

The Estimated Economic Contribution of Scotland's Seed and Ware Potato Sectors

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An output of **WP1: Economic Assessment** of the Scottish Government funded project:
"Delivering a sustainable potato industry for Scotland through management of Potato cyst nematode (PCN)"



Key Points

- Farmgate production of potatoes in Scotland had a value of c.£245 million (m) from c.11k hectares (ha) of seed potatoes and c.17k ha of ware potatoes (2018–2020). This represented c.6% (from <1% of agricultural land) of Scottish agricultural output (inclusive of support payments) and c.24% of GB farms' potato production.
- At the UK level, the area grown has declined markedly from c.200k ha to c.127k (<1% of utilisable agricultural area, c.2% of cropped land) ha since the 1980s, but was more stable in Scotland resulting in Scotland's share of UK potato production increasing over time to current c.22%.
- A range of different varieties are grown, with some, such as Osprey, Hermes, Saxon and Rooster being more common in Scotland. Maris Piper and Markies are most common at the GB-level. Many varieties incur royalty payments (often to entities outwith Scotland and the UK), necessary to fund long-term investments in future breeding, but some are royalty-free (notably Maris Piper).
- Falling production partially reflects a long-term decline in overall consumer demand, particularly for fresh potatoes. In particular, population growth and rising demand for processed products has been insufficient to counter volume reductions in the demand for fresh potatoes (-71%, -0.9kg/week since the 1970s) as consumers switched to (e.g.) rice and pasta.
- The loss of access to export markets for seed potatoes following Brexit represents another significant loss of demand, particularly for Scotland where seed production is relatively more important due to disease-free growing conditions and associated 'high-health' status.
- Equally, although some (c.0.5 million tonnes) production is exported, a greater volume (> 2 million tonnes) is imported, predominantly of processed products. Conversely, GB is a net exporter of seed potatoes (of which Scotland accounts for c.75% of area grown).
- Nonetheless, potato production remains an important component of agricultural output. Moreover, up and downstream supply-chain linkages (e.g. input suppliers, packers and processors) plus embeddedness in rural economies mean that the contribution of potato production is greater than simply its farmgate value. For example, chilled, frozen, dried and cooked processed products represent significant further economic activity. Production is often under contract to processors, with prescribed choices of varieties to suit particular market requirements.
- Yields and quality are sensitive to growing and harvesting conditions, with aggregate physical production fluctuating between c.4.2m and 6.3m tonnes and the proportion going for stockfeed or waste also varying. As a result, prices can fluctuate markedly year-on-year, but have declined consistently (by c.50%) in real-terms since the 1970s. Prices also vary within year, leading to significant investments in cold storage facilities to allow flexibility of when to sell.

- Seed potato production is closely regulated to ensure disease-free status and desirable production traits. In Scotland, SASA (Science & Advice for Scottish Agriculture) has regulatory responsibility, including production of original 'nuclear stock' and inspection of commercial production through the Seed Potato Classification Scheme (SPCS) to certify different classes.
- Commercial seed production is highly concentrated with relatively few firms accounting for a high share of output, albeit that land used for growing is often rented on a seasonal basis and ownership structures are often complex and difficult to discern.
- Land used for production must be certified as free from potato cyst nematodes (PCN), but PCN is an increasing problem in Scotland due to uncertainty over the status of some rented land and lack of uptake of new resistant varieties. This has led to a gradual geographical expansion of where seed (and ware) production occurs, necessitating longer movements of specialist equipment and produce, and higher land rents.
- Crop protection represents c.25% of variable costs in potato production, with effectively all potatoes receiving fungicide and herbicide treatments and the majority receiving insecticide and seed treatments. Fertiliser accounts for a slightly smaller share, seed costs a slightly higher share.
- The nature of the potato industry means that a highly specialised supply chain has evolved to supply inputs to and process and distribute outputs from potato growers in Scotland. For example, plant breeding, specialised machinery, fertilisers, agronomy, plant protection products, specialised storage and processing facilities, specialised haulage, important research and development and regulatory oversight services.
- Consequently, the economic activity, value added and employment underpinned by growing potatoes reaches far beyond the farmgate. Estimation of the magnitude of these wider contributions can be attempted through the use Input-Output (IO) tables and associated multiplier values. This approach invokes various simplifying assumptions and caveats but is sufficient to provide illustrative approximations.
- Drawing on available published and unpublished secondary data (including some kindly provided by AHDB) and guided by interactions with growers, IO and multiplier analysis was used to estimate the economic contributions of potato production in Scotland.
- Scottish on-farm potato growing generated £242m in revenue, with £44m retained profit, and direct labour costs of £34m (with £4m SASA labour costs). It was estimated that 1,041 FTE jobs were directly created by the potato growing sector (558 attributable to the seed sector) – with 961 FTE jobs on farm, with a further 80 FTEs through publicly funded SASA staff. The Gross Value Added (GVA) generated directly from Scottish potato growers amounted to £78.3m (average 2017-2021). Of that £26.2m was attributable to seed potato growing and £52.1m to ware potato growing.
- Potato growers (plus SASA and public research and development running costs) spent £168.6m on upstream input goods and services. This led to further indirect and

induced multiplier effects along input supply chains of a further £101m. Thus, potato growers upstream total economic impacts amounted to £265m (£105m from the seed sector expenditure). The upstream spend stimulated 1,839 FTE jobs (731 FTEs arising from seed sector expenditure) after indirect and induced impacts were considered. The GVA attributed to the upstream multiplier effects from potato growers expenditure amounted to £126m (£50m from the seed sector).

- Overall, the Scottish potato sector had an on-farm and upstream economic contribution of £507m output, accounted for 2,880 FTE jobs and contributed £208m to Scottish GVA.
- In addition, downstream parts of the supply-chain process, distribute and sell on the £242m of farmgate output. This incurs additional costs but also adds additional value, culminating in eventual sales to consumers, and generates employment. However, attributing specific elements of these downstream effects to on-farm production in Scotland is difficult due to the complexity of supply-chains and the opaqueness of business reporting.
- Nonetheless, it is estimated that across the UK each £1 of farmgate sales is associated with £6.71 of downstream revenue. This implies that Scottish on-farm production of £242m contributes towards £1.6bn of downstream revenues, although not all of this will necessarily be within Scotland.

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I would like to thank each of the farmers who provided insights into the seed and ware potato sectors in Scotland, including access to commercially sensitive information. I would also like to thank AHDB for permitting access to their FarmBench data for the potato sector that forms the basis of the economic model. I would also like to acknowledge the support of the project partners that provided support throughout the drafting of the report. I would also like to acknowledge Dr Andrew Moxey, Eric Anderson (Scottish Agronomy), James Price (JHI), John Jones (JHI) and Jon Pickup (SASAO for their critical comments during the final editing of the report.

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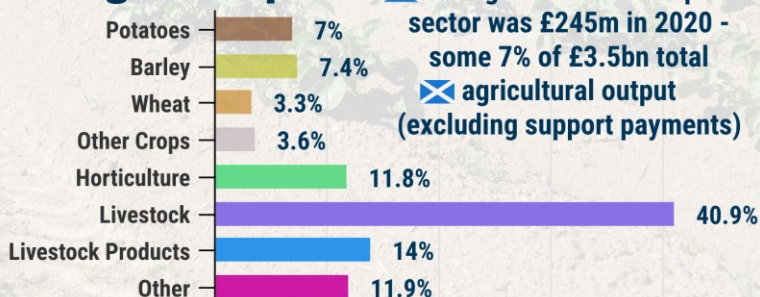


Economic Contribution of Scotland's Potato Sector

Potatoes On-Farm

- 0.5% farmland & 4.6% of cropland
- 10.4k Ha seed potato in 2020
- 17.9k Ha ware potatoes grown
- 372 seed potato varieties
- assessed by SASA

Farmgate Output*



Farmgate value of the potato sector was £245m in 2020 - some 7% of £3.5bn total agricultural output (excluding support payments)

Supply Chain

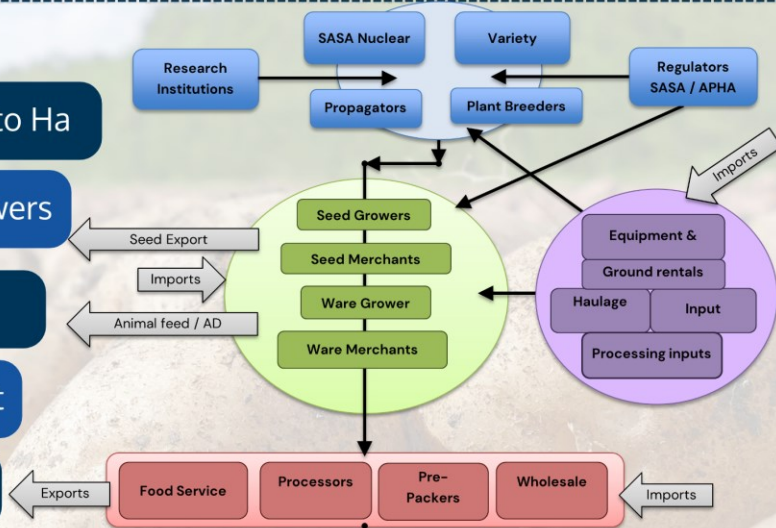
grows 75% certified GB seed potato Ha

£82m direct GVA from potato growers

Reputation for 'high-health' seed

250k tonnes seed - 40% for export

51% Ha grown for pre-pack sector



Downstream Value Chain

£649m farmgate ware potato sales for human consumption in 2021 led to:

- £1bn fresh potato sales to consumers & £54m exported
- £3.1bn processed potato sales to consumers & £155m exported



£6.71 downstream revenue generated from every £1 farmgate sales for consumption - underpinned by seed potato production

Seed Potatoes

- 478 FTE farm workforce
- £65m farmgate output
- £62m spend upstream
- £26m GVA @ £63k per worker

Ware Potatoes

- 483 FTE farm workforce
- £154m farmgate output
- £119m spend upstream
- £52m GVA @ £103k per worker

Economic Impact

- £243m direct output
- 2,880 total FTE jobs
- £265m upstream impacts
- £208m GVA impact

Consumption

2006-21 real expenditure:

- 35% on fresh potatoes
- 16% on chips
- 18% in crisp & potato snacks

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1 Introduction

1. The Scottish potato sector produces high quality seed potatoes for a number of home and international markets, as well as a range of ware potatoes for human consumption. In Scotland c.11k Ha of seed potatoes and c.17k Ha of ware potatoes are grown annually. We estimate that Scotland accounts for c.75% of the total United Kingdom (UK) seed potato area and 17% of the ware area and that Scotland accounts for c.24% of Great Britain's (GB) potato sector farmgate output.
2. The Scottish Government's (2021)¹ Total Income From Farming (TIFF) estimates suggest that the output of Scotland's potato sector was c.£245m in 2020, or 6.2% of Scottish Agriculture's gross agricultural output including agricultural support payments (making it bigger than the poultry sector (5.4%, pig sector (3.1%) and marginally smaller than the sheep sector (7.2%). However, this figure is an under-estimate of the economic contribution the sector makes as it does not account for the economic impacts and multipliers this activity has in (i) upstream supply sectors; (ii) down-stream haulage, processing, catering and retail sectors; and (iii) increased wage spend from the workforce. Further, the economic contribution of Scottish seed potatoes extends beyond Scotland's national boundary, providing the basis of a significant proportion of the English and Welsh ware potato sectors (and related processing sectors), and internationally in countries such as Egypt and Morocco where there are long-standing trade relationships.
3. SAOS (2022a)² define the seed potato sector as including "the production and marketing of seed potatoes by growers, merchants and marketing co-ops for onward planting as well as the development of new varieties by plant breeders." Thus, there is naturally an acceptance that the seed sector extends beyond the farm gate into marketing and sales of seed, as well as backwards into plant breeding. The main activities of the seed sector include research and development (plant breeding), growing, seed potato regulation, harvesting, grading and packing for markets at home and abroad, including for domestic (garden) growers. SAOS (2022)³, further define the Scottish ware potato sector as including "seed potato suppliers, ware growers, processors, merchants and marketing co-ops" thereby including elements of the seed potato supply chain as well as downstream processors.
4. Scottish seed potatoes have traditionally been in high demand both domestically and internationally due to relative disease-free status of the crop. However, there

¹ [Total Income from Farming Estimates: 2018-2020 – gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/total-income-from-farming-estimates-2018-2020/pages/1-introduction.aspx)

² SAOS (2022) Scottish Seed Potato Supply Chain

³ SAOS (2022) Scottish Ware Potato Supply Chain

have been growing concerns over the spreading of Potato Cyst Nematode (PCN) infections that jeopardise the economic contribution of the potato seed sector.

5. A working group of potato industry representatives, government officials and academics was established to identify a strategy and key recommendations for dealing with PCN in Scotland. Following recommendations from the **Scottish PCN Working Group** (2020)⁴ to the Scottish Government, funding was awarded to a 5-year project of scientific research and knowledge exchange with an aim to deliver a sustainable potato and bulb industry for Scotland through the management of PCN. The project is led by the Plant Health Centre, and involves other organisations including the James Hutton Institute, SRUC, SoilEssentials, Scottish Agronomy and SASA who are all working together to deliver nine core work packages:
6. This report is part of Work Package 1: Economic Contribution of the Scottish Government funded research project: *Delivering a sustainable potato industry for Scotland through management of Potato cyst nematode (PCN)*. As part of this workstream this report aims to provide new insights into the economic contribution that the Scottish potato sector makes beyond the often cited farmgate value of potato production. This report provides a statistical overview of this concentrated and highly regulated sector, including data on consumption, exports, imports, production, varieties, seed and ware sector – alongside estimates of economic contribution.
7. The report provides evidence on the Scottish, Great Britain and UK potato sectors, depending on the data availability.
 - The main report starts by examining long term [potato consumption trends in the UK](#) (pg. 3) as the main driver of demand for Scottish potatoes.
 - An overview of [UK and GB potato production](#) (pg. 6) then considers markets, varieties grown, prices, imports and exports.
 - [Scotland's](#) potato sector (pg. 19) is then discussed, including details about seed potato development and growers (including varieties and royalties), the potato growing regions of Scotland (and the demand for clean ground), markets for Scottish seed and ware potatoes as well as insights on crop protection products used.
 - The [methods and data used to estimate the economic contribution of the potato sector](#) (pg. 45) then describes how economic multipliers derived from input-output tables are used to estimate the upstream economic contribution derived from expenditure made by potato growers (with data provided by AHDB's Farmbench).

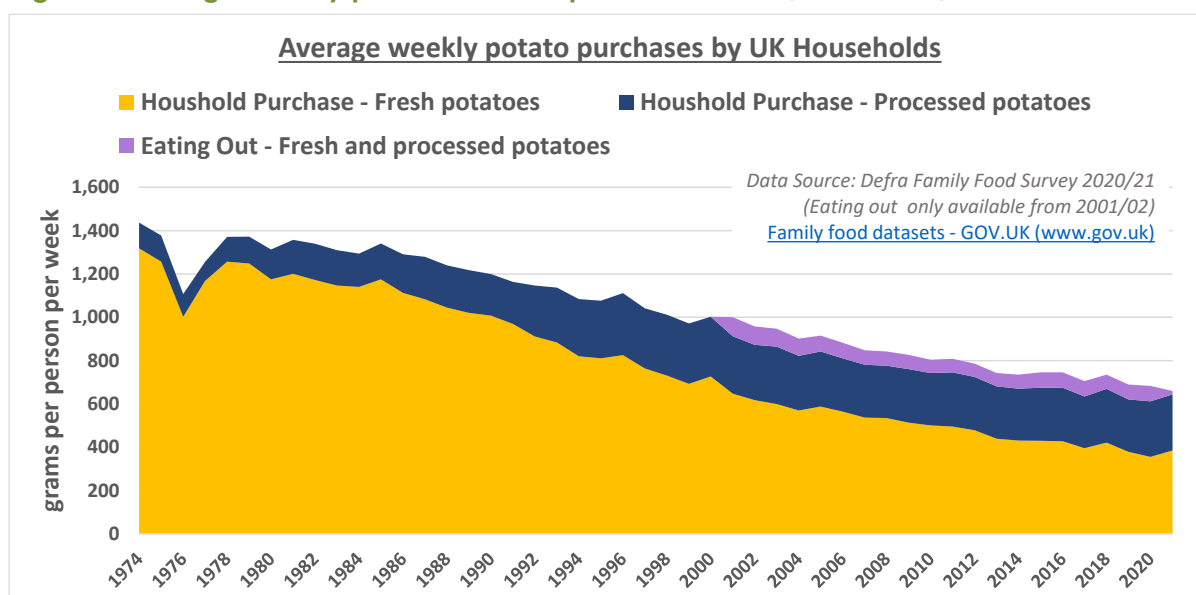
⁴ https://www.planthealthcentre.scot/sites/www.planthealthcentre.scot/files/2021-04/pcn_working_group_-_final_report.pdf

- The final chapter presents the [results and estimates of backward economic contributions within the supply chain of the potato sector](#) (pg. 62). It then looks at downstream data and final consumption data in UK and Scotland and the value chain from farm to fork.

