments and PAS 2050:2008.²
- A Life Cycle Assessment allows the industry to engage with stakeholders on the basis of detailed and auditable data. This will benefit working with partners in the supply chain or government agencies, to influence areas over which the industry has no direct control.

¹ ISO 14040:2006 - “Environmental management - Life cycle assessment - Principles and framework”

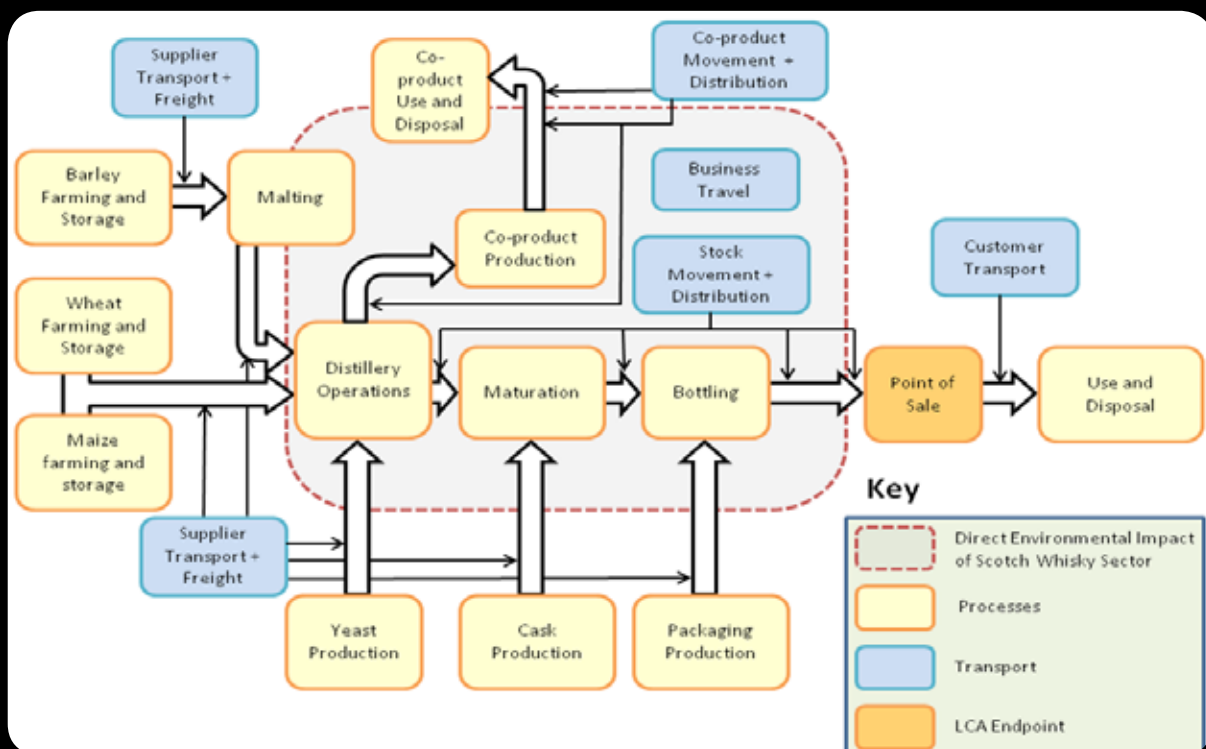
² BSI PAS 2050:2006 - “Specification for the assessment of the life cycle greenhouse gas emissions of goods and services”

What is the scope of the Scotch Whisky Life Cycle Assessment?

The LCA is a major piece of work undertaken by The Scotch Whisky Research Institute (SWRI), in collaboration with The Scotch Whisky Association (SWA). The assessment's scope covers all the processes within the Scotch Whisky life cycle, up to the point of retail. The processes covered are detailed in the following figure, with the grey box highlighting the approximate split between those operations under the industry's direct control and those over which the industry has only varying degrees of influence. Taken as a whole, the boxes map all the manufacturing processes of Scotch Whisky, up to the point of sale and define the boundaries of the LCA.

Key environmental impacts being measured are climate change, water use and land use. Other impacts are included, which study the environmental effects of emissions to air, land and water.

A Process Map of the Life Cycle of Scotch Whisky



How is the LCA performed?

First an inventory analysis of the industry is undertaken, collecting all relevant data. From this data set, measures of environmental impact can be calculated, such as raw material inputs, production volumes, energy used, waste generated and relevant emissions to air, land and water. Given the scale and diversity of the industry, this data collection exercise is a large and detailed undertaking. Data is collected by the SWA and treated confidentially. Only aggregated data will be reported externally.

Using established and published conversion factors, inventory data is converted into standard measures of environmental impact. For those processes outwith the industry's direct control, for example the supply of cereals or disposal of waste, the industry will ensure that any conversion factors related to those processes have been calculated in accordance with an accepted life cycle protocol.

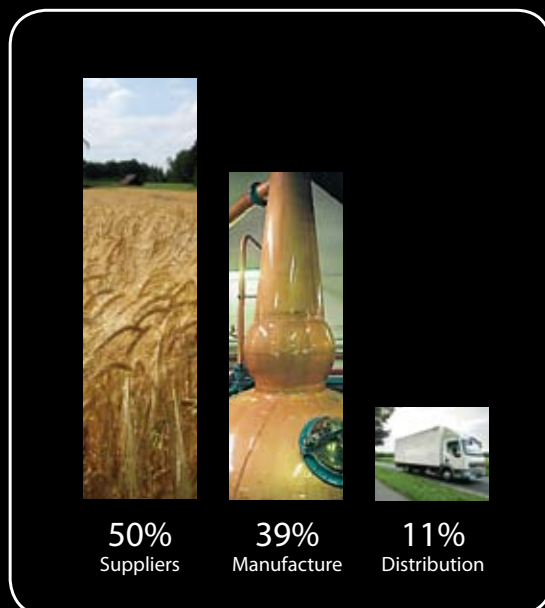
For example, to measure the Scotch Whisky life cycle impact on climate change:



How will the LCA be used?

