

Alternative crop factsheet: Sugar beet

OPPORTUNITIES FOR SUGAR BEET PRODUCTION

Sugar beet production in Scotland has been marginal since the closure of the key processing plant in Fife in the 1970s. Removal of transport subsidies, low yields and competition with markets such as the South of England, made Scottish production less commercially viable.

However, hugely improved yields, new opportunities for bioprocessing, and interest in biofuel blends, create a compelling case to investigate re-establishment of sugar beet production in Scotland.

Lower carbon fuel is of increasing interest to governments and car manufacturers, with more stringent targets on renewable energy use, such as the proposal to increase the biofuel content on petrol from E5 (5%) to E10 (10%) and then to E14 (14%).

Other opportunities include the development of specialist bio-refining plants close to sites of biofuel production, for the production of biochemicals and bioplastics, alternatives to fossil-fuel-based chemicals and plastics, as well as

mycoproteins for either food or animal feed.

There are limitations and barriers to reviving Scottish sugar beet production that should be acknowledged. The first limitation is that a recent report by The Bioeconomy Consultants for Scottish Enterprise estimated that 22,000 ha of suitable land would be needed within a 60-mile radius of a plant to make it a viable commercial operation, requiring that production and processing must be integrated and relatively localised.

The second barrier is that the current price received by farmers for sugar beet is based on the price of beet for sugar production, which factoring in transport costs is often too low to make pay. However, if incentives were provided, e.g. for facilitating low-carbon energy production, it may become more viable. There is an ongoing industry project aiming to open conversations with industry and government to enable this to happen, and to develop cooperation along the supply chain and risk models to ensure stability of long-term production.

GROSS MARGIN

These gross margins are based on a yield of 70t/ha, slightly lower than yields reported for crops in England, and based on the estimation of yields in Scotland from NNFC..

Data source: ABC Costing Book, Nov 2019, and NNFC report, 2019.

	/ha
Yield (t/ha)	70
Price per tonne	£ 25
Output	£ 1,750
Seed	£ 201
Fertiliser	£ 237
Crop protection	£ 245
Transport	£ 369
Sundries	£ 20
Variable costs	£ 1,072
Gross margin	£ 678

Establishment costs:

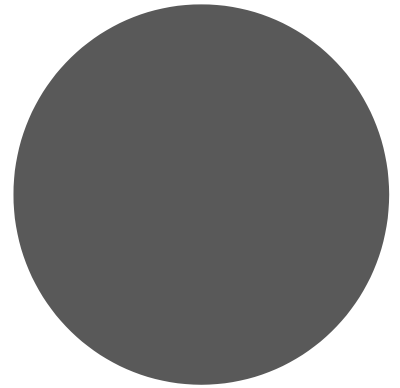
- Estimated establishment costs of £700-800/ha

PROCESSING AND SUPPLY CHAINS

- There are currently no sugar beet plants in Scotland, although a proposed new plant is being investigated on the East Coast. Production in the South of Scotland would be outwith the production radius of an East Coast plant, but if the new plant were to prove successful and if transport between the South of Scotland and the area of crop produced was sufficient, there may be scope to investigate the potential of a second new plant in or near the South of Scotland.
- Once lifted sugar beet must be cleaned before storage, and both storage and transportation minimised to reduce the deterioration of the crop. These processes should be factored in on-farm. At the processors the beet is washed and peeled before going into the refining process; washed-off soil can be sold as topsoil.



- Infrastructure from farm to the processing plant must be considered. For example, mud and traffic on farm tracks and roads in winter must be managed, and the infrastructure to support haulage considered.
- Challenges over the distribution and management of risk along the supply chain are essential to success, such as farmer cooperation, and the development of an attractive and reliable contract model between farmers and processors to enable stability of a long-term supply of sugar beet to a processing plant. Communication between industry stakeholders and local and national government will also be important to develop attractive financing models, and minimise detrimental effects to local communities of haulage and processing.



CROP ESTABLISHMENT AND PRODUCTION

LAND REQUIREMENTS

It is estimated that at least 20,000 ha of sugar beet are required to viably supply a processing plant.

CLIMATE

In terms of soil type and climate, growers with land in LCA classes 1, 2 and 3.1 could grow sugar beet, but production is likely to be cost-effective only on light and medium textured soils.

Frosts can cause damage to the crop if left in the ground over winter for yield benefits, so areas susceptible to severe frosts should consider autumn lifting, or may not be suitable.

SOIL TYPE

Sugar beet will generally grow in soils which are suitable for the production of key arable crops including cereals, oilseeds and potatoes, and other vegetables. However, the beet is very sensitive to poor soil structure and grows best in deep, fertile soils with good structure. The best yields are experienced on fairly light to medium textured soils (i.e. loamy soil) but production is still possible in clays, and the heavier, more poorly drained clay loams, and very light soils providing they are not susceptible to drought.

CROPPING SYSTEMS

Sugar beet is generally grown in rotation with other crops including cereals, oilseeds and potatoes. It would typically be grown one year in four, five or six. Care should be taken with the rotation to minimise pests and diseases, such as a max of 1 in 3 in the rotation with potatoes to reduce the risk of cyst nematode. Compaction of soil is a common issue and should be kept to a minimum, and avoiding trailers in fields is recommended.

MACHINERY AND EQUIPMENT

Power harrowing and direct drilling is recommended, and sometimes rolling after drilling if it is dry or stony, or some irrigation, is recommended to help establish the crop. Some growers have found it challenging to buy small-scale equipment, and find the older machinery more appropriate. Some processors require the beet to be chopped before send to processing and removal of stones, which requires additional– equipment on farm.

TIMING

Drilling into warming soil can help the crop establish quickly, as weeds tend to be the biggest issue. Pre-emergents used after drilling, and later applications of pesticides, fungicides, minerals and nitrogen will help establishment.

The timing of harvest is most crucial, as it can be risky and difficult to lift with wet ground, not uncommon for Scottish growers. If left too late it risks the ground being too wet and having to leave the crop until the spring with frosts impacting on sugar content. However, leaving lifting until later results in a yield increase. Lifting in February can see a 15% yield increase but is susceptible to frosts; leaves falling down over the root can protect this to some extent. Lifting can be done regularly over the winter, labour and machinery provided, to minimise storage cost and get a yield bonus. Booking in contractors well ahead of time is recommended, although in terms of estimating ahead an appropriate harvest date.

Further information

- An Assessment of the Opportunities for Re-establishing Sugar Beet Production and Processing in Scotland; a report produced by the Bioeconomy Consultants (NNFCC)
- Agricultural Budgeting Costing Book
- Bringing sugar beet back to Scotland; a summary of the ongoing RISS project. See www.innovativefarmers.org

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