

# Think Global, Drink Local: a LCA of microbrewing

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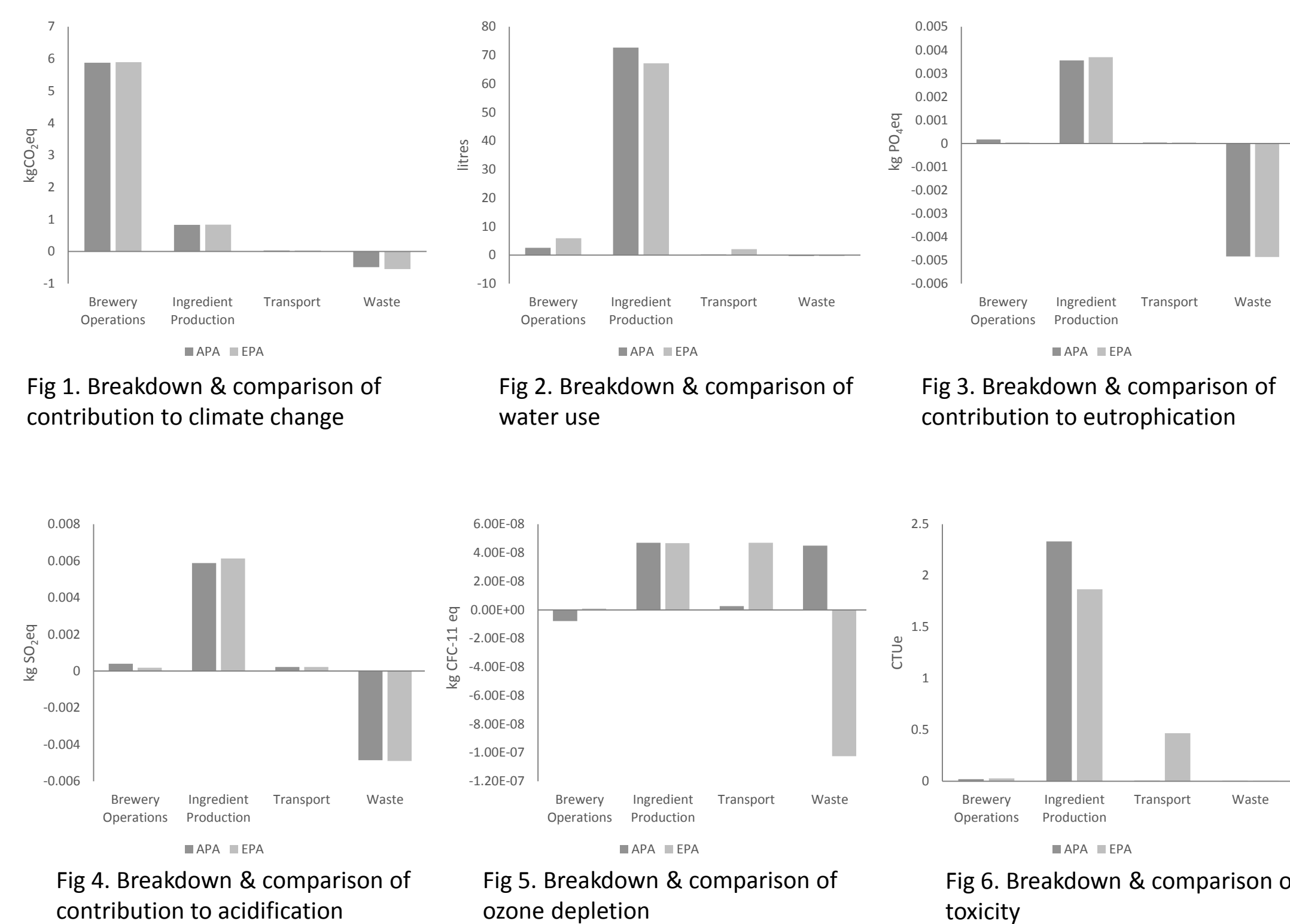
## Abstract

The brewing industry has experienced a renaissance in recent decades, with the number of micro- and craft- brewers increasing rapidly. Whilst exact definitions for “micro-” or “craft-” breweries vary, typically they are small scale independently owned breweries using traditional brewing methods. Typically they adopt a different approach to marketing and distribution in order to compete in an extremely competitive market, with an emphasis on flavour, quality, and individuality. Despite the relative simplicity - inputs of malt, hops, water, yeast and energy - of the craft beer manufacturing process opportunities exist for brewers to enhance sustainability – environmentally, socially and economically. This study examined the cradle-to-gate impacts of a locally sourced English Pale Ale (EPA) style and imported hop American Pale Ale (APA) style beers. Impact results suggest that the addition of imported ingredients has a marginal impact when considered in the context of the overall brewing operation.

## Introduction

The World’s third most popular drink, after water and tea, beer is an alcoholic beverage produced through the saccharification of starch and fermentation of the resulting sugars<sup>1</sup>. Traditionally the starch and characteristic flavours are obtained from malted cereal grains (commonly barley or wheat), with the addition of hops to impart bitterness and help preserve the product<sup>2</sup> (figure 1). As the beer production processes uses grains as its main raw material it is considered a food product. Agricultural production relies to a large extent on the natural environment and local farming practice<sup>3</sup>. The UK independent micro-brewing industry has seen significant growth in recent years. Traditional English ales rely on low alpha hops, often produced locally. Many modern micro-breweries are developing highly hopped ‘American’ styled beers, reliant on imported new world hops and grains. These beers often require a larger amount of often rarer, more expensive varieties of hops, this study investigated the comparative cradle-to-gate impacts of a traditional English ale and a beer using imported specialist hops.