2 UK potato consumption

8. There has been a very long-term decline in the average consumption of potatoes in the UK (see Figure 1). Defra's 2020–21 Family Food Survey⁵ reveals that household consumption of fresh and processed potatoes fell from 1.44 kilograms (kg) per person per week in 1974 to 0.64kg in 2020–21 (55% decline). Fresh potato consumption alone fell from 1.32kg per person per week in 1974 to 0.39kg in 2020–21 (71% decline). In comparison, UK household consumption of processed potatoes increased from 120 grams (g) per person per week to 259g per person per week over the same period (118% increase).

Figure 1 Average weekly potato consumption in the UK (1974–2021)



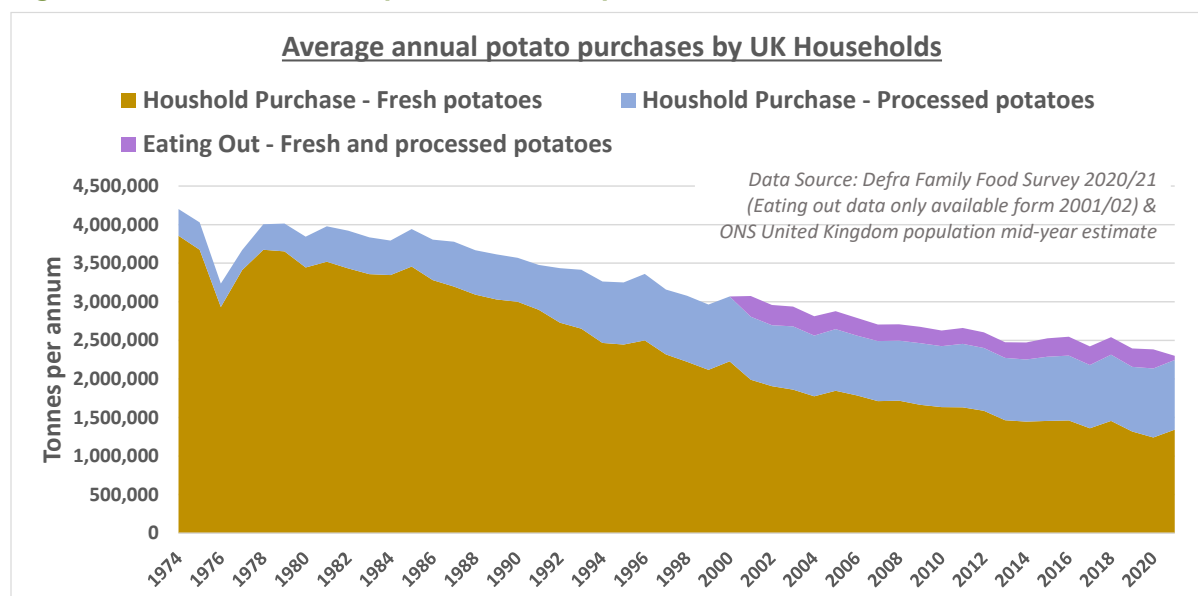
9. Despite increases in processed potato consumption, Figure 1 demonstrates it has not been enough to stem the long term decline in overall volume of household potato consumption (even when including consumption when eating out of 71 g per person per week in 2019–20 – falling to only 16 g in 2020–21 as a result of the COVID-19 pandemic and forced closure of businesses and movement of people). This long-term trend represents changing diets and increased home consumption of snacks such as crisps, as well as alternative staples; notably rice, pasta and ready

⁵ <https://www.gov.uk/government/statistical-data-sets/family-food-datasets>

meals⁶ that also reflect increased ethnic diversity and food cultures in the UK's population over the last 50 years.

10. Using mid-year population estimates from the Office for National Statistics (ONS) Figure 2 shows how the decline in estimated overall UK potato consumption is not as significant as per capita reductions. This reflects that the UK population grew by 19% from 56m people in 1974 to 67m people in 2021. Using weekly consumption figures with population statistics it is estimated that annual fresh potato consumption in the UK fell from 3.85m tonnes in 1974 to 1.34m tonnes in 2021 (a 65% decline). In that same period, it is estimated that there was a 160% increase in the total annual consumption of processed potatoes by households, from 347k tonnes to 903k tonnes. From 2001 to 2020 the overall UK consumption of potatoes when eating out was estimated fell by 8% from c.270k tonnes to c.248k tonnes – before c.190k tonne decline in 2020-21 due to COVID-19 restrictions.

Figure 2 Estimated annual potato consumption in the UK (1974–2021)



11. Consumption data can provide insight into future economic opportunity in the sector, particularly where there is increased consumption in added value processed products. Table 1 provides estimated annual tonnage of fresh and processed potatoes consumed by UK households or whilst people are eating out. The decline in consumption is not uniform across all classifications of potatoes. In the fresh sector, whilst household consumption fell by 33% between 2001 and 2021 there was a 78% decline in estimated consumption of fresh new potatoes (c.693k tonne

⁶ Rice consumption increased from 17g per person per week in 1974 to 101g per person per week in 2020-21. Pasta consumption increased from 31g per person per week to 104g per person per week over the same period with ready meals increasing from 27g to 183g per person per week.

decline) and a 52% decline in fresh baking potatoes (c.206k tonne decline) consumption of other fresh potatoes increased by 36% (c.253k tonne increase).

Table 1 Estimated UK household and eating out consumption of fresh and processed potatoes (tonnes) selected years 1974 – 2021

| | 2001 | 2011 | 2020 | 2021* | 2001-21 change |
|---|------------------|------------------|------------------|------------------|----------------|
| Household Purchase - Fresh & processed potatoes | 2,804,609 | 2,454,635 | 2,134,497 | 2,241,091 | -20% |
| Household Purchase - Fresh potatoes | 1,988,471 | 1,632,206 | 1,239,915 | 1,341,867 | -33% |
| - Fresh new potatoes | 884,804 | 243,039 | 180,517 | 191,695 | -78% |
| - Fresh baking potatoes | 398,127 | 198,817 | 205,837 | 191,695 | -52% |
| - Other fresh potatoes | 705,539 | 1,190,350 | 853,561 | 958,476 | 36% |
| Household Purchase - Processed potatoes | 816,138 | 822,428 | 894,583 | 902,710 | 11% |
| - Chips & takeaway chips | 466,157 | 476,316 | 487,240 | 474,010 | 2% |
| - Chips - frozen or not frozen | 321,564 | 358,078 | 365,932 | 376,420 | 17% |
| - Takeaway chips | 144,593 | 118,239 | 121,308 | 94,105 | -35% |
| - Instant potato | 6,563 | 4,351 | 1,845 | 3,485 | -47% |
| - Canned potatoes | 23,976 | 11,571 | 10,847 | 10,456 | -56% |
| - Crisps & potato snacks | 180,399 | 183,821 | 212,421 | 230,034 | 28% |
| - Other potato products, frozen or not frozen | 139,044 | 146,369 | 182,230 | 188,210 | 35% |
| Eating Out - Fresh & processed potatoes | 270,501 | 204,031 | 247,663 | 55,766 | -79% |
| - Chips & french fries - from fast food outlet (e.g. McDonalds) | 39,960 | 26,327 | 38,370 | 13,941 | -65% |
| - Chips - served with meal (e.g. from restaurant or chip shop) | 153,694 | 118,470 | 132,552 | 31,368 | -80% |
| - Potatoes - boiled or unspecified 'potato' | 21,517 | 16,454 | 17,441 | 3,485 | -84% |
| - Potatoes - mashed | 6,148 | 6,582 | 10,465 | 0 | -100% |
| - Potatoes - roast | 18,443 | 16,454 | 20,929 | 3,485 | -81% |
| - Sautéed potatoes, potato croquettes, hash browns etc. | 6,148 | 3,291 | 10,465 | 3,485 | -43% |
| - Baked or jacket potatoes - without filling | 21,517 | 13,163 | 10,465 | 0 | -100% |
| - Other potato dishes (e.g. wedges, potato salad including unspecified 'potato dish') | 6,148 | 3,291 | 3,488 | 0 | -100% |
| UK Population | 59.1m | 63.3m | 67.1m | 67.0m | 13% |

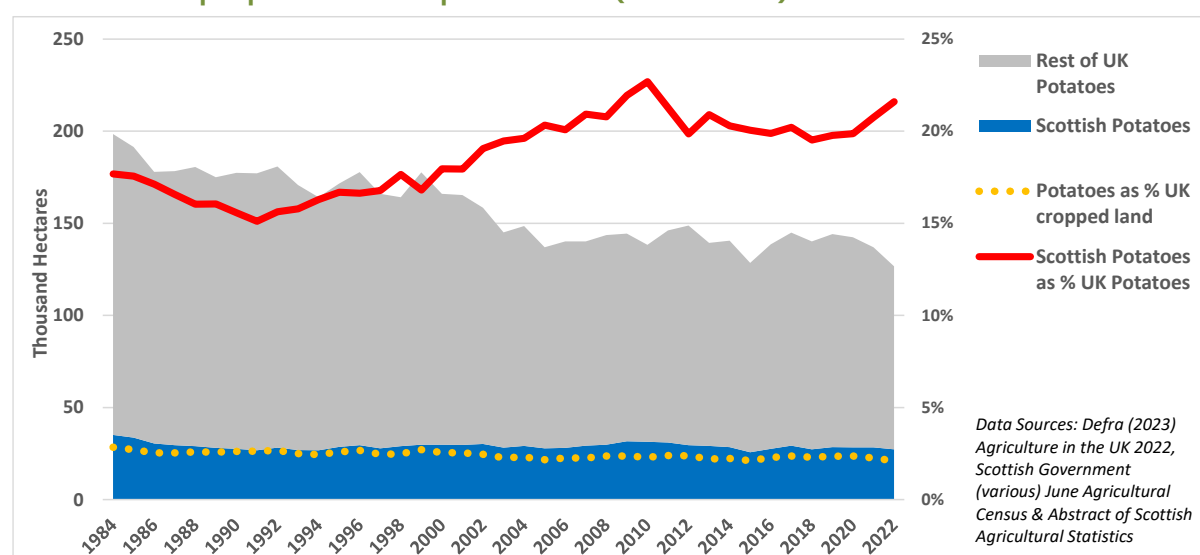
*note these data are influenced by the COVID-19 pandemic and enforced movement restrictions
Data derived from Defra (2023) and ONS (2023)

12. For processed potato consumption in the UK the consumption of takeaway chips remained relatively stable between 2001 and 2022, but there was growth in home cooked chips by 17% (c.55k tonnes), a 28% increase in consumption of crisps and potato snacks (c.50k tonnes) and 35% (c.49k tonnes) increase in other processed potato product consumption.
13. Prior to the COVID-19 pandemic impacts on eating out patterns there was general decline in potato consumption (most notably served chips with meals (c.21k tonne decline) and baked potatoes (c.11k tonne decline) with modest increases in consumption of mashed, roast and sautéed potatoes whilst eating out.

3 UK/GB potato production

14. Defra (2023)⁷ data suggests that potatoes accounted for c.0.8% of utilisable agricultural area and 2.1% of used cropland (excluding fallow, etc.) in 2022. Figure 3 shows that the area of potatoes grown in the UK has witnessed long term decline since the 1980s, although there was relative stability from 2004 to 2020, before further declines. Defra (2023) data reveals that the estimated area of potatoes grown in the UK was c.198k hectares in 1984, falling to c.137k Ha in 2005 before stabilising (with some weather-related annual fluctuations) for 15 years, before falling from c.142k hectares in 2020 to c.127k hectares in 2022. Figure 3 also shows that the proportion of the total UK potato area that is grown in Scotland increased from c.15% in 1991 to 22% in 2022.

Figure 3 Scottish and Rest of UK area of potatoes grown, proportion of UK cropland and Scottish proportion of UK potato area (1984–2022)



3.1 GB – Potato markets

15. Defra⁸ estimate that between 2011 and 2022 between c.4.2m and 6.3m tonnes of potatoes were harvested annually in the UK. Whilst related to the area planted, the harvested yield of potatoes is also very dependent on growing conditions (warmth and moisture) but also on harvest conditions. The effects of weather (see Annex 1 – Weather maps) are noticeable in Figure 4 which shows very low harvest volume in 2012 (very wet summer and wet harvest period⁹), 2018 (“nightmare growing

⁷ <https://www.gov.uk/government/statistics/agriculture-in-the-united-kingdom-2021>

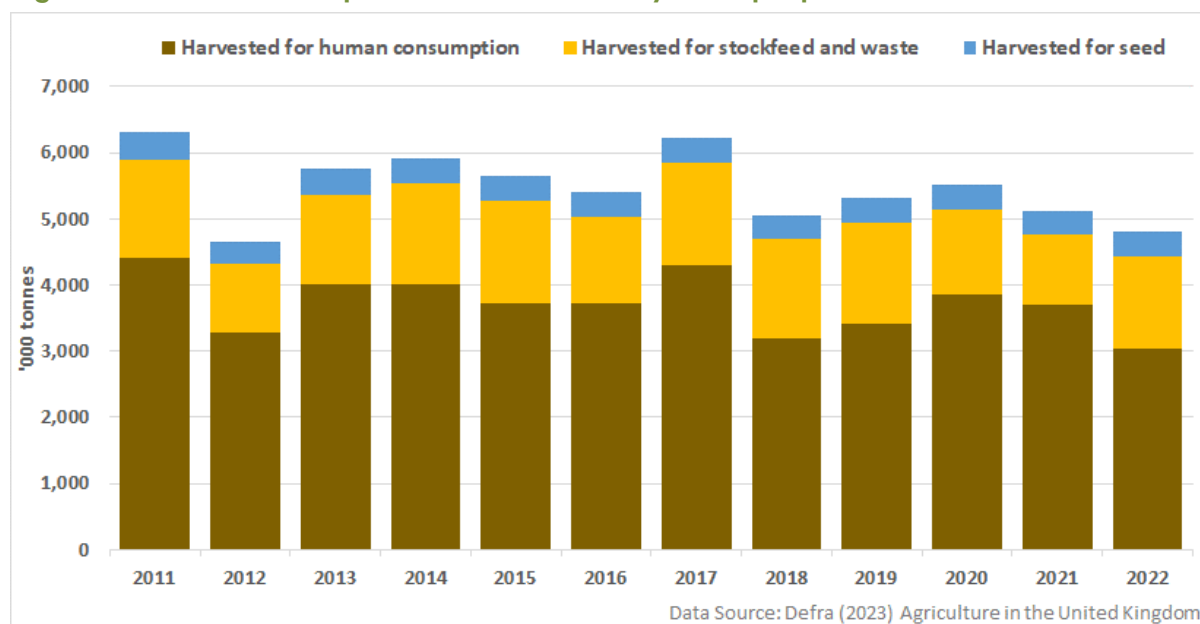
⁸ <https://www.gov.uk/government/collections/agriculture-in-the-united-kingdom>

⁹ <https://www.potatopro.com/news/2012/2012-watershed-year-uk-potato-industry?amp>

conditions"¹⁰ with late planting due to the 'Beast from the East' and hot dry summer¹¹), and 2022 (reduced plantings and very dry summer).

16. Between 2011 and 2022 Defra data suggests that c.6.0%–7.5% of UK crop volume harvested was for seed – an average of c.370k tonnes per year over the period. The relative proportion of crop harvested destined for human consumption (as opposed to stockfeed / waste) varied between c.63% – 71% of harvested volume. Figure 4 shows that the volume harvested for human consumption ranged from c.4.4m tonnes in 2011 to c.3m tonnes in 2022 – with c.347k–c.424k tonnes harvested destined for stockfeed or waste (including anaerobic digestion) over the period.

Figure 4 Volumes of UK potatoes harvested by main purpose, 2011–22

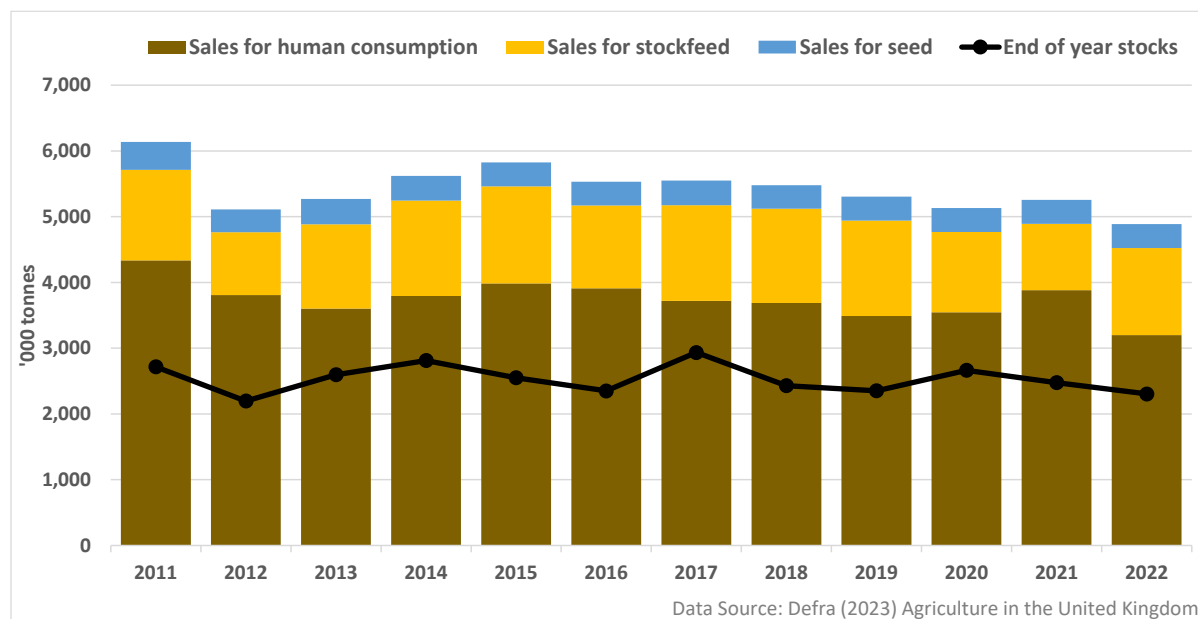


17. The potato sector has developed very effective cold storage systems that mean that large volumes of harvested potatoes remain in storage for periods throughout the year, being released to market between the end of one crop-year harvest and the start of the next-years main harvest. Defra estimate that the UK volume of potato stocks at the end of a calendar year fluctuated between c.2m – 3m tonnes between 2011 and 2022 (see Figure 5), depending on the growing and harvest conditions. Defra data shows that marketed volume was c.6.1m tonnes in 2011, dropping to c.5.1m tonnes in 2012 (a very wet harvest year).

