



# Cereal Supply Chain Map

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SAOS 

# About This Sector

## DEFINITION

The cereal supply chain includes plant breeders, seed producers, co-ops/merchants, farmers and cereal consumers

The most commonly farmed cereals in Scotland are barley, wheat, oilseeds and oats

They are mainly used in the manufacture of animal feed, alcoholic drinks, vegetable oil, wheat flour (biscuits) and oat-based products

## MAIN ACTIVITIES

- Seed production and distribution
- Growing and harvesting
- Grain testing, drying and storage
- Transporting
- Processing:
  - Animal feed production
  - Malting
  - Spirit and beer production
  - Flour milling
  - Other food manufacture

## MAJOR PLAYERS

### **Grain Co-ops and Merchants -**

Aberdeen Grain, Banff and Moray Grain Group, East S. Farmers, GrainCo, Highland Grain; Cefetra, Frontier, MSP, ScotGrain

**Animal Feed -** 2Agriculture, ABN, Davidsons Bros, East Coast Viners, Harbro, Karro Foods

**Maltsters and Distillers -** Bairds, Boortmalt, Crisp Malting, Simpson, Diageo, Chivas, Edrington, Wm Grant and small distillers

**Flour Mills -** ADM Milling, Carr's Flour

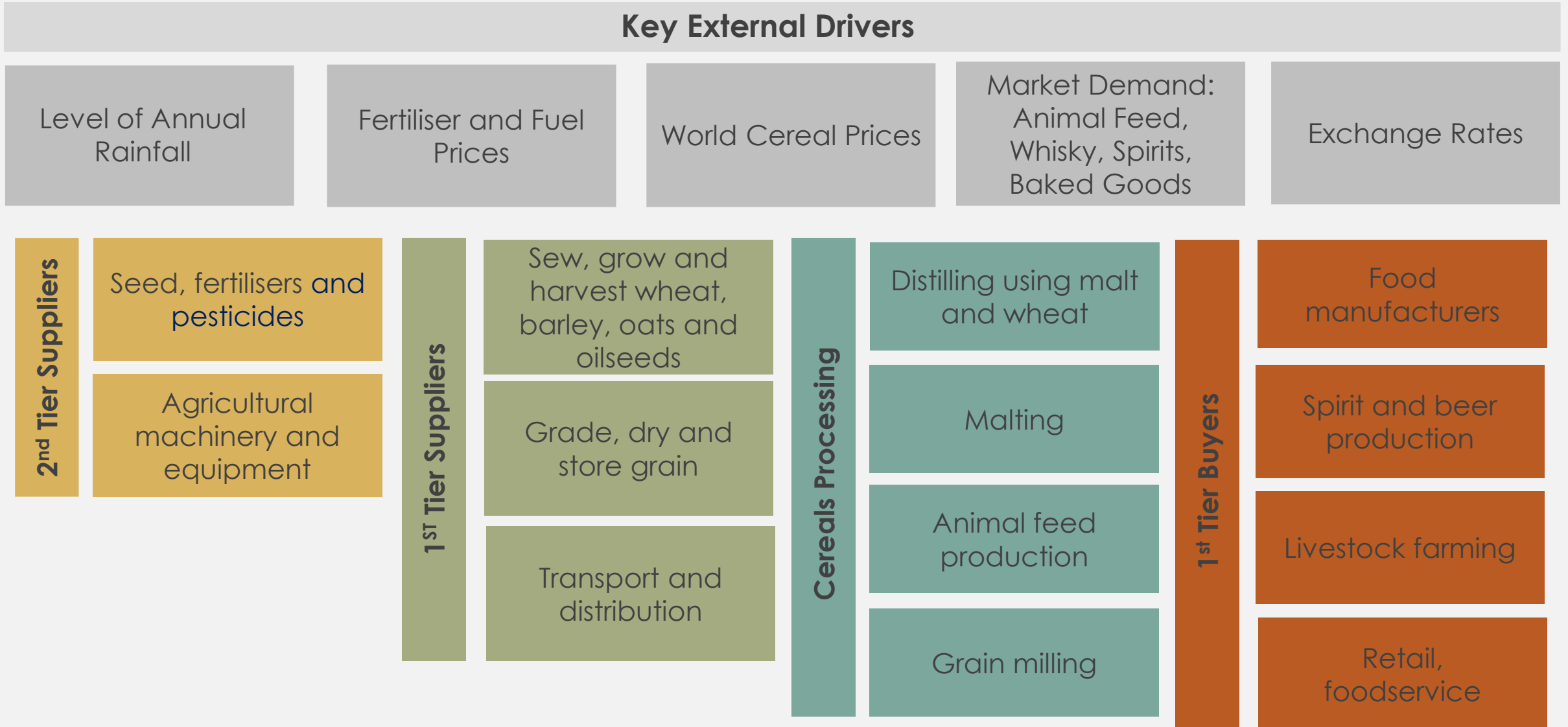
**Grain Spirits -** North British Distillers, Diageo, Wm Grant, Loch Lomond, Pernod Ricard, Whyte and MacKay