## Results & Conclusions



The main stages of ingredient production and brewery operations dominate the environmental burdens. The high brewery operation climate change impact is indicative of high energy requirements for water boilers. A small brewery has limited control over the production of raw material, however they do control destinations of wastes and brewery management. Water use in the brewing process is relatively low (2-6 litres), with the majority occurring during ingredient production. Whilst other studies are not fully comparable due to differences in boundary selection and methods, this is consistent with suggestion of an ‘efficient’ brewery utilising between 4 – 10l/l<sup>5</sup>. Although estimates of life cycle water use are high in comparison<sup>4</sup>. Overall the setup of the brewing operation is more dominant in determine impacts. The opportunities for small scale brewers to improve performance through production are limited, possibilities may arise in brewery reconfiguration.

## Acknowledgements

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## Key references

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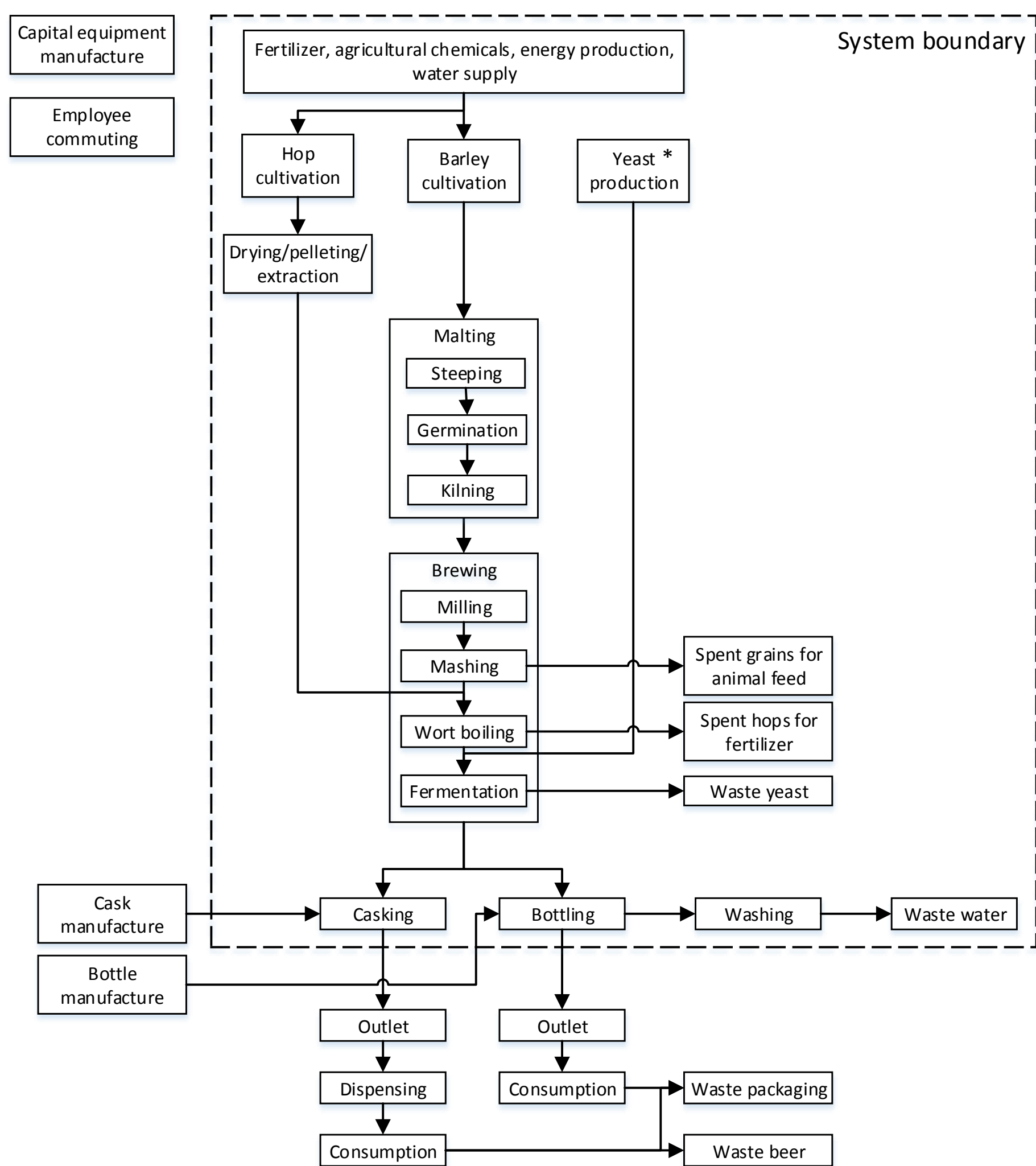


Figure 1. System boundary of beer production used in the study  
\*Note no data were available for yeast production

Data collection was for unit processes required for the production of beer to point of sale at the brewery. Data were provided from the LCA Food DK database, the Ecoinvent Database, USDA National Agricultural Statistics Service, and individual breweries. Calculations were completed using SimaPro.