¹⁰ <https://www.fruitnet.com/fresh-produce-journal/potato-shortage-forcing-uk-grocers-to-evolve/176493.article>

¹¹ <https://www.bakeryandsnacks.com/Article/2019/02/28/Exceptional-weather-in-2018-impacts-2019-potato-crisp-prices-in-UK-EU>

Figure 5 Volumes of UK potatoes marketed by main purpose, 2011–22



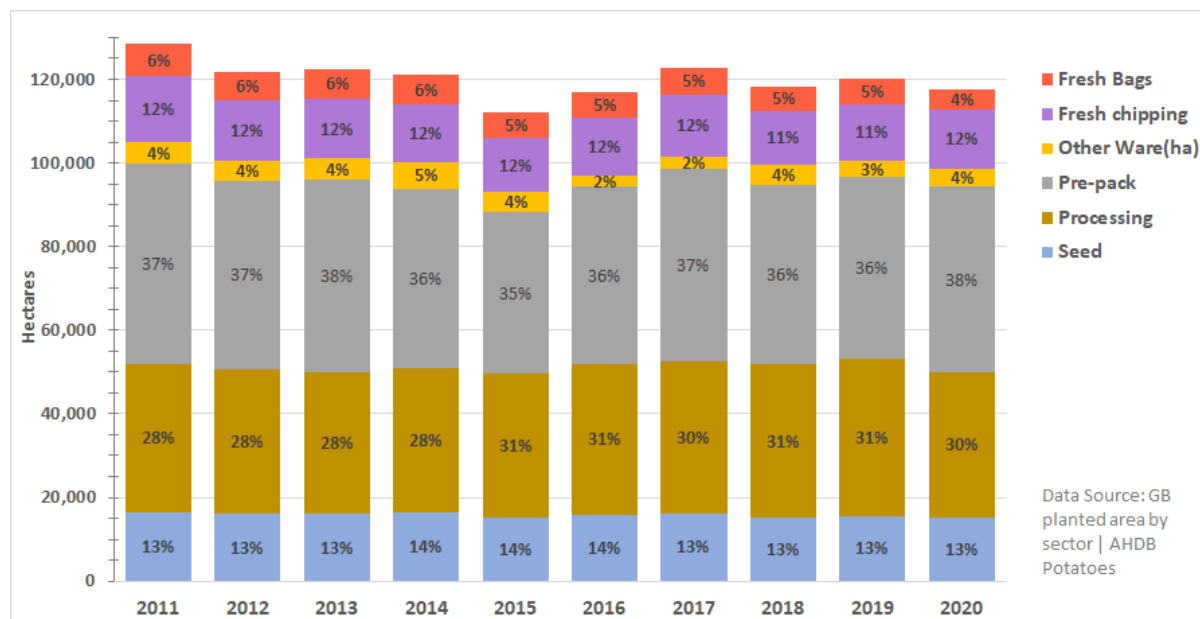
18. AHDB Potatoes¹² used to collect and disseminate potato sector market information¹³, for Great Britain¹⁴ but since the decision to end the statutory levy for horticulture (including potatoes) there are growing data gaps on important sectoral data such as markets, varieties, prices and yields.
19. Figure 6 shows the area of potatoes grown (and % of area) destined for different markets within the downstream GB potato sector. Between 2011 and 2020 AHDB data suggests that 13% of the area grown in GB was for seed production, supplying ware growers across GB, but also supplying international potato growers through valuable seed potato exports. In 2020 this equated to c.15k hectares out of a total GB planted area of c.117k hectares that were grown for seed potatoes.
20. AHDB estimated that, depending on the growing season, c.35–38% of the GB area (c.44k hectares in 2020) was grown for the ‘pre-pack’ sector. A further c.28–31% of the GB area (c.35k hectares in 2020) were grown for ‘processing’, whilst c.12% (c.14k hectares in 2020) was grown for ‘fresh chipping’. Around 5% of the grown area (c.5k hectares in 2020) were grown for bagging with c.4% (c.4k hectares in 2020) grown for ‘other ware’ markets.

¹² <https://horticulture.ahdb.org.uk/potatoes>

¹³ Now archived: <https://archive.ahdb.org.uk/knowledge-library/potatoes-market-information>

¹⁴ Note the difference between Defra UK-wide statistics and AHDB’s GB area (i.e. AHDB area excludes Northern Ireland)

Figure 6 GB area (and proportions) of potatoes grown by sector



3.2 GB varieties grown

21. Details of the characteristics, resistance to bruising and splitting, disease resistance, breeders and breeder rights of different varieties can be found on the Potato Variety Database¹⁵. Retailers, processors and packers likely remain significantly influential in the varieties of potato grown in GB – although growers may be forced to adapt varietal selection due to changing local growing conditions – including prevalence of diseases. AHDB data provided useful insights into the predominant varieties of potato grown across GB (from levy returns) that affect the domestic demand for seed potato varieties. This data also demonstrates the dynamic nature of the sector as some varieties become less popular and newer varieties gain popularity year-on-year.
22. Table 2 reports the GB area grown (estimated by AHDB) for the 30 most common varieties in GB for 2020 (including rank) as well as the area grown (and rank) for those varieties from 2015–2020. It is immediately apparent that Maris Piper remained the most common variety of potato crop grown between 2015 and 2020, accounting for 11.8% of total GB potato hectares in 2020 (with 38% of Maris Piper grown in Scotland in 2020) despite a c.2.8k hectare (17%) decline in the area grown between 2015 and 2020. Markies remained the second most commonly grown potato across the period (albeit with an 8% reduction in area grown between 2015 and 2020).

¹⁵ [Variety Database - Home \(agricrops.org\)](https://www.agricrops.org/)

23. Varieties like Melody (rank 5th to 3rd), Taurus (rank 13th to 4th), Sagitta (ranked 19th to 5th), Innovator (ranked 12th to 6th), Royal (ranked 14th to 8th), Cultura (ranked 28th to 12th), Brooke (ranked 39th to 16th), and Lanorma (ranked 45th to 15th) each saw increased area planted between 2015 and 2020 of between c.1.1k and c.2.2k hectares.
24. In contrast, varieties like Maris Peer (ranked 3rd to 7th), Lady Rosetta (ranked 4th to 9th), Estima (ranked 6th to 21st), Hermes (ranked 7th to 25th) saw decreased areas planted of between c.1.1k and c.1.9k hectares between 2015 and 2020.
25. As a result of Scotland focusing principally on seed and pre-pack markets there are some processing varieties where there is very limited area grown in Scotland (e.g. Melody, Taurus). In contrast, in 2020 Scotland accounted for all of GB area planted with Osprey (100%), and the majority of Hermes (87%), Saxon (85%), Rooster (79%), Desiree (51%) as listed in Table 2 – as well as 90% of Cara and 66% of Vivaldi crops.

Table 2 Annual GB area grown, and rank of top 30 varieties (2020) – including the proportion of variety grown in Scotland

| Variety | 2015 | | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | | | 2015 to 2020 Change | |
|----------------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|-----------|------------|---------------------|------|
| | Ha | Rank | Ha | Rank | Ha | Rank | Ha | Rank | Ha | Rank | Ha | Rank | % GB area | % Scottish | Ha | % |
| Maris Piper | 16,680 | 1 | 16,860 | 1 | 16,510 | 1 | 15,120 | 1 | 15,990 | 1 | 13,920 | 1 | 11.8% | 38% | -2,760 | -17% |
| Markies | 6,410 | 2 | 6,110 | 2 | 6,080 | 2 | 5,700 | 2 | 6,260 | 2 | 5,870 | 2 | 5.0% | ~ | -540 | -8% |
| Melody | 3,480 | 5 | 3,790 | 5 | 4,340 | 4 | 3,720 | 5 | 3,730 | 5 | 4,730 | 3 | 4.0% | ~ | +1,250 | 36% |
| Taurus | 1,830 | 13 | 2,680 | 7 | 2,800 | 8 | 3,250 | 7 | 3,820 | 3 | 3,860 | 4 | 3.3% | 1% | +2,030 | 111% |
| Sagitta | 1,540 | 19 | 2,110 | 16 | 2,490 | 11 | 2,560 | 11 | 3,210 | 9 | 3,740 | 5 | 3.2% | 1% | +2,200 | 143% |
| Innovator | 1,910 | 12 | 2,270 | 11 | 2,490 | 11 | 2,730 | 9 | 3,380 | 7 | 3,580 | 6 | 3.0% | 11% | +1,670 | 87% |
| Maris Peer | 4,820 | 3 | 4,740 | 3 | 5,040 | 3 | 5,180 | 3 | 3,780 | 4 | 3,540 | 7 | 3.0% | ~ | -1,280 | -27% |
| Royal | 1,730 | 14 | 2,270 | 11 | 2,410 | 13 | 2,890 | 8 | 3,010 | 10 | 3,430 | 8 | 2.9% | 10% | 1,700 | 98% |
| Lady Rosetta | 4,470 | 4 | 3,970 | 4 | 3,720 | 5 | 3,860 | 4 | 3,270 | 8 | 3,310 | 9 | 2.8% | ~ | -1,160 | -26% |
| Nectar | 1,600 | 17 | 2,290 | 10 | 3,150 | 6 | 3,670 | 6 | 3,460 | 6 | 2,480 | 10 | 2.1% | 3% | +880 | 55% |
| Agria | 1,650 | 16 | 1,850 | 18 | 2,220 | 14 | 2,060 | 15 | 1,910 | 16 | 2,360 | 11 | 2.0% | 0% | +710 | 43% |
| Cultra | 1,150 | 28 | 1,310 | 26 | 1,740 | 19 | 1,880 | 17 | 2,230 | 13 | 2,340 | 12 | 2.0% | ~ | +1,190 | 103% |
| Marfona | 2,330 | 9 | 2,500 | 9 | 2,550 | 10 | 2,340 | 13 | 2,140 | 14 | 2,310 | 13 | 2.0% | 6% | -20 | -1% |
| Rooster | 2,140 | 10 | 2,010 | 17 | 1,900 | 18 | 1,970 | 16 | 2,510 | 11 | 2,150 | 14 | 1.8% | 79% | +10 | 0% |
| Lanorma | 210 | 45 | 390 | 44 | 820 | 40 | 1,060 | 31 | 1,460 | 25 | 2,080 | 15 | 1.8% | ~ | +1,870 | 890% |
| Brooke | 620 | 39 | 1,480 | 21 | 1,630 | 22 | 1,510 | 21 | 1,810 | 17 | 1,990 | 16 | 1.7% | ~ | +1,370 | 221% |
| VR 808 | 1,340 | 23 | 1,170 | 30 | 1,030 | 35 | 1,040 | 32 | 1,670 | 19 | 1,910 | 17 | 1.6% | 6% | +570 | 43% |
| Pentland Dell | 2,720 | 8 | 2,640 | 8 | 2,770 | 9 | 2,710 | 10 | 2,270 | 12 | 1,900 | 18 | 1.6% | ~ | -820 | -30% |
| Saxon | 1,190 | 26 | 1,200 | 29 | 1,260 | 31 | 1,250 | 27 | 1,540 | 23 | 1,830 | 19 | 1.6% | 85% | +640 | 54% |
| Challenger | 1,510 | 20 | 1,440 | 23 | 1,290 | 29 | 1,460 | 24 | 1,590 | 21 | 1,550 | 20 | 1.3% | ~ | +40 | 3% |
| Russet Burbank | 1,580 | 18 | 1,660 | 20 | 1,680 | 21 | 1,480 | 23 | 1,430 | 26 | 1,510 | 21 | 1.3% | ~ | -70 | -4% |
| Estima | 3,430 | 6 | 3,330 | 6 | 3,010 | 7 | 2,480 | 12 | 2,140 | 14 | 1,510 | 21 | 1.3% | 7% | -1,920 | -56% |
| Charlotte | 1,730 | 14 | 2,120 | 15 | 2,150 | 15 | 2,080 | 14 | 1,810 | 17 | 1,460 | 23 | 1.2% | 30% | -270 | -16% |
| King Edward | 2,130 | 11 | 2,200 | 14 | 2,150 | 15 | 1,780 | 18 | 1,670 | 19 | 1,460 | 23 | 1.2% | 17% | -670 | -31% |
| Hermes | 2,950 | 7 | 2,250 | 13 | 1,740 | 19 | 1,000 | 33 | 1,320 | 27 | 1,380 | 25 | 1.2% | 87% | -1,570 | -53% |
| Arsenal | 1,290 | 25 | 1,160 | 32 | 1,350 | 27 | 1,380 | 26 | 1,150 | 31 | 1,310 | 26 | 1.1% | 10% | +20 | 2% |
| Gemson | 640 | 38 | 770 | 38 | 1,160 | 33 | 1,490 | 22 | 1,520 | 24 | 1,290 | 27 | 1.1% | 33% | +650 | 102% |
| Accord | 1,150 | 28 | 1,140 | 33 | 1,320 | 28 | 1,390 | 25 | 1,160 | 30 | 1,180 | 28 | 1.0% | 1% | +30 | 3% |
| Osprey | 1,090 | 30 | 1,430 | 24 | 1,440 | 25 | 970 | 34 | 950 | 37 | 1,120 | 29 | 1.0% | 100% | +30 | 3% |
| Desiree | 1,510 | 20 | 1,850 | 18 | 1,970 | 17 | 1,770 | 19 | 1,550 | 22 | 1,100 | 30 | 0.9% | 51% | -410 | -27% |

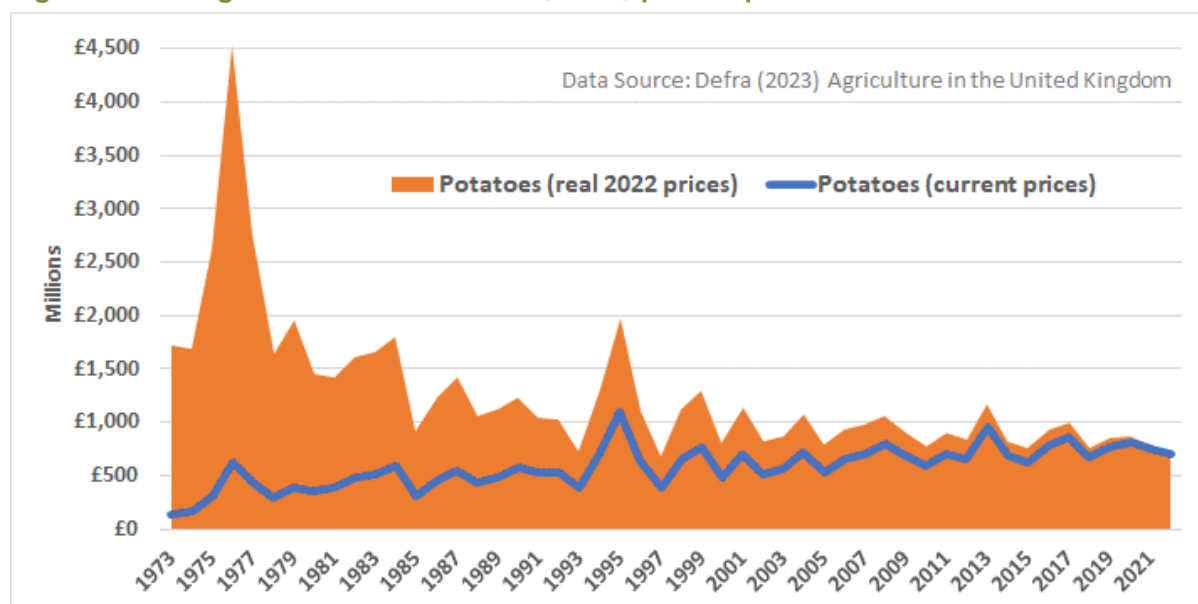
Data Source: AHDB (GB planted area by variety | AHDB)

~ excluded for disclosure reasons

3.3 GB – Average Farmgate Prices

26. Figure 7 shows the average farmgate price for potatoes over the last 50 years, expressed in both current prices and inflation adjusted 'real' prices (expressed in 2022 prices). Whilst there has been an upward increase in average UK potato prices, the last 50 years has witnessed steady erosion of the real, inflation adjusted, average price. Current (2020s) average prices are less than half the average price received in the 1970s after inflation adjustments.
27. Figure 7 also shows the significant impact of growing conditions on farmgate price (both in current and real terms). The summer of 1976 saw significant drought and the potato sector did not have the familiar irrigation systems in place that are now familiar. As a result of this drought potato prices spiralled upwards causing instability in the market that led Mr Tierney MP to claim in a House of Commons debate¹⁶ that: *"There are reports that potatoes have become valuable bingo prizes. They are offered as an incentive to buy second-hand cars. They are compared in value with jewellery. I heard on the radio this morning that someone had offered his super deluxe speedboat for 7½ tons of potatoes. It seems that suppliers themselves are watching their stocks by night seated on their tractors."* In a similar vein poor growing conditions in 1994¹⁷ followed by drought in 1995¹⁸ led to soaring prices in 1995.