**Oats -** Grampian Oats, John Hogarth, Quaker, Oatmeal of Alford, Oat Co

**Bakery and Biscuit Manufacturers -**

Dean's Nairn's, Paterson Arran

# Scottish Cereals Supply Chain



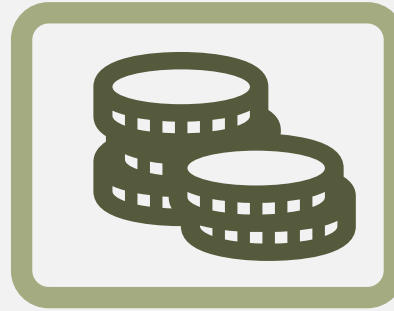
# Key Facts and Figures



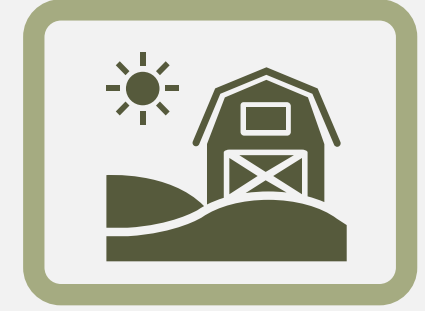
Barley production (**2021**) was **1.78mt**; wheat **890kt**, oats **189kt** and oilseed rape **126kt**



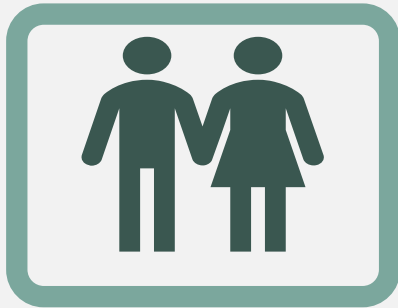
In **2021** there was an **8%** decrease in total cereal production. West Central Scotland only area to increase area and yield



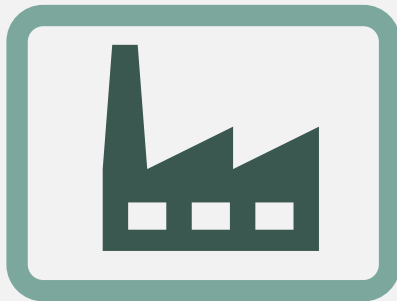
Wheat accounts for largest share of UK industry revenue at **47%**, and is **30%** of total Scottish cereal crop production



In **2019**, **61%** of arable farms were between **10** and **200ha**. Smaller or larger holdings are less common



Heavy reliance on immigrant labour - sector has been greatly affected by the new points-based system



Two major flour mills in Scotland:- ADM Milling and Carr's Flour  
No oilseed rape crushing plants in Scotland



Cereal growing in the UK is **~50%** for the food and drink industry; **37%** for livestock; and **~14%** for biofuel



Emissions from arable farms account for **21%** of total agricultural emissions, mostly from farm vehicles and soil management

# Cereal Production Process



## Grain Store

Grain is stored on-farm or transported to a grain store for grading, drying and storage



## Milling, Malting, and Compounding

Milling for flour, oatmeal, etc.; malting for whisky, beer, spirits; animal feed blends



## On-Farm

Farmers sow, grow and harvest wheat, barley, oats and oilseeds. Majority of farms are family-run



## Grain Co-ops and Merchants

Purchase in bulk - directly from farmers, or through co-ops



## Further Processing

Spirit production, breakfast cereals, bread, biscuits and oatcakes

# Primary Production

## Growing and Harvesting

The main grain crops in Scotland are barley, wheat, oats and oilseed rape. Rapeseed, wheat and oats are sold on the open market, as commodities. Oats can also be grown under contract and malting barley is only grown under contract

### Barley

- Can be ground into flour for food or used as stock feed or retained on farm.
- Barley straw is kept for bedding, compost and other uses
- Spring barley is commonly used to produce malt for the whisky sector and to a lesser extent for beer production
- In 2021, 81% of barley production was spring barley
- Malting barley trades at a premium over feed barley, in 2020 57% was sold to maltsters and 35% to the feed industry