The LCA provides the baseline industry performance, identifies areas for reduction, and predicts and monitors the success of mitigation measures. The exercise will be repeated on an annual basis. Data collected and generated from the LCA exercise will be used to monitor progress against all of the environmental targets identified in the Scotch Whisky industry's Environmental Strategy.

What Life Cycle Assessment information is already available for Scotch Whisky?



Initial work was undertaken on the life cycle of Scotch whisky, using data from 2006 to measure greenhouse gas emissions and water use. This highlighted where the major impacts occur within the Scotch Whisky supply chain (the LCA based on 2008 data will permit a more detailed analysis).

Figure 1: Distribution of Greenhouse Gas Emissions for the Scotch Whisky Life Cycle (2006)

Figure 1 demonstrates how the total greenhouse gas emissions associated with the life cycle are split between generation of raw materials (supplies), the activities of the industry (manufacture) and the distribution of product to the point of sale (distribution). Use and disposal has not been included in this analysis. Total emissions are calculated as 2.0 million tonnes CO₂ equivalents.

Table 1: Relative impacts of Scotch Whisky related greenhouse gas (GHG) emissions

Source of GHG Emissions	GHG Emissions 2006 (Mt CO ₂ equivalents)	Contribution of Scotch Whisky Manufacture (%)
Scotch Whisky Manufacture	0.76	100
Scotch Whisky Life Cycle	2.0	39
Scotland	59.0	1.3
UK	652.3	0.12
EU-27	5143	0.015
Global	27,843	0.0027

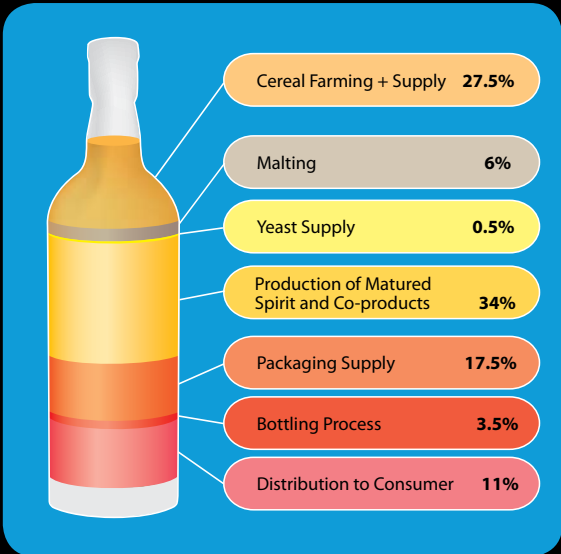


Table 1 puts the greenhouse gas emissions from the Scotch Whisky industry and life cycle into the context of national and international emissions.

Figure 2 provides more detail as to the how the 2006 GHG emissions are split amongst the individual processes. Agriculture represents over a quarter of the total emissions associated with the production of Scotch Whisky.

Figure 2: Process based breakdown of greenhouse gas emissions from Scotch Whisky life cycle (2006)

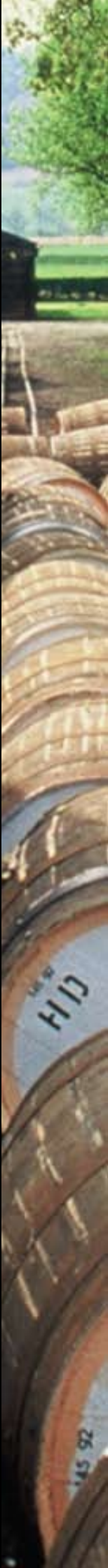
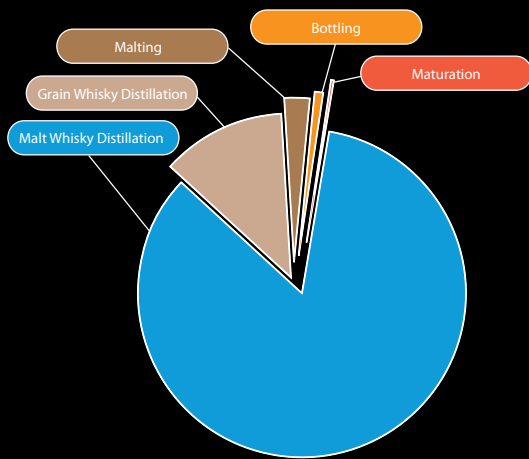


Figure 3: Distribution of water use amongst five production areas



The relative distribution of water required for five main process areas is given in Figure 3. More detail on water use within the industry and the Scotch Whisky life cycle will be supplied by the baseline analysis for 2008 and allow the industry to make decisions about the most environmental use of this resource.

The LCA highlights that the industry currently recycles its draff (malt and grain distillation co-products) as animal feeds or fertilisers. This practice is as old as the Scotch Whisky industry itself. Figure 4 demonstrates from previous process analysis data how a large percentage of the industry's co-products are re-used in this way.



Figure 4: Percentage re-use of cereal and yeast co-products from distillery operations (2002 data)

Conclusion

The use of a Life Cycle Assessment delivers a method for measuring and reducing the environmental impact of the Scotch Whisky industry and its supply chain, and will support the targets laid out in the Scotch Whisky industry's Environmental Strategy. It will be the tool of choice for evaluating the environmental performance of the sector. It will also allow individual companies to assess their performance in relation to the industry as a whole.