Figure 7 Average UK current and real (2022) potato prices, 1973–2022



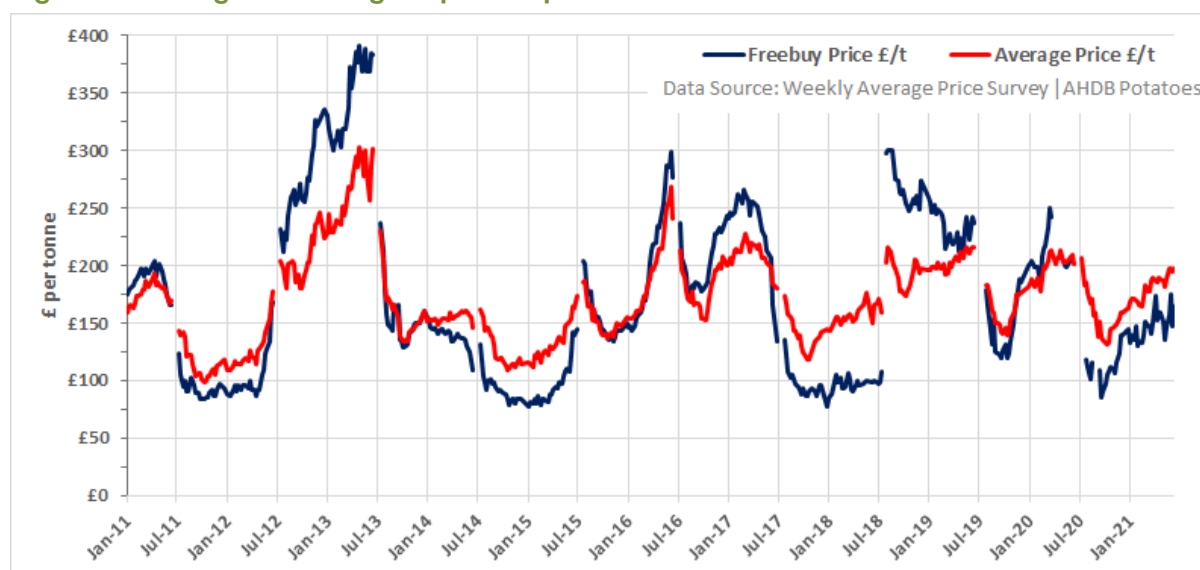
¹⁶ <https://api.parliament.uk/historic-hansard/commons/1976/jan/28/potatoes>

¹⁷ [Potato Prices - Hansard - UK Parliament](#)

¹⁸ [The Tanker Drought - 1995 to 1998 | UK Centre for Ecology & Hydrology \(ceh.ac.uk\)](#)

28. The GB weekly average price is an average of both free-buy and contract purchases bought direct from growers across all market sectors whereas the GB weekly free-buy price is an average of free-buy purchases only bought direct from growers across all market sectors. The free-buy price likely better reflects the actual potato growing conditions and strength of market demand – and where there is significant variance it is generally related to weather events, such as wet harvest periods, or water scarcity during the growing season (see Annex 1 – Weather maps).
29. Figure 8 shows the significant seasonal variation in potato prices achieved by farmers across GB from 2011 to 2021 (noting the breaks in the data series represents the start of new season prices). It is noticeable that for each crop year early growing season prices (late July to early August) tend to be weaker, reflecting the volumes available, whilst late season (May to June the following year) tend to be stronger – again reflecting volumes available and addition to higher storage costs. In gathering this data AHDB surveyed “22 purchasing companies, including grower groups, provide volume and value data relating to free-buy and contract purchases made from growers.”¹⁹

Figure 8 Average GB farmgate potato prices 2011–2021



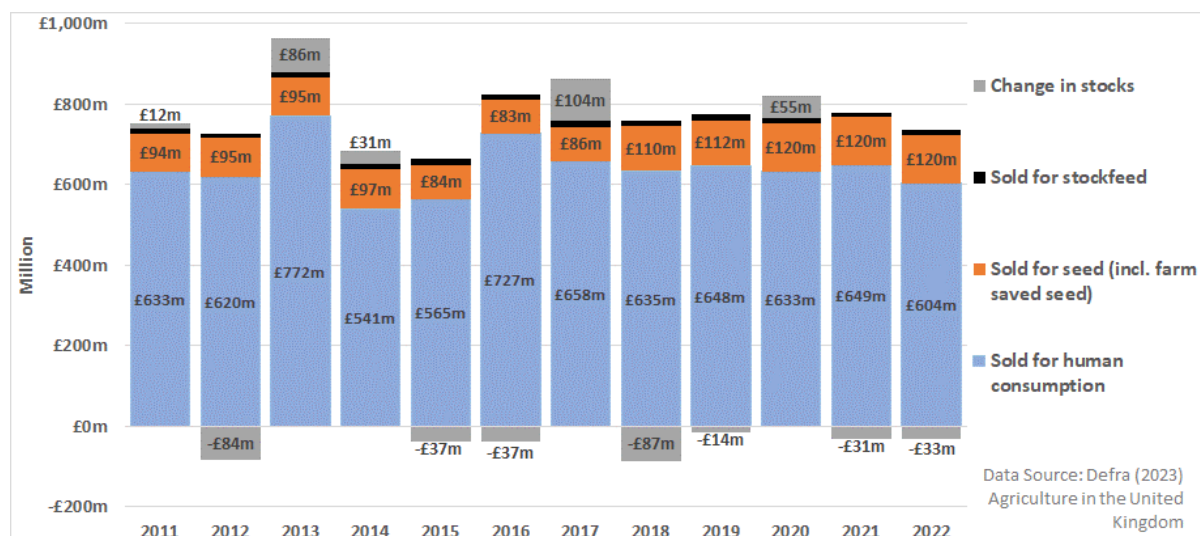
30. Figure 9 shows the Defra (2023)²⁰ estimated value of UK potato sales from 2011–2022. Over the period the value of potatoes sold for human consumption ranged from c.£514m to c.£772m, whilst the value of seed sales ranged from c.£83m to c.£120m and stock-feed (and AD) sales accounted for an average of c.£13m. Depending on the growing season (and net imports) the change in stocks at the end of the year varied significantly – from an increase of £104m in 2017 to a decrease of

¹⁹ [Weekly Average Price Survey | AHDB](#)

²⁰ [Agriculture in the United Kingdom data sets – GOV.UK \(www.gov.uk\)](#)

£87m in 2018. These figures reiterate the dynamic nature of the sector and the importance of storage in balancing supply and demand.

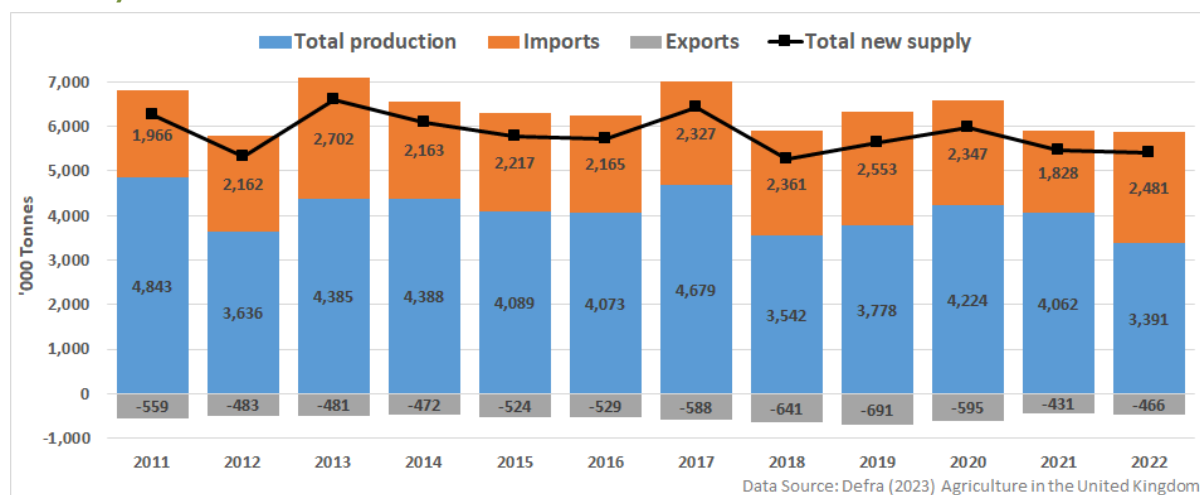
Figure 9 Estimated value UK potatoes sold, by purpose and changes in end of year stocks, 2011–2022



3.4 UK – Imports and Exports

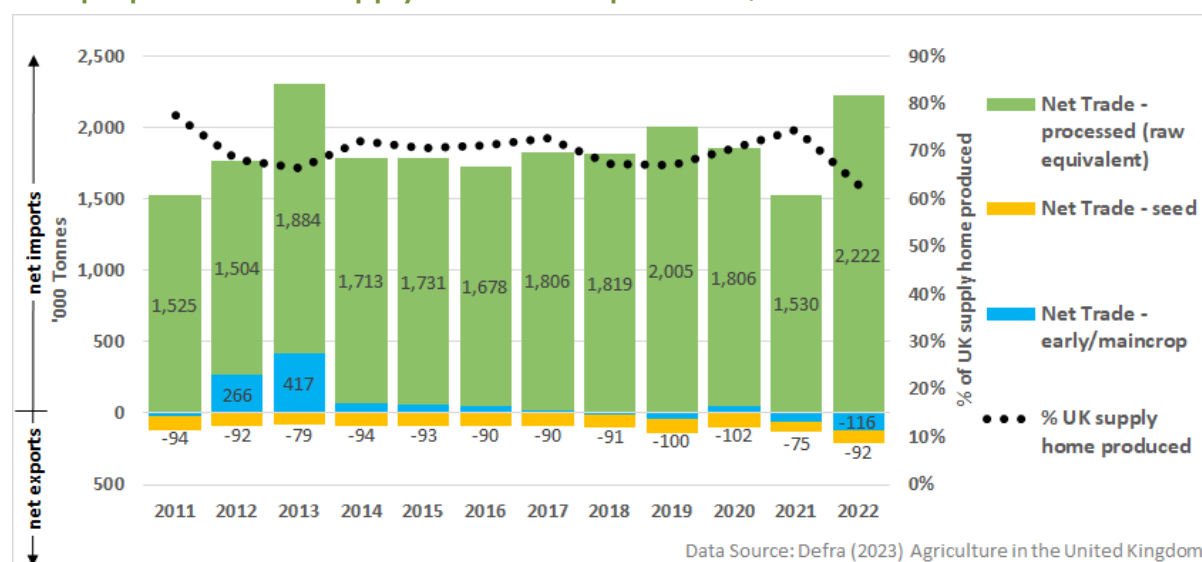
31. The UK is not self-sufficient in potatoes. Figure 10 shows that the value of potato production varies significantly between years and between 2011 and 2022 the UK produced between c.3.4m tonnes and c.4.8m tonnes worth of potatoes annually. Over that period c.430k tonnes to c.690k tonnes of UK potatoes (expressed here as negative values to indicate not available for UK supply) were exported annually, whilst potato imports extended to c.2m tonnes to c.2.6m tonnes each year. The combination of production, imports and exports meant that c.5.3m tonnes to c.6.6m tonnes were available as UK supply in any given year between 2011 and 2022.

Figure 10 Volume of UK potato production, exports, imports and total new supply annually, 2011–2022



32. With variable potato imports and domestic harvest volumes the proportion of the UK's annual potato supply that was home produced (see Figure 11) varied from c.63% to c.77% between 2011 and 2022 (average of 70%). This means that, despite being a large grower of potatoes, the UK normally relies on imports for c.30% by volume for UK needs (an import reliance that jumped to c.36% in 2022). The majority of net potato trade in the UK is in the form of processed potatoes, with net imports of between c.1.5m tonnes to 2.2m tonnes annually between 2011 and 2022 (average c.1.78m tonnes).
33. Whilst the UK does import seed potatoes, it is a net exporter and Figure 11 shows that between 2011 and 2022 the UK (mostly Scotland) had net seed exports of c.75k tonnes to c.102k tonnes. The UK's net trade in early/maincrop was highly variable from net exports of c.116k tonnes in 2022 to net imports of c.266k tonnes in 2012.

Figure 11 UK net trade in potatoes, including processed, seed and early/maincrop, with proportion of UK supply that is home produced, 2011-2022

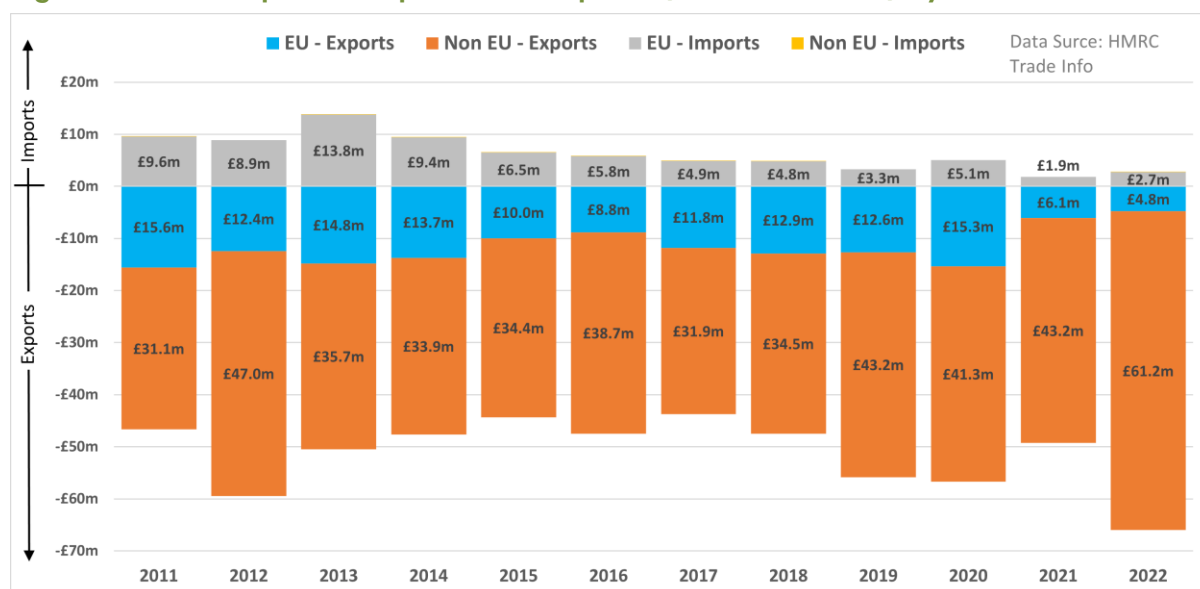


34. Scotland has an international reputation for producing high quality seed potatoes, setting strict tolerances for freedom from disease and trueness to type. As such, several key international markets have evolved over time for Scottish seed (notably Egypt, Morocco, Canaries, but also until more recently the EU). Figure 12 reveals the UK's trade (by value) in seed potatoes from 2011 to 2022.
35. Prior to the UK's withdrawal from the EU an average of c.£7.2m of seed was imported from the EU between 2011 and 2020 (peaking at c.£13.8m in 2013 following the poor 2012 growing season). Following the UK's EU withdrawal imports from the EU fell to c.£2m to c.£3m per year – that reflects that since July 2021 From 1 July 2021 "it is no longer permitted to market EU seed potatoes in GB"²¹ without

²¹ [PVS FAQ Guide – UK Plant Health Information Portal \(defra.gov.uk\)](https://www.defra.gov.uk/pvs-faq-guide-uk-plant-health-information-portal/)

certification of meeting UK standards. Similarly UK exports of seed potatoes to the EU have been adversely affected by the UK's withdrawal from the EU and the prohibition of UK seed potato exports to the EU and Northern Ireland²² for phytosanitary reasons. Between 2011 and 2020 UK seed potato exports to the EU averaged c.£13m, peaking at £15.6m in 2011. However, the value of that trade dropped to £6.1m in 2021 and £4.8m in 2022²³.