### Wheat

- Used for animal feed, very little for milling and some for bioethanol but more for distilling
- Wheat straw used as livestock bedding, compost, or ploughed back into fields to enrich soil
- Wheat production in Scotland (2021) was estimated at 890kt

### Oats

- In 2021, oats made up 6% of total crop production in Scotland
- ~189kt were harvested in 2021, mostly spring oats
- In 2021 there was a 15% decrease in area use for growing oats

### Oilseed Rape

- Oilseed rape is an important break crop, almost all of it is winter variety
- In 2021 ~126kt oilseed rape was produced

## Wheat

- Wheat flour is the most common output from the milling sector (~65% of UK grain industry revenue). Scotland's production of hard wheat for bread flour is limited
- There are two major flour mills in Scotland, they import most of their hard wheat

## Barley

- Higher quality barley commands a higher price and is used for malting – primarily for whisky, some for beer production
- Lower quality is used in animal feed
- Inconsistent assessments of malting barley quality along the supply chain are a source of frustration

## Oats

- Most of the oats grown in Scotland are under contract to a specified oat miller
- 80% of oats are used for milling
- Oats are kilned and milled to produce oat flakes and flour

## Oilseed Rape

- Most of Scotland's oilseed rape is exported, there is insufficient scale to justify investment in large-scale crushing capacity in Scotland, it is considered a "high risk crop"
- Oilseed rape is crushed to produce rapeseed oil
- There are a number of small-scale cold-pressed rapeseed oil producers

## By-Products

- The processing of cereal grains results in by-products most of which are used in the animal feed sector: bran, germ, protein cake and malt culms

# Primary Processing

**Milling,  
Malting and  
Animal Feed**

# Secondary Processing

A close-up photograph of a wooden surface. In the foreground, there is a mound of fine, white flour. Behind it, several golden wheat stalks are scattered, some lying flat and others standing upright. The background is a blurred wooden surface.

**Food Manufacture,  
Beer and Spirit  
Production**

- Much of the barley grown is from malting varieties and is used by the malting and distilling sector
- Most of the wheat grown in Scotland is soft wheat and is used in distilling and to manufacture biscuits and bakery flours
- Distillers use ~680kt of wheat when operating at full capacity
- Scottish wheat is mostly not suitable for bread flour production, as it contains insufficient protein
- Flour functionality is enhanced with additional ingredients e.g., baking soda, to produce mixes that are used in food manufacturing and foodservice industries (e.g., self raising flour)
- Oatmeal and flakes are used for porridge, muesli and other cereal products



# Markets



**Food and Alcoholic Drink  
Manufacturers,  
UK Wholesalers, Retailers  
and Foodservice  
Companies**

- Cereal demand in the UK comes from ~50% in the food and beverage industry, ~37% livestock feed production and ~14% biofuel production
- Grain milling demand in the UK comes from 68% food manufacturers, 14.5% food service enterprises and wholesalers, 9.8% food service enterprises and 8.3% animal feed processors
- Oilseed rape prices increasing due to shortage of sunflower oil and its use in biofuel
- An estimated 40kt of oats are imported from England and occasionally Europe to meet Scottish demand
- Demand for barley has increased over the last few years as a result of greater use by distillers and brewers
- Demand from the livestock sectors is affected by the price of feed, availability of stocks and harvest volumes
- Growth in convenience and healthy snacks has raised demand for oats and other cereals
- In most years, Scotland does not produce all the wheat it consumes and imports soft wheat from Northern England for distilling and for use in animal feed
- UK cereals exports increased due to the falling value of Sterling

# SWOT Analysis

## STRENGTHS

- Well-connected and efficient supply chains
- Variety of strong grain buyers in the sector
- Arable sector is resilient compared to livestock sector
- Weather is suitable for growing malting barley and distilling wheat
- The wet, cool Scottish climate is ideally suited for growing oats
- Barley is a resilient crop and will grow well in Scotland's highly productive arable areas, as well as on more marginal land
- Livestock farming relies heavily on cereal feeds
- Malting capacity is increasing as investment in the distillery sector grows and demand for malt increases
- Sound research base developing new barley varieties
- Long term decline of cattle numbers seems to have stabilised, while the number of dairy cows has increased slightly, supporting the sector's feed demand