Figure 12 UK seed potato exports and imports (EU and Non-EU) by value, 2011–2022

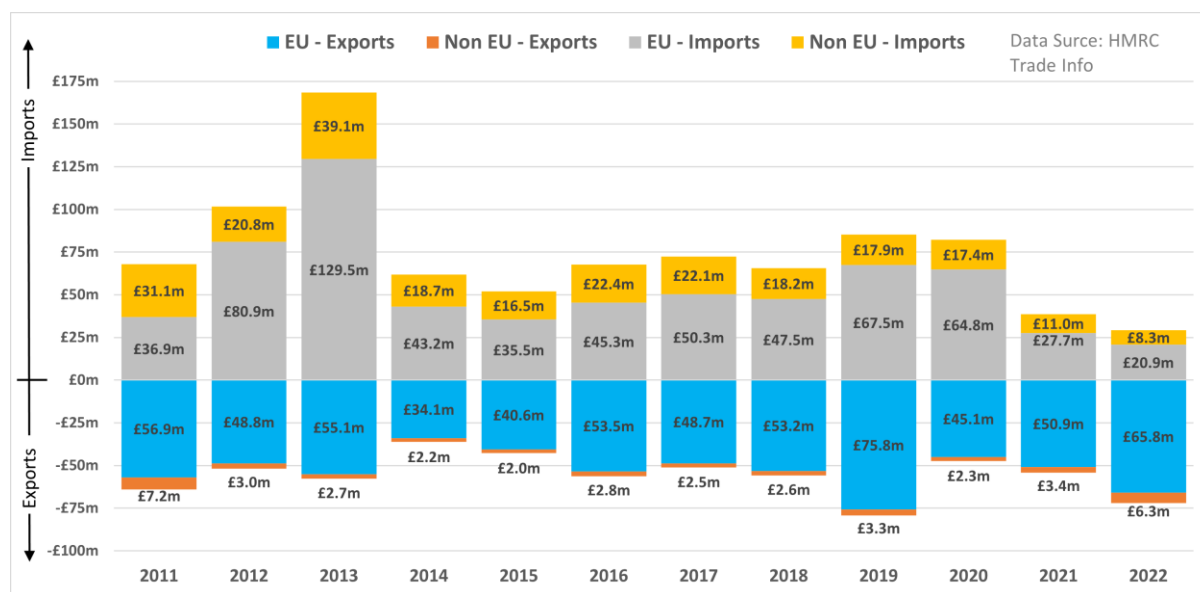


36. Figure 13 shows the UK's trade in fresh and chilled potatoes (by value) with EU and non-EU countries between 2011 and 2022. The trade of potatoes for consumption have not been affected by the UK's withdrawal from the EU as unlike seed potatoes ware and processed potatoes remain eligible for entry to the EU. The value of fresh and chilled potatoes traded vary quite considerably on an annual basis, with for example c.£168m (77% from EU) imported in 2013, dropping to c.£52m in 2015. Fresh and chilled exports averaged c.£52m to the EU (peaking at c.£76m in 2019) with c.£3.5m to non-EU countries between 2011 and 2022.

²² <https://planthealthportal.defra.gov.uk/plant-varieties-and-seeds/faq-guide/>

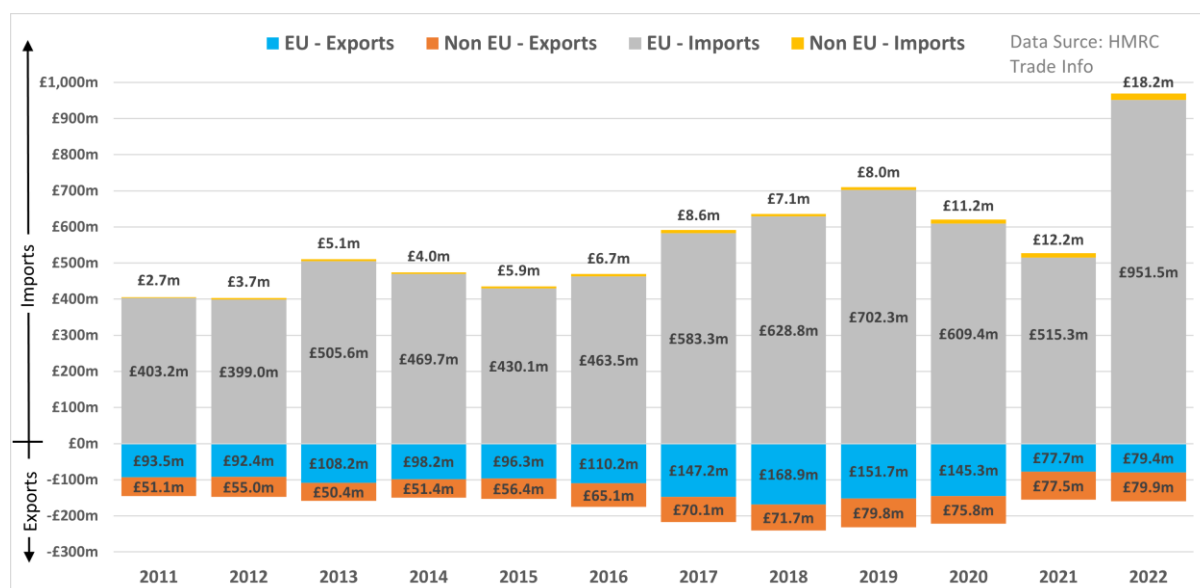
²³ This suggests trade is continuing but it may include exports to the Canary Islands (Spain).

Figure 13 UK fresh and chilled potato exports and imports (EU and Non-EU) by value, 2011-2022



37. Figure 14 shows the UK's trade processed potatoes (by value) with EU and non-EU countries between 2011 and 2022. Exports from the UK averaged c.£180m between 2011 and 2022 with the EU receiving for two-thirds of product by value. Exports peaked in 2018 where fresh and chilled potato exports were worth c.£169m to the EU and £72m to non-EU countries. Between 2011 and 2021 the UK imported c.£526m per annum on average with 99% sourced from within the EU. In 2022 the value of imports jumped by 83% to c.£970m, again revealing the highly dynamic nature of the UK potato trade with international partners.

Figure 14 UK processed potato exports and imports (EU and Non-EU) by value, 2011-2022

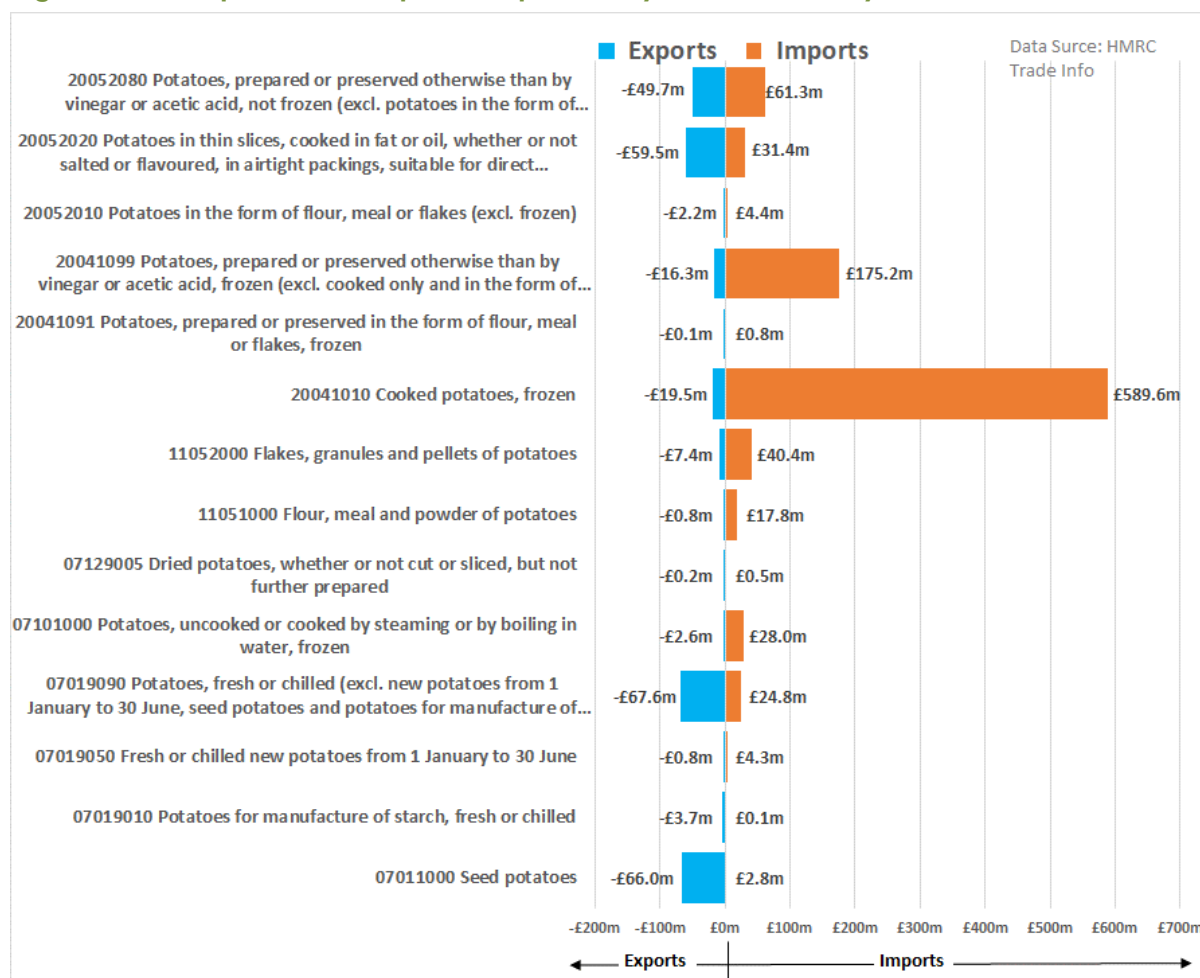


38. Figure 15 reveals the value of different potato products classified by the Harmonised System²⁴ imported by, and exported from, the UK in 2022. This permits a closer inspection of what type of potatoes are traded by the UK (see Annex 2 – International Trade for list of HS codes associated with potatoes and detailed trade values for 2011–2022). In 2022 ‘cooked potatoes, frozen’ (HS 20041010) accounted for 60% (c.£590m) of UK potato imports whilst another 18% (c.£175m) was in the form of ‘potatoes, prepared or preserved otherwise than by vinegar or acetic acid, frozen (HS 20041099). For exports, other than seed potatoes (22% – HS 07011000), the main products were:

- potatoes, ‘fresh or chilled (excl. new potatoes from 1 January to 30 June, seed potatoes and potatoes for manufacture of starch)’ accounting for 23% (HS 07019090);
- ‘potatoes in thin slices, cooked in fat or oil, whether or not salted or flavoured, in airtight packings, suitable for direct consumption, not frozen’ accounting for 20% (HS 20052020),
- (iii) ‘potatoes, prepared or preserved otherwise than by vinegar or acetic acid, not frozen (excl. potatoes in the form of flour, meal or flakes, and thinly sliced, cooked in fat or oil, whether or not salted or flavoured, in airtight packings, suitable for direct consumption)’ accounting for 17% (HS 20052080)

²⁴ This is a standardised numeric system of classifying traded products that is used globally for gathering statistics and for assessing duties and taxes on products

Figure 15 UK exports and imports of potato by Harmonised System (HS) Code, 2022

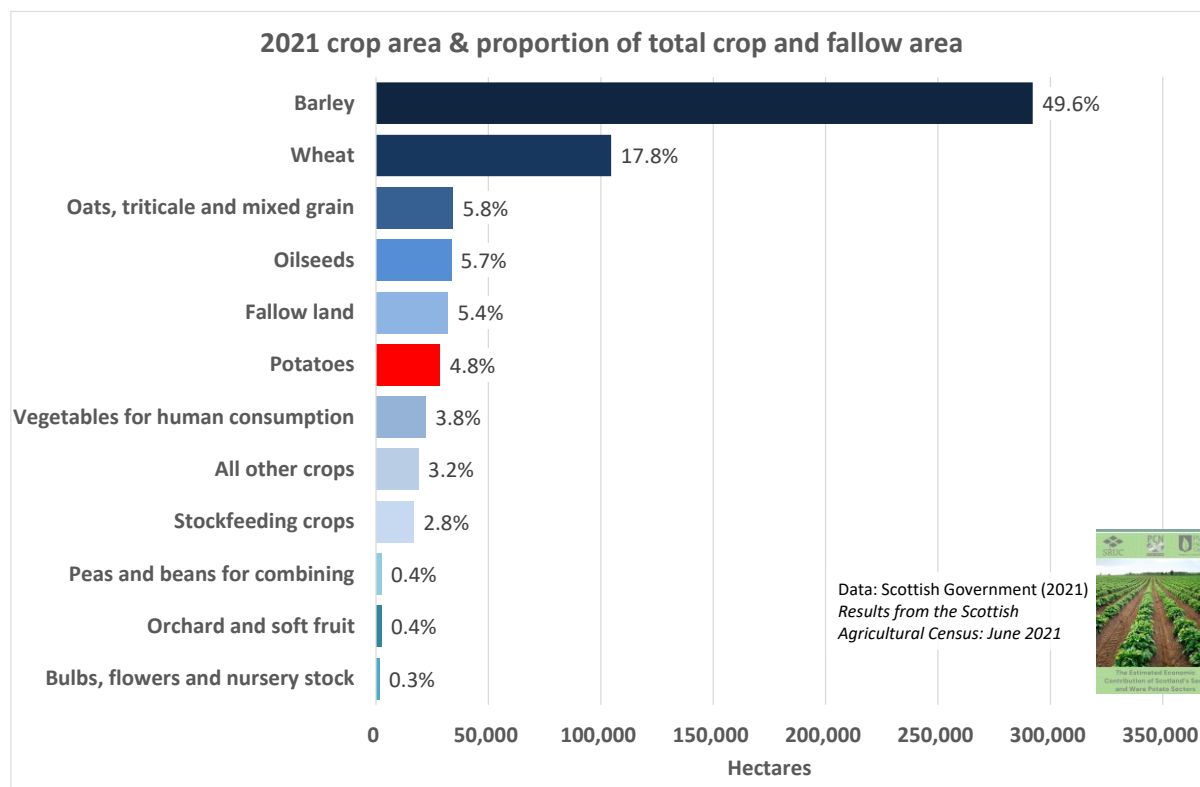


4 Scotland's Potato sector

39. Scottish Government (2021²⁵) data shows that the area associated with growing potatoes only accounted for 0.46% of Scotland's c.6.2m hectares of farmland plus common grazings in 2021. Figure 16 shows that in 2021 Scotland's potato sector accounted for 4.8% (c.28k Ha) of Scotland's c.589k Ha of crop and fallow land. Barley was the most prominent crop, accounting for c.50% of the crop and fallow area of Scotland, whilst wheat accounted for a further c.18%.

²⁵ [Results from the Scottish Agricultural Census: June 2021 – gov.scot \(www.gov.scot\)](https://www.gov.scot/resources/information/results-from-the-scottish-agricultural-census-june-2021/)

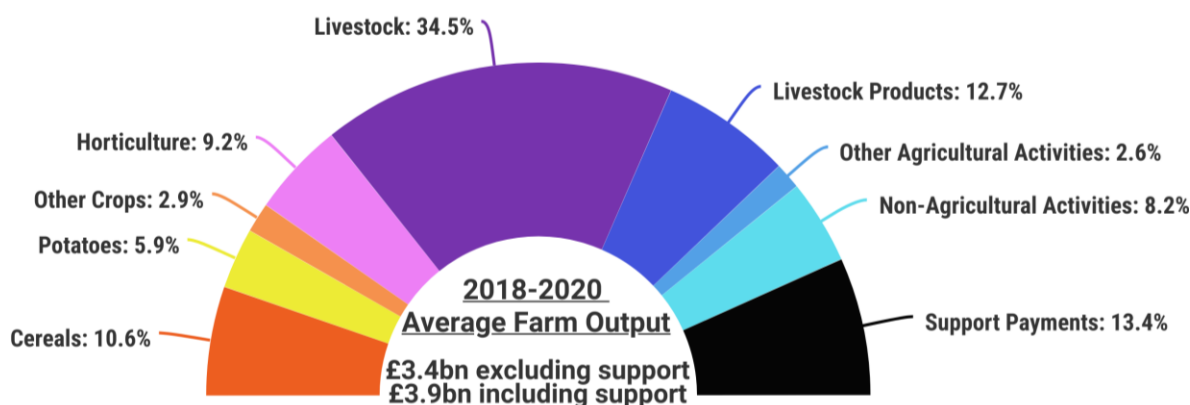
Figure 16 Area of crops grown and proportion of total crop and fallow land in Scotland, 2021



40. Whilst potato growing only accounted for less than 0.5% of agricultural land in Scotland, potatoes were estimated to have accounted for 6.8% of gross agricultural output excluding support (c.£3.4bn) on average between 2018 and 2020 (Scottish Government, 2021²⁶). When agricultural support payments are added to output – potatoes still accounted for 5.9% of total agricultural output of c.£3.9bn (as shown in Figure 17).
41. Between 2018 and 2020 the estimated Scottish farmgate output from potatoes was £230 million ranging from c.£200m in 2018 to c.£248m in 2019). These Scottish Government estimates are derived through estimates of average yields and crop value (£ per tonne) alongside area of potatoes grown. This means that there may be over, or under, estimation of the value of farmgate value, particularly considering the high variations in the value of different types and timings of ware crops but also differences in the value of seed varieties domestically and as exports.

²⁶ [Total Income from Farming Estimates: 2018-2020 – gov.scot \(www.gov.scot\)](http://www.gov.scot)

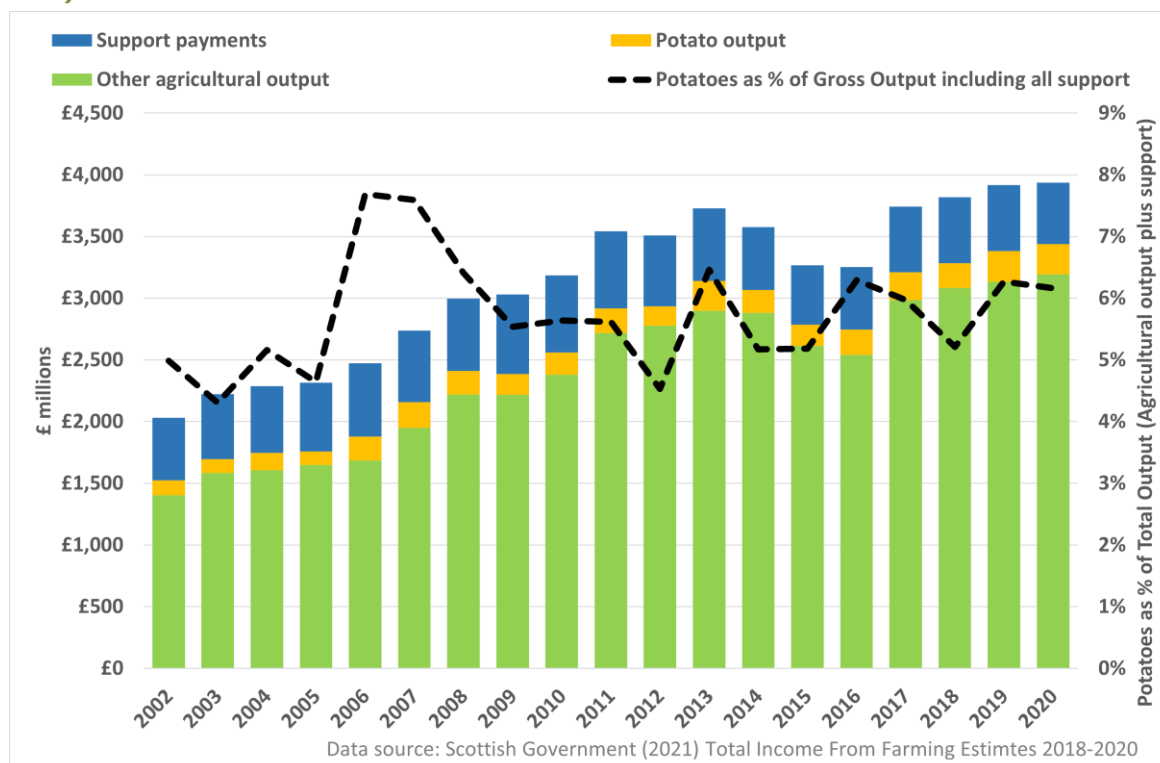
Figure 17 Average farmgate output by main source from Scottish agriculture as proportion of net output (inclusive of agricultural support) between 2018 and 2020



Data Source: Scottish Government (2021) Total Income from Farming Estimates: 2018-2020

42. Figure 18 demonstrates that that between 2002 and 2020 Scotland's potato sector contributed between 4.3% (2003) and 7.7% (2006) that reflect variations in relative output and prices across other agricultural sectors in comparison to potatoes – often affected by growing and harvest conditions in any given year.

Figure 18 Trends in potato and other agricultural output and support payments, and the proportion of gross output inclusive of support attributed to potatoes (2002–2020)²⁷



²⁷ There have been no Scottish TIFF figures published in 2022 or 2023

4.1 Seed Potato Development & Growers

43. The growing of seed potato is a specialist category within Scotland's (and GB/UK's) potato industry, meaning it requires special attention. The seed sector underpins the ware sector that in turn supplies packers and processors. The Scottish seed potato sector has an international reputation for 'high-health' seed potatoes and supplies significant volumes across GB, but also internationally – most notably to Egypt and Morocco. In Scotland, the growing of seed potatoes is closely regulated by SASA (Science and Advice for Scottish Agriculture) which is a Division of the Scottish Government Agriculture and Rural Economy Directorate. SASA play a vital role in maintaining Scotland's 'high health' status of the seed potato sector through the Seed Potato Classification Scheme (SPCS)²⁸.
44. The seed potato sector is complex to those unfamiliar with the terminology and legislation. There are very strict rules governing the marketing of the sector meaning it is an offence to market seed potatoes where: *"a crop inspection report has not been issued for the potatoes; the containers have not been officially labelled and sealed; the tubers have not been inspected in accordance with the Regulations."*²⁹
45. Duff (2018)³⁰ reaffirmed that seed potato is not 'seed' derived in the conventional sense of flowering plants that are pollinated and then set seed. Rather the 'seed' potato sector in GB and UK uses vegetative multiplication techniques to produce exact replicants of the 'mother'. Because vegetative propagation is used it means that any diseases from prior years can easily be carried over into next generations unless close attention is paid to the process. As generations (replications) increase so do the risks of carrying disease in the tubers – which is why the sector is heavily regulated. Indeed Scotland, Northern Ireland, Cumbria and Northumberland are designated protected regions for seed potato production.
46. There are various stages in the production of commercial (marketable) seed potato in Scotland (see Figure 19). **'Nuclear stock'** (microplants) are produced by micropropagation in SASA labs and are subject to stringent testing before multiplication can be carried out by officially approved commercial

²⁸ <https://www.sasa.gov.uk/seed-ware-potatoes/classification-scheme>. In England and Wales the scheme is administered by the Animal and Plant Health Agency (<https://www.gov.uk/guidance/the-seed-potato-classification-scheme>).

²⁹ See SASA Scottish Seed Potato Classification Scheme – Marketing Leaflet for more details: [Marketing Leaflet_1.pdf \(sasa.gov.uk\)](#)

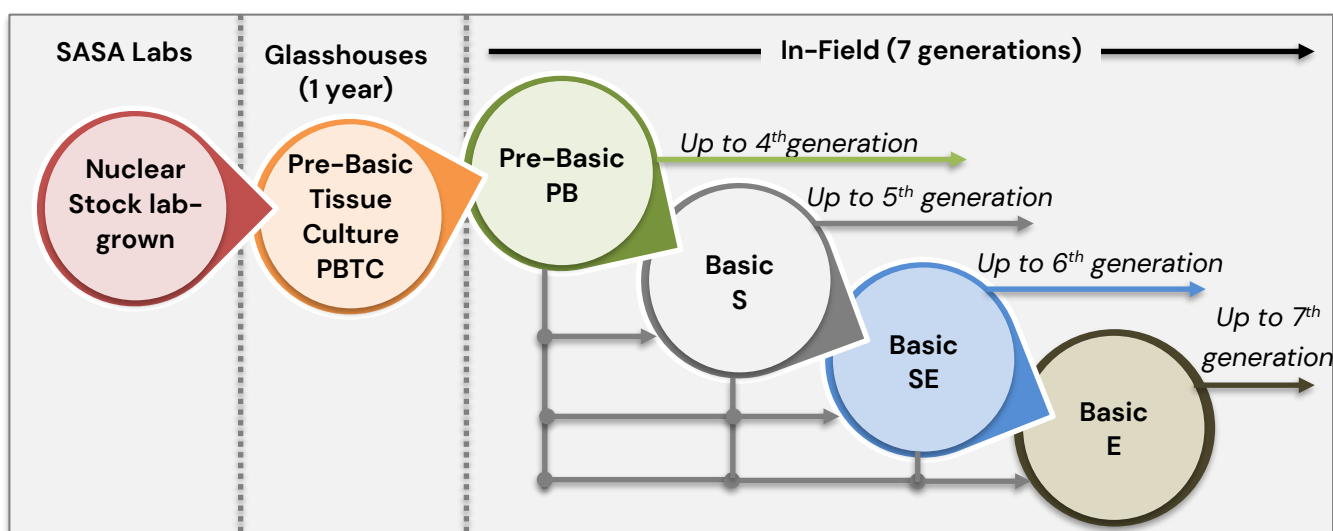
³⁰ Duff, I. (2018)

Seed Potato Production In Northern Ireland Sector Production and Brexit Implications. Evidence to the 'Brexit and Agriculture in Northern Ireland' Enquiry of the Northern Ireland Affairs Committee of the UK House of Commons' [AGROO13 – Evidence on Brexit and Northern Ireland: Agriculture \(parliament.uk\)](#)

micropropagation facilities to produce minitubers (**Pre-Basic Tissue Culture – ‘PBTC’**) – for one season only (PBTC is the highest grade of seed potato grown in Scotland).

47. At **Pre-Basic (‘PB’)** stage SASA authorised growers plant PBCT minitubers in fields for multiplication for between one and four generations and are assessed for being true to type and disease. PB then form the stocks for seed potato production in Scotland and ensure a continuous supply of healthy stock for all varieties grown. All basic **‘S’ (super) classification** crops must be derived from PB Seed and include up to 5th generation field crops (again tested for trueness to type and disease tolerances). Basic **‘SE’ (super-elite) classified crops** include up to 6th generation field crops that must come from PB or S stocks. Basic **‘E’ (elite) classified crops** include up to 7th field generation crops and can be grown from grown from PB, S or SE. All S, SE and E growers must be registered with the SPCS. Any crop rejected from the classification scheme cannot be marketed for seed – thereby maintaining confidence in Scotland’s high health reputation, and the economic contribution of the sector.

Figure 19 Scottish seed potato development phases



Source: Based on SASA (2022)³¹

48. PB grades can not be grown on land where a potato crop has been grown in the preceding 7 years and grades S, SE and E must not be planted in land where any potatoes have been grown in the preceding 5 years. In Scotland there is zero tolerance across all seed potato classes for blackleg symptoms caused by *Dickeya* pathogens³². Further, the land where seed potatoes are grown should be free from

³¹ SASA (2022) Scottish Seed Potato Classification Scheme Explanatory Leaflet – 2022 [Growing Crop Leaflet 2022 Updated Final_O.pdf \(sasa.gov.uk\)](#)

³² Ibid

wart disease (*Synchytrium endobioticum*) and must be certified by SASA as free from potato cyst nematodes – PCN (*Globodera rostochiensis* and *Globodera pallida*). Further, if PCN cysts are found during in-field inspections SASA will not issue a crop inspection report meaning the crop cannot be marketed as seed. Indeed, it is an offence to knowingly grow ware potatoes on land recorded as PCN infested unless there is an Official Control Programme in place³³.

49. In other parts of GB growers are also permitted to grow lower quality certified Grades A and B (up to field generations 8 and 9³⁴) – which are not classified as basic seed and therefore cannot be planted in Scotland, as a high-grade area.³⁵ However, seed growers in England and Wales (excluding Cumbria and Northumberland – which with Scotland make up GB ‘protected region’) have options to downgrade seed classification to A and B for commercial purposes.
50. The area of seed potato grown by Scottish county and SPCS grade are provided in Table 3. Whilst Angus dominates the total area of seed potato grown in Scotland the plantings of PB classified seed is largely located further North in Aberdeenshire, Easter Ross and Nairn. Only 51 hectares of PB seed was grown in England and Wales in 2022 meaning Scotland accounted for 92% of GB’s highest grade, PB seed potato. Scotland accounted for 76% of Basic S, 80% of Basic SE and 53% of Basic E seed potatoes grown in GB in 2022, with England also growing 282 hectares of certified A or B seed. Within Scotland it is noticeable that areas such as Easter Ross and Nairn are more heavily focused on the highest grade of potatoes, PB and Basic S.
51. At GB level PB accounted for 5% of the total SPCS area grown in 2022, 61% of the area grown was Basic S, 25% Basic SE, 8% Basic E with just over 2% of the area classed as certified A/B seed. Whilst these SPCS data are revealing it should be noted that they do not include any ‘farm-saved’ seed meaning there is an underestimation of the total area of seed potatoes grown.

³³ Ibid.

³⁴ [Explanatory guide to the Seed Potato Classification Scheme and Approved Stock Scheme 2023 to 2024 \(publishing.service.gov.uk\)](https://publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/114444/explanatory-guide-to-the-seed-potato-classification-scheme-and-approved-stock-scheme-2023-to-2024.pdf)

³⁵ [Growing Crop Leaflet 2022 Updated Final_0.pdf \(sasa.gov.uk\)](https://www.sasa.gov.uk/growing-crop-leaflet-2022-updated-final-0.pdf)

Table 3 Area of seed potato grown by SPSC classification and Scottish counties, 2022

| Region | SPCS Grades | | | | | | Total |
|-------------------------|--------------|----------------|----------------|----------------|--------------|-------------|-----------------|
| | PB | S | SE | E | A | B | |
| Angus | 1.3 | 1,833.0 | 1,042.7 | 243.1 | | | 3,120.1 |
| Aberdeen | 262.1 | 869.3 | 411.3 | 126.0 | | | 1,668.7 |
| Perth | 7.3 | 1,085.6 | 400.1 | 100.4 | | | 1,593.4 |
| Kincardine | | 639.5 | 341.7 | 63.1 | | | 1,044.3 |
| Ross | 242.0 | 335.4 | 3.6 | | | | 581.0 |
| Banff | 0.1 | 391.9 | 133.2 | | | | 525.2 |
| Moray | 4.2 | 327.9 | 64.1 | 1.2 | | | 397.4 |
| Fife | | 204.6 | 157.9 | 8.0 | | | 370.5 |
| Berwick | | 236.2 | 49.6 | | | | 285.8 |
| Nairn | 60.5 | 99.4 | 21.5 | 9.6 | | | 191.0 |
| Roxburgh | | 143.8 | 11.4 | | | | 155.2 |
| Kinross | | 76.9 | 45.4 | 0.4 | | | 122.7 |
| Inverness | 52.7 | 33.3 | 11.5 | 0.8 | | | 98.3 |
| East Lothian | | 27.2 | 12.5 | | | | 39.7 |
| Sutherland | | 26.2 | | | | | 26.2 |
| Midlothian | | 12.6 | 7.1 | 1.0 | | | 20.7 |
| Caithness | 15.4 | | | | | | 15.4 |
| Dumfries | | 2.1 | 1.8 | 2.5 | | | 6.4 |
| Orkney | 5.1 | 0.3 | 0.2 | | | | 5.6 |
| Lanark | | 5.0 | | | | | 5.0 |
| Scotland | 650.8 | 6,350.2 | 2,715.6 | 556.1 | 0.0 | 0.0 | 10,272.7 |
| England & Wales | 53.1 | 2,030.4 | 692.4 | 492.5 | 264.1 | 20.7 | 3,553.3 |
| GB Total | 703.9 | 8,380.7 | 3,408.0 | 1,048.6 | 264.1 | 20.7 | 13,826.0 |
| Scotland as % GB | 92.5% | 75.8% | 79.7% | 53.0% | 0.0% | 0.0% | 74.3% |

52. The seed potato sector within Scotland and wider GB is concentrated in the hands of a relatively small number of specialist growers – often growing under contracts for potato breeders, buyers, packers, processors, distributors and marketers such as Agrico³⁶, Branston Ltd³⁷, Caledonia Potatoes³⁸, Cygnet PB³⁹, Grampian Growers⁴⁰, IPM Potato Group⁴¹, HZPC⁴², McCain Potatoes⁴³, Stet Potato Group⁴⁴.

³⁶ [Specialist in high quality seed potatoes | Agrico UK](#)

³⁷ [What We Do | Branston](#)

³⁸ [Caledonia Potatoes | Scottish Potato breeder and producer](#)

³⁹ [Homepage – Cygnet PB](#)

⁴⁰ [Seed Potatoes – Grampian Growers](#)

⁴¹ [IPM Potato Group](#)

⁴² [United Kingdom › HZPC](#)

⁴³ [Potato Products | McCain Foods](#)

⁴⁴ [About STET Potato Ltd | STET UK \(stet-potato.com\)](#)

53. It is difficult to ascertain exactly how many seed potato growers there are in Scotland / GB from the SASA and APHA SPCS producer / certified stock registers. Some growers are listed as growing groups/cooperatives – such as the farmer cooperative Grampian Growers⁴⁵, or through companies such as Stet⁴⁶ who have their own group of growers. Further some ‘growers’ such as Stet are listed as multiple entries in the SASA database, with different companies they are growing ‘for’ listed (e.g. Stet for Greenvale AP, Stet Potato Ltd for Saltire Seed Ltd, Stet UK Ltd⁴⁷ for Branston Ltd, etc). In the APHA dataset (certified stocks⁴⁸) the grower is listed alongside who they are growing seed potatoes for as separated columns, although in some cases individual growers are listed in different places (e.g. Keith Summers Ltd listed as an individual grower, but also listed as a grower in the entry for Wholecrop Marketing Ltd (Keith Summers Ltd)).
54. With these caveats in mind, in the combined SASA and APHA list of SPCS ‘growers’ there were c.250 unique seed ‘grower’ entries (after removing the ‘for’ company in SASA database), with c.170 in Scotland (ranging from 0.1 hectares to over 1,000 hectares). In 2022 there were 12 growers SPCS listed in Scotland growing more than 150 hectare and they accounted for c.5,480 hectares (55% of Scottish crop area). Five growers with more than 500 hectares of SASA listed SPCS crops accounted for 37% of the crop area (McCain Potatoes, IPM Potato Group Ltd, Cygnet PEP Ltd, Agrico UK Ltd and Cygnet Potato Breeders Ltd). At GB level there were 18 listed growers in 2022 that accounted for 51% of the crop area (c.7,100 hectares) and 30 listed growers accounting for 62% of the SPCS 2022 certified crop area.
55. When the details of the applicant’s name were assessed (assumed ‘for’ in SASA’s database) it reveals the complexity of the industry. The way these databases are constructed suggest that Agrico were the grower for 607 hectares in Scotland in 2022 but had a further 194 hectares grown on their behalf in England. **Consistency in these databases would improve overall data clarity on the GB seed potato sector, and particular thought should be given to improving insights were growing groups / companies are listed as the grower.**

⁴⁵ [Home – Grampian Growers](#)