## WEAKNESSES

- Shortages of labour are a challenge for the sector
- Much of Scotland is not suitable for crop production
- Volatility of input costs and cereal prices are difficult for farmers to manage
- Declining numbers of crop protection products due to the need to protect biodiversity
- Inconsistent assessments of barley quality along the supply chain are a source of conflict
- For oat production, a key constraint is the frequently higher margins available from wheat production, due to price and greater yield potential
- When support payments are excluded, over 40% of cereal farms become unprofitable

# SWOT Analysis

## OPPORTUNITIES

- Ongoing developments in precision farming
- Improving crop genetics
- Livestock farmers moving to finish on cereals rather than in forage as its quicker
- Wheat demand for biofuels might rise over the coming years, though no more than 7% of bioethanol produced in any country can be made from crops
- Carbon emissions can be reduced by 15 to 19% by improved pH management and variable rates of fertiliser applications
- Development of the International Barley Hub
- Innovation is key to adding value in cereal grain milling – new product development and operational efficiency
- The industry is expected to benefit from increased automation as production output and efficiency increase

## THREATS

- Rapidly rising costs of fertiliser, which will have an impact on the 2023 crops
- Labour availability is critical at harvest. Lack of labour can slow the intake of grain and skilled machine operators can be hard to outsource
- The industry faces potential competition from other grains, e.g., maize
- Weather conditions becoming more unpredictable with more extreme events
- Changing rates and conditionality of farm support
- Cereal for animal feed is much more susceptible to price changes than cereal for maltsters, where the variation is much smaller
- High cost of grain milling operations (water, electricity, etc.)
- Ageing workforce – 90% are more than 40 years' old

# Sector Trends



- Number of shorter land tenancies is increasing, while the amount of total tenanted land keeps falling
- 80% of farmers grow barley
- Overall cereal production in Scotland is lower in 2021 than 2020. Grain prices are forecast to increase through 2021-2026
- The exchange rate is forecast to depreciate, making imports more expensive and exports more competitive
- The number of farmers and processing businesses are expected to fall slightly over the next 5 years as difficult operational conditions increase
- The area of land used for growing cereals has remained similar to 2020
- The area and yield of Scottish oats has increased in the last 10 years, driven by new varieties and customer demand
- The malting barley sector has been strong in the last couple of years, with COVID having little to no effect, compared to the brewing sector which was disrupted due to the closure of hospitality venues
- The focus on sustainability and carbon along the supply chain will increase

# Sustainability



## ECONOMIC

- Significant price volatility and competition has led to a decrease in the number of farms and processing businesses operating (consolidation)
- Combined farms (arable and livestock) provide more stable year-round employment than arable only, which tend to need staff only around harvest time
- The industry is susceptible to volatile external factors, e.g., global grain prices, global supply and demand and annual rainfall
- Farms will need to become more efficient to decrease the per-unit cost of production – consolidation will continue
- The rise in fertiliser costs has been offset to a degree by the rise in cereal prices, but if the cereal price collapses before fertiliser prices come down, the 2023 harvest will be affected
- New entrants to the sector require a significant amount of investment, including land, grain silos and machinery making it very restrictive
- Financial investment commitments are needed to strengthen research, technical developments and innovation to achieve climate change targets

# Sustainability



## ENVIRONMENT

- The weather can directly affect industry demand - good weather can improve the quality and quantity of grass reducing the demand for animal feed
- Flexibility is important in being able to alter crop rotation in response to changing market demands
- Improved management of hedges, field margins and crop rotation could help biodiversity
- Other biodiversity friendly practices include retention of winter stubbles, use of cover crops, etc.
- Use of intercropping (pea or fava bean)
- Some co-ops have biomass plants to reduce their energy costs
- Sustainability actions are expected to come as a push from the whisky sector

## SOCIAL/PEOPLE

- Limited supply of labour could drive up wages and increase operational costs
- Ageing workforce

# Cereal Supply Chain

**Quality Assurance**  
Scottish Quality Crops, FSS

**Research Institutes**  
SRUC, JHI, SEFARI, International Barley Hub

**Trade Bodies**  
AHDB, Defra, NFUS, CIMA, Assoc. of British & Irish Millers

## Primary Production

Sowing, Growing and Harvesting

Grading, Drying and Storing

## Processing

Milling, Malting and Animal Feed

Food Manufacture, Spirit and Beer Production

## Markets

Retail and Foodservice

Food and Drink Manufacturing

Livestock Farmers

New processing technologies  
New crop cultivars resistant to climate changes

Supply Chain Opportunities

High cost of entry and increasing operational costs

Increasing operational costs  
Shortage of labour

Health consciousness  
Volatility of world wheat price

## Supply Chain Issues



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Evidence for the Farmer-led Arable Climate Change Group  
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