⁴⁶ [Seed potato growers | STET UK \(stet-potato.com\)](#)

⁴⁷ Even though this company appears wound up in 2012 (see [STET \(UK\) LIMITED filing history - Find and update company information - GOV.UK \(company-information.service.gov.uk\)](#))

⁴⁸

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1110611/spcs-list-of-certified-stocks.ods

Table 4 SASA and APHA SPCS listed growers with >100 hectares of seed potato, 2022

| Growers | England & Wales | Scotland | GB Total | % of GB SPCS area |
|-----------------------------------|-----------------|---------------|---------------|-------------------|
| McCain Potatoes | | 1,038 | 1,038 | 7.5% |
| IPM Potato Group Ltd | | 1,001 | 1,001 | 7.2% |
| Cygnnet PEP Ltd | | 614 | 614 | 4.4% |
| Agrico UK Ltd | | 608 | 608 | 4.4% |
| Cygnnet Potato Breeders Ltd | | 510 | 510 | 3.7% |
| Meijer Potato UK | | 413 | 413 | 3.0% |
| Saltire Seed Ltd | | 382 | 382 | 2.8% |
| Greenseed International Ltd | 332 | | 332 | 2.4% |
| Stet Potato Ltd | | 309 | 309 | 2.2% |
| Albanwise Ltd | 291 | | 291 | 2.1% |
| T Soanes & Son (Potatoes) Limited | 289 | | 289 | 2.1% |
| The Humble Potato Company | 220 | | 220 | 1.6% |
| A & F Growers | | 205 | 205 | 1.5% |
| Keith Summers Ltd | 187 | | 187 | 1.4% |
| Caledonia Potatoes Ltd | | 183 | 183 | 1.3% |
| HZPC UK Limited | | 179 | 179 | 1.3% |
| JAMES STOCKDALE LTD | 175 | | 175 | 1.3% |
| Solana Seeds United Kingdom Ltd | | 168 | 168 | 1.2% |
| D Geddes (Farms) Ltd | | 138 | 138 | 1.0% |
| B & C Farming Ltd | 137 | | 137 | 1.0% |
| Cullen Allen Ltd | | 135 | 135 | 1.0% |
| D RUSSELL & SONS | 133 | | 133 | 1.0% |
| JSR Farming Group | 131 | | 131 | 0.9% |
| Grampian Growers | | 131 | 131 | 0.9% |
| Branston Ltd | | 119 | 119 | 0.9% |
| D Y Bishop & Co Ltd | | 117 | 117 | 0.8% |
| Ovenstone Ltd | | 117 | 117 | 0.8% |
| JM & SJ Edwards | 113 | | 113 | 0.8% |
| Cairngall Farms | | 108 | 108 | 0.8% |
| McEwan Potatoes Limited | | 101 | 101 | 0.7% |
| Total GB | 3,553 | 10,273 | 13,826 | |

Derived from SASA's Scottish Seed Potato Register and APHA's list of certified stocks

4.1.1 Seed Royalties – Plant Breeder Rights

56. Significant investment is required to develop varieties that are disease resistant or tolerant and can improve yields and revenues (see **Error! Reference source not found.** for an explanation of resistance and tolerance from a PCN context). Therefore, breeders can register intellectual property rights of their varieties that demand a royalty (administered by British Society of Plant Breeders - BSPB) to help recover research and development costs. Without consideration of disease

resistance Barnes *et al.* (2016)⁴⁹ estimated annual average yield increases of 0.9% (C.4.8t/Ha) between 1984 and 2014 – whilst CPVO and EUIPO (2022)⁵⁰ estimate annual yield increases of 1.49% at EU level from 1995–2019.

57. Breeding and taking new varieties of potato to market is a slow process that can take many years expenditure without certainty of economic return⁵¹. To enable this investment of time and capital money can be safeguarded and recouped by plant breeders through Plant Variety Rights (PVR). PVRs give breeders *“exclusive control over the propagating material (including seed, cuttings, divisions, tissue culture) and harvested material (cut flowers, fruit, foliage) of a new variety. With these rights, the breeder can choose to become the exclusive marketer of the variety, or to license the variety to others”* (Duff, 2018).⁵²
58. Royalties are paid by potato growers to plant breeders for varieties to which they control intellectual property rights. These royalties are paid based on the area and variety grown. However, as the UK potato sector remains dominated by older varieties free of any PVR control or royalty payments (varieties such as Maris Piper, Kerrs Pink, King Edward, Golden Wonder). For these older PVR free varieties, Barnes *et al.* (2016) highlighted the important role of variety ‘maintainers’, – noting the importance of *“publicly funded breeders”* such as SASA, the James Hutton Institute and Department of Agriculture, Environment and Rural Affairs of Northern Ireland (DARD) to *“maintain PVR-free varieties”*. A list of official variety maintainers (including those companies with PVRs) in the UK by the number of varieties they maintain / have intellectual property rights over is provided in Figure 20. The full list of maintainers are listed by variety with the with the area of GB seed grown in Annex 3 – GB certified seed area 2022 and seed variety maintainers.

⁴⁹ [The UK Plant Breeding Sector and Innovation \(publishing.service.gov.uk\)](https://publishing.service.gov.uk)

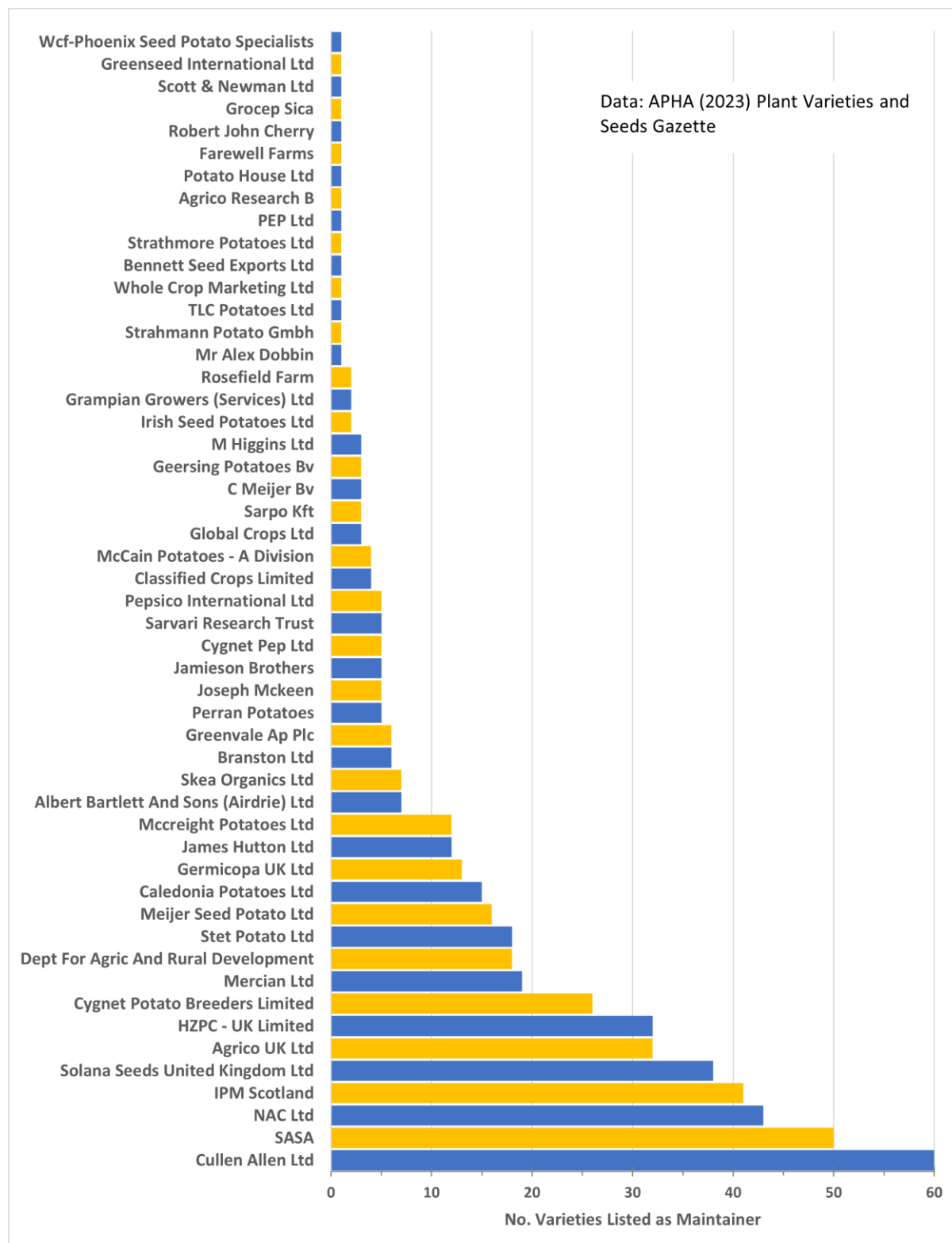
⁵⁰ CPVO and EUIPO (2022) [CONTRIBUTION OF THE COMMUNITY PLANT VARIETY RIGHTS SYSTEM TO THE EU ECONOMY AND THE ENVIRONMENT \(europa.eu\)](https://euiipo.europa.eu)

⁵¹ Pers Comm. Archie Gibson of Agrico (2022)

⁵² Duff, I. (2018)

Seed Potato Production In Northern Ireland Sector Production and Brexit Implications. Evidence to the ‘Brexit and Agriculture in Northern Ireland’ Enquiry of the Northern Ireland Affairs Committee of the UK House of Commons’ [AGROO13 – Evidence on Brexit and Northern Ireland: Agriculture \(parliament.uk\)](https://www.parliament.uk)

Figure 20 Potato varieties by number of maintainers, share of total varieties held per maintainer and average no of varieties held. Top maintainers listed and characterised below



59. Barnes *et al.* (2016) also pointed to the role of multinational companies in the seed potato breeding sector – that can cause economic leakage from Scotland/GB/UK as

dividends are returned to parent companies.⁵³ A number of the companies listed in Figure 20 sit out with GB – with a number in Northern Ireland, and many more official registered internationally.

60. SAC Consulting (2022⁵⁴) report that the vast majority of seed potatoes are grown under contract where “*growers multiply seed stocks in partnership with the seed houses*”. Seed price is variable and high grade seed is reported to have a premium – with higher quality contracts afforded growers with the best reliability and reputation.
61. Whilst ‘farm saved seed’ (FSS)⁵⁵ may not necessarily be submitted for inspection through the SPCS the British Society of Plant Breeders (BSPB) list varieties eligible for FSS payments annually (i.e. varieties eligible for royalty payment⁵⁶) from breeders that have entered the Potato Farm Saved Seed Agreement Scheme (PFA scheme). The first year in which certified seed sales are sold is the only point full royalty is paid to the plant breeder, with royalties due on eligible FSS potato varieties lower⁵⁷ and Farmers Weekly (n.d.)⁵⁸ report that for potatoes payment rates were “set at the default rate established in EU law of 50% of the royalty payable for classified seed production of each variety”. PVR royalties vary by breeder and seed classification.

Payment Rates on Protected Varieties, 2023

- **Farm Saved Seed payment rates: £18.38 per ha to £277.50 per ha**
- **SPCS Certified royalty rates: £65 per ha to £375 per ha.**

Pers Comm. BSPB 2023

62. It is unclear if the presence of royalty fees (or not) influences production decisions of ware growers that are growing out of contract using the free-buy market. Maris Piper, the most popular variety, is royalty free and SAC Consulting (2022) suggest that is driven by consumer demand driven by awareness of the variety as a good all round potato. SAC Consulting suggest that “*the most important factor when*

⁵³ This may also work in reverse for Scottish companies like Albert Bartlett that are founded and based in Scotland but now operate in foreign countries.

⁵⁴ SAC Consulting (2022) – Beattie (Ed) The Farm Management Handbook 2022/23 Edition fas.scot/downloads/farm-management-handbook-2022-23/

⁵⁵ Under statute, potatoes can only be sown as FSS for one generation after growing from certified seed and there is a small farmer payment exemption (declarations still must be made) for those growing less than 185 tonnes.

⁵⁶ [Potatoes – BSPB](#)

⁵⁷ See: [The UK Plant Breeding Sector and Innovation \(publishing.service.gov.uk\)](https://publishing.service.gov.uk)

⁵⁸ Gillbard, E. (2023) The dos and don'ts of farm-saved seed – Farmers Weekly 26th June 2023. <https://www.fwi.co.uk/arable/the-dos-and-donts-of-farm-saved-seed>

selecting a potato variety is suitability for the end market” and the specifications for chips, crisps and fresh packing vary, but growers may have limited variety choice as buyers “often have restricted lists which limits grower choice”. Many ware potato growers grow under contract as processors need to secure supplies in advance. Varieties with resistance to pests and disease are becoming increasingly important to growers with emphasis “on quality over quantity in the pursuit of profitability” ...but... “unfortunately, the end market drives producers to grow potato varieties with higher susceptibility to issues such as blight, PCN, common scab.”⁵⁹

4.1.2 Scotland – Seed Variety

63. In Scotland, whilst the seed potato sector is dominated by relatively few varieties some 370 varieties were assessed by SASA⁶⁰ between 2003 to 2022. There are long term dynamic adjustments to the area of each variety entered for SASA inspection annually, with for example the area of Maris Piper that passed inspection falling from 19.1% (2,108 Ha) of total seed area in 2003 to 12.7% (1,313 Ha) in 2022. Over the same period the area of Cara that passed inspection increased from 3.4% of total area (375 Ha) to 10.2% (1,050 Ha) whilst the area of Desiree fell from 12.7% (1,399 Ha) to 4.3% (440 Ha). Varietal changes are a result of a wide range of factors, often driven by ware specifications set by processor, retail and wholesale needs, but also export market variety specifications.
64. Scotland accounted for c.75% of the 13,882 hectares of certified seed potato grown in GB in 2022⁶¹. Figure 21 shows the area of certified seed potatoes by variety grown in GB in 2022, split by area grown in Scotland and area grown in England and Wales. Maris piper represented c.10% of the total seed potato area of GB (1,370 Ha) with 96% of this grown in Scotland. Cara (1,050 Ha, c.8%) and Hermes (916 Ha, c.7%) were the next largest grown areas and they were exclusively grown in Scotland. Varieties such as Sagitta and Taurus were primarily grown in England and Wales in 2022. The full GB listing for varieties and area grown in 2022 can be found in Annex 3 – GB certified seed area 2022.

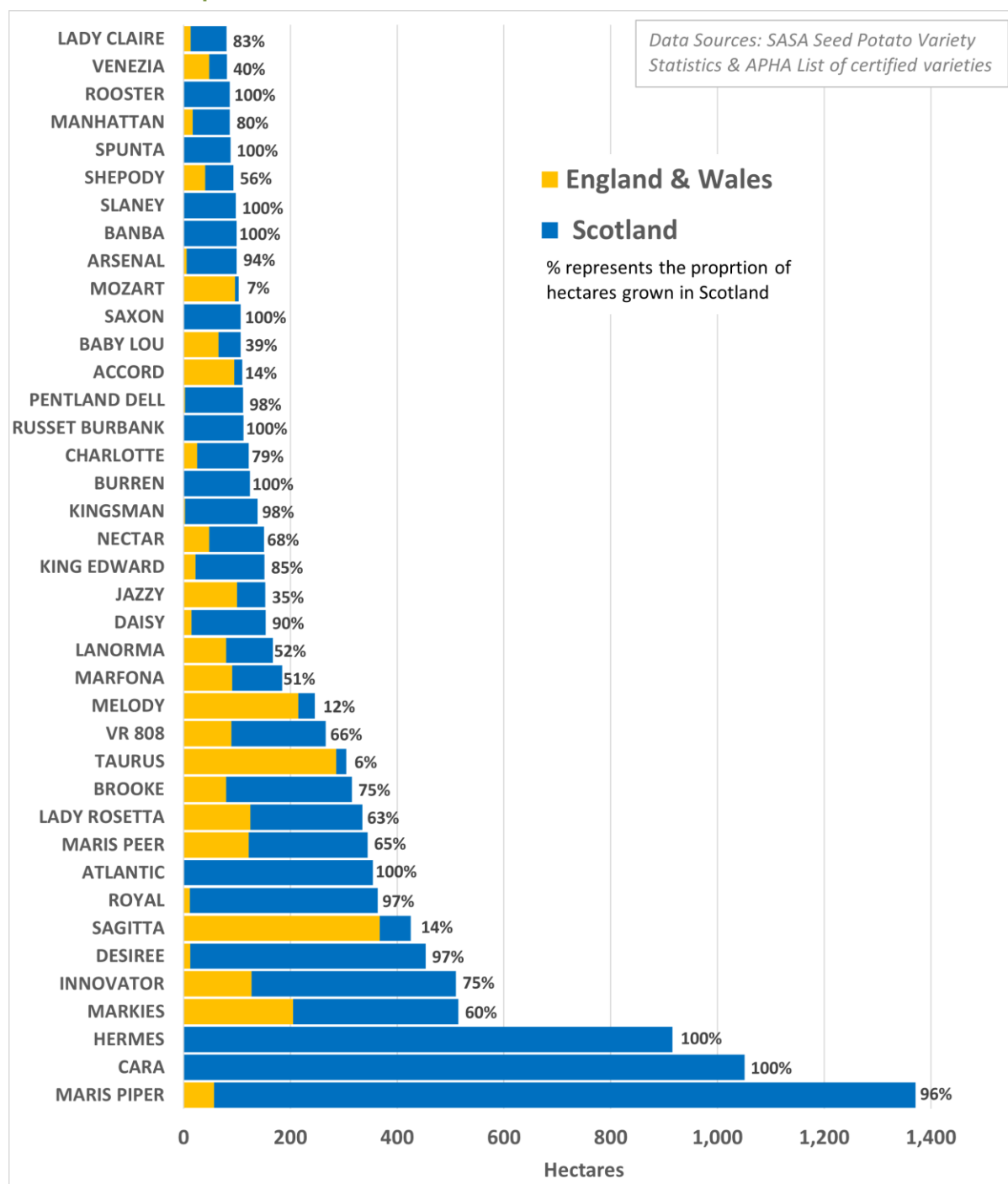
⁵⁹ SAC Consulting (2022)

⁶⁰ [Seed Potato Variety Statistics | SASA \(Science & Advice for Scottish Agriculture\)](#)

⁶¹ SASA and APHA data were merged

- [Seed Potato Variety Statistics | SASA \(Science & Advice for Scottish Agriculture\)](#)
- https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1110612/spcs-list-of-certified-varieties.ods

Figure 21 Area of seed potato grown in Scotland and England & Wales in 2022, with Scottish area expressed as % of GB area (limited to GB areas over 80 hectares)



65. Table 5 shows the area grown, and rank, of seed potato varieties certified by SASA for various years 2003–2022. Some key points include:

- Whilst the total area of Maris piper certified seed grown fell by 794 Ha (38%) between 2003 and 2022 it remained the most commonly grown variety in Scotland over the period, except for between 2012 and 2017 where the Hermes became more common.

- The area of Cara (a variety grown for export to Egypt) increased by 675 Ha over the period, causing it to increase from 6th ranked by area in 2003 to 2nd ranked in 2023 (although its area had shrunk between 2003 and 2008 causing it to drop to 15th ranked crop by area from 2008 to 2010).
- The area of Hermes increased by c.1k Ha between 2006 and 2017, before the area reduced by 790 Ha between 2017 and 2022.
- Whilst there was a 958 Ha (68%) reduction in the area of Desiree grown over the period it only dropped from 2nd ranked crop by area to 4th.
- Innovator was not grown until 2007 when 0.14 Ha was certified with significant growth in the area (380ha) between 2010 and 2022 that made it the 5th most grown crop in 2022.
- The first certification of Royal occurred in 2010 when 0.02Ha was grown, with rapid growth in the area grown to 351 Ha in 2022 (ranked 7th).
- Markies only had 0.07 Ha certified in 2003 and by 2022 that area had grown to 310 Ha (ranked 8th).
- Maris Peer dropped from the 4th most common variety in 2003 to the 8th most common in 2022.
- Other new varieties that have emerged in the last 15 years include VR 808, Daisy and Kinsman.

Table 5 Area grown and rank (2022) of top 30 Scottish grown seed potato varieties for selected years, 2003–2022

| Variety | 2003 | | 2005 | | 2010 | | 2015 | | 2020 | | 2022 | | 2003 to 2022 Change (Ha) |
|----------------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-----------------------------|
| | Ha | Rank | Ha | Rank | Ha | Rank | Ha | Rank | Ha | Rank | Ha | Rank | |
| MARIS PIPER | 2,108 | 1 | 1,743 | 1 | 1,744 | 1 | 1,289 | 2 | 1,104 | 2 | 1,314 | 1 | -794 |
| CARA | 376 | 6 | 315 | 7 | 197 | 15 | 395 | 4 | 639 | 3 | 1,051 | 2 | +675 |
| HERMES | 922 | 3 | 806 | 3 | 1,290 | 2 | 1,656 | 1 | 1,212 | 1 | 916 | 3 | -6 |
| DESIREE | 1,399 | 2 | 913 | 2 | 726 | 3 | 457 | 3 | 495 | 4 | 441 | 4 | -958 |
| INNOVATOR | 0 | 116 | 0 | 119 | 21 | 63 | 155 | 15 | 377 | 6 | 383 | 5 | +383 |
| ATLANTIC | 164 | 16 | 186 | 15 | 151 | 22 | 246 | 8 | 394 | 5 | 355 | 6 | +190 |
| ROYAL | 0 | 116 | 0 | 119 | 0 | 176 | 140 | 19 | 333 | 7 | 352 | 7 | +352 |
| MARKIES | 0 | 110 | 1 | 100 | 294 | 7 | 304 | 6 | 304 | 8 | 310 | 8 | +309 |
| BROOKE | 0 | 116 | 0 | 119 | 14 | 75 | 148 | 17 | 207 | 10 | 235 | 9 | +235 |
| MARIS PEER | 618 | 4 | 772 | 4 | 412 | 4 | 306 | 5 | 264 | 9 | 223 | 10 | -395 |
| LADY ROSETTA | 114 | 23 | 170 | 17 | 310 | 5 | 184 | 11 | 198 | 11 | 210 | 11 | +96 |
| VR 808 | 0 | 116 | 0 | 119 | 0 | 176 | 49 | 42 | 102 | 21 | 176 | 12 | +176 |
| DAISY | 0 | 116 | 0 | 119 | 5 | 103 | 15 | 86 | 70 | 32 | 139 | 13 | +139 |
| KINGSMAN | 0 | 116 | 0 | 119 | 0 | 189 | 0 | 212 | 87 | 26 | 136 | 14 | +136 |
| KING EDWARD | 292 | 10 | 255 | 11 | 268 | 10 | 130 | 21 | 101 | 22 | 130 | 15 | -162 |
| BURREN | 120 | 22 | 155 | 19 | 173 | 19 | 169 | 12 | 164 | 12 | 124 | 16 | +4 |
| RUSSET BURBANK | 276 | 11 | 221 | 13 | 171 | 20 | 204 | 10 | 145 | 14 | 112 | 17 | -164 |
| PENTLAND DELL | 504 | 5 | 411 | 6 | 279 | 9 | 247 | 7 | 146 | 13 | 108 | 18 | -396 |
| SAXON | 217 | 12 | 282 | 8 | 220 | 14 | 93 | 29 | 95 | 24 | 107 | 19 | -110 |
| NECTAR | 0 | 116 | 3 | 86 | 21 | 62 | 42 | 47 | 83 | 27 | 103 | 20 | +103 |
| BANBA | 1 | 86 | 17 | 50 | 68 | 35 | 147 | 18 | 143 | 15 | 99 | 21 | +98 |
| SLANEY | 163 | 17 | 159 | 18 | 116 | 24 | 138 | 20 | 109 | 18 | 98 | 22 | -65 |
| CHARLOTTE | 153 | 19 | 271 | 9 | 195 | 16 | 117 | 24 | 91 | 25 | 97 | 23 | -56 |
| MARFONA | 198 | 14 | 265 | 10 | 239 | 13 | 85 | 30 | 103 | 20 | 94 | 24 | -104 |
| ARSENAL | 0 | 116 | 0 | 119 | 1 | 139 | 100 | 28 | 105 | 19 | 94 | 25 | +94 |
| SPUNTA | 32 | 43 | 32 | 40 | 17 | 70 | 19 | 74 | 51 | 42 | 88 | 26 | +56 |
| LANORMA | 0 | 116 | 0 | 119 | 4 | 108 | 12 | 98 | 52 | 41 | 88 | 27 | +88 |
| ROOSTER | 36 | 41 | 28 | 41 | 164 | 21 | 115 | 25 | 124 | 16 | 87 | 28 | +51 |
| ELLAND | 0 | 116 | 0 | 119 | 0 | 190 | 0 | 227 | 11 | 106 | 76 | 29 | +76 |
| KING RUSSET | 0 | 116 | 0 | 119 | 0 | 190 | 0 | 235 | 3 | 162 | 76 | 30 | +76 |

4.2 Scotland's potato growing area

66. Whilst the June Agricultural Census (JAC) data reports the area of ware and seed potatoes grown in Scotland there are discrepancies between the published (JAC) area of seed potatoes, the area reported in the Economic Report on Scottish Agriculture⁶² and the area reported by SASA through the Scottish Seed Potato Register⁶³. The discrepancy arises from the JAC being derived from farmer completed entries in their annual Single Application Form⁶⁴ (submissions that farmers make in application for agricultural support) and where land is rented out for potatoes it may be that the support claimant⁶⁵ does not actually know what type of potato is being grown, or there is 'farm-saved seed' that is not entered for inspection with SASA⁶⁶.
67. According to the JAC, the area of potatoes grown in Scotland has remained relatively stable since 1986, fluctuating between 26k and 30k hectares (see Figure 22). Whilst the total area of potatoes has remained relatively stable over a long period the area of seed potatoes grown in Scotland has faced a long-term decline, steadily dropping from c.20k hectares in the early 1980s to a low of c.11k hectares in 2005 before stabilising. SASA data also suggest a relatively stable area of seed grown in the last 20 years. In contrast, the area of ware potatoes grown increased from a low of c.11k hectares in 1990 to a peak of c.18k hectares in 2008 and 2009, before stabilising at c.15k-16k hectares.
68. Figure 22 also reveals the differences between the area of seed recorded in the JAC (through SAF form submissions), the area of seed entered for SASA inspection, and the area of seed passed by SASA inspection.

⁶² [Scottish agriculture: economic reports – gov.scot \(www.gov.scot\)](http://www.gov.scot)

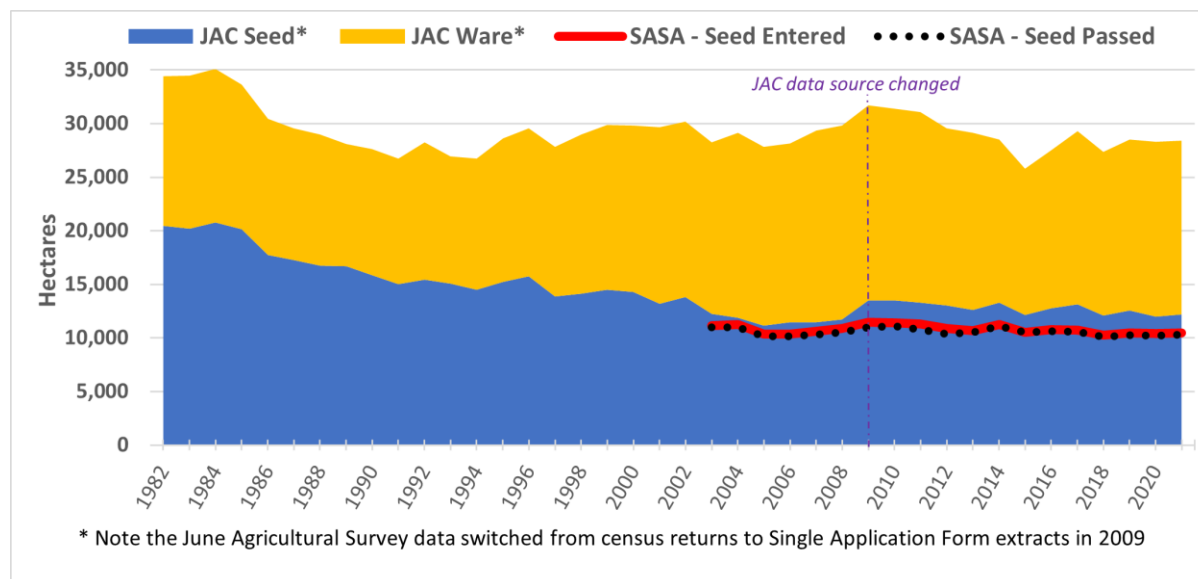
⁶³ [Scottish Seed Potato Register | SASA \(Science & Advice for Scottish Agriculture\)](#)

⁶⁴ [Single Application Form 2023 \(ruralpayments.org\)](http://ruralpayments.org)

⁶⁵ In Scotland potatoes are often grown on rented land. Often the owner/ manager of the land where potatoes are grown will let the land out for a rental fee, but they will also retain any support payments associated with the land.

⁶⁶ Pers. comm. (July 2023) various SAC Consultants

Figure 22 Area of seed and ware potatoes grown in Scotland (1982–2021)



69. Thomson and Bell (2019)⁶⁷ utilised SASA’s seed potato labelling data⁶⁸ and MySPUDS⁶⁹ extracts alongside HMRC data⁷⁰ to assess the potential impacts on the Scottish seed potato sector as a consequence of the UK’s (then) prospective withdrawal from the EU. As part of the process, the area of seed and ware potatoes grown in Scottish parishes were mapped using for 2014 and 2019.
70. The coloured maps in Figure 23 show the area (hectares) of seed potatoes grown in Scottish agricultural parishes in 2019, alongside the absolute (hectares) change in the area grown between 2014 and 2019. The 2019 map illustrates that the Scottish seed potato sector is highly concentrated in Eastern regions with the best quality land⁷¹ and growing conditions (the further north generally means fewer aphids and risks of disease spreading). Angus is the dominant seed potato growing region in Scotland with Aberdeenshire, the Moray coast and Black Isle, Perthshire, Fife and the Borders all playing important roles. In recent times there has been discussion that with the continued spread of PCN that seed growers are increasingly looking for ‘clean’ ground where potatoes have never been grown – or have not for a long time. This has meant seed growers have often been forced further ‘up the glens’⁷² to find suitable ground. The map that shows the change in seed area between 2014 and

⁶⁷ Thomson, S. and Bell, J. (2019) Scottish Seed Potato Sector– Potential Impacts from Brexit. An unpublished report for Scottish Government as part of underpinning support for policy advice in the 2016–2022 Strategic Research Programme.

⁶⁸ [SPCS Marketing Documents | SASA \(Science & Advice for Scottish Agriculture\)](#)

⁶⁹ [MySPUDS | SASA \(Science & Advice for Scottish Agriculture\)](#)

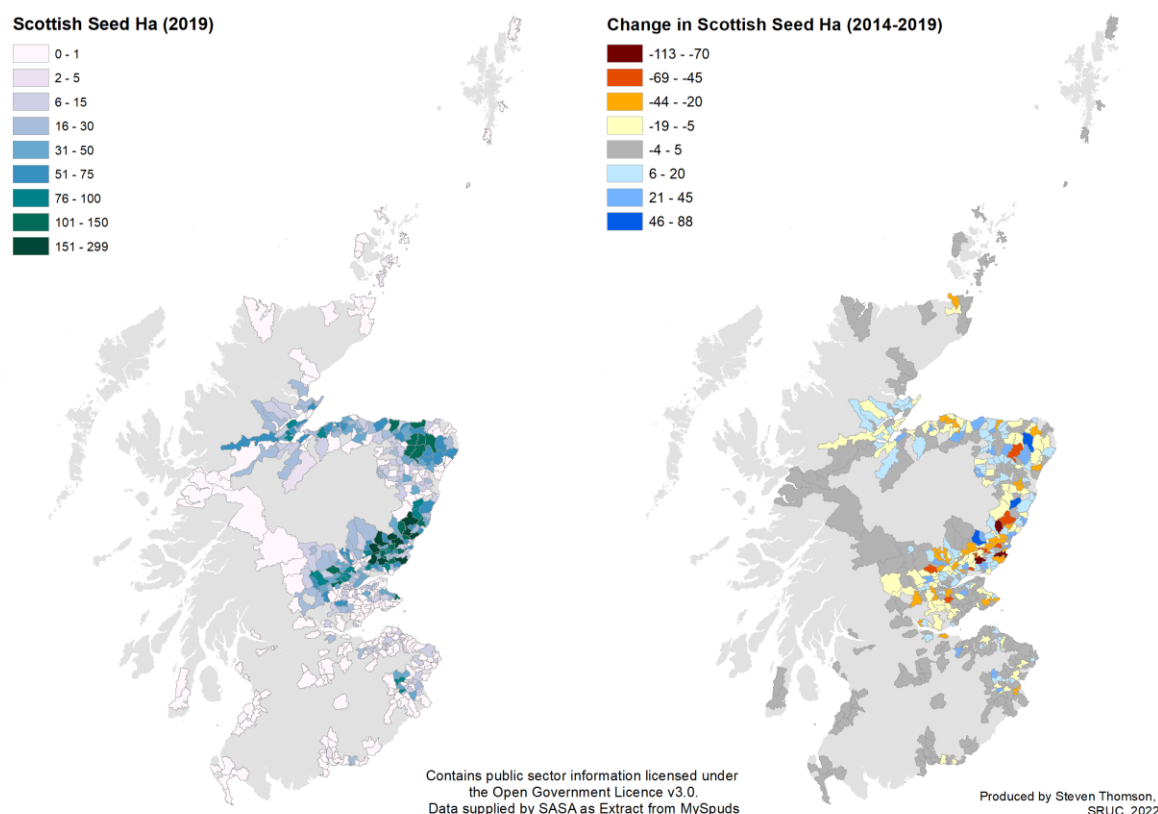
⁷⁰ [UK Trade Info from HM Revenue & Customs](#)

⁷¹ See the Land Capability for Agriculture maps <https://www.hutton.ac.uk/learning/exploringscotland/land-capability-agriculture-scotland>

⁷² A term used in PCN working group discussions (<https://www.planthealthcentre.scot/publications/pcn-working-group-final-report>)

2019 confirms there has been extension of the area growing seed potatoes in some areas (those in blue) whilst other areas saw sharp decline (maroon and orange) – most notably in specific parishes in Angus⁷³ and Aberdeenshire.

Figure 23 Area of seed potato production by agricultural parish, 2019 and area change from 2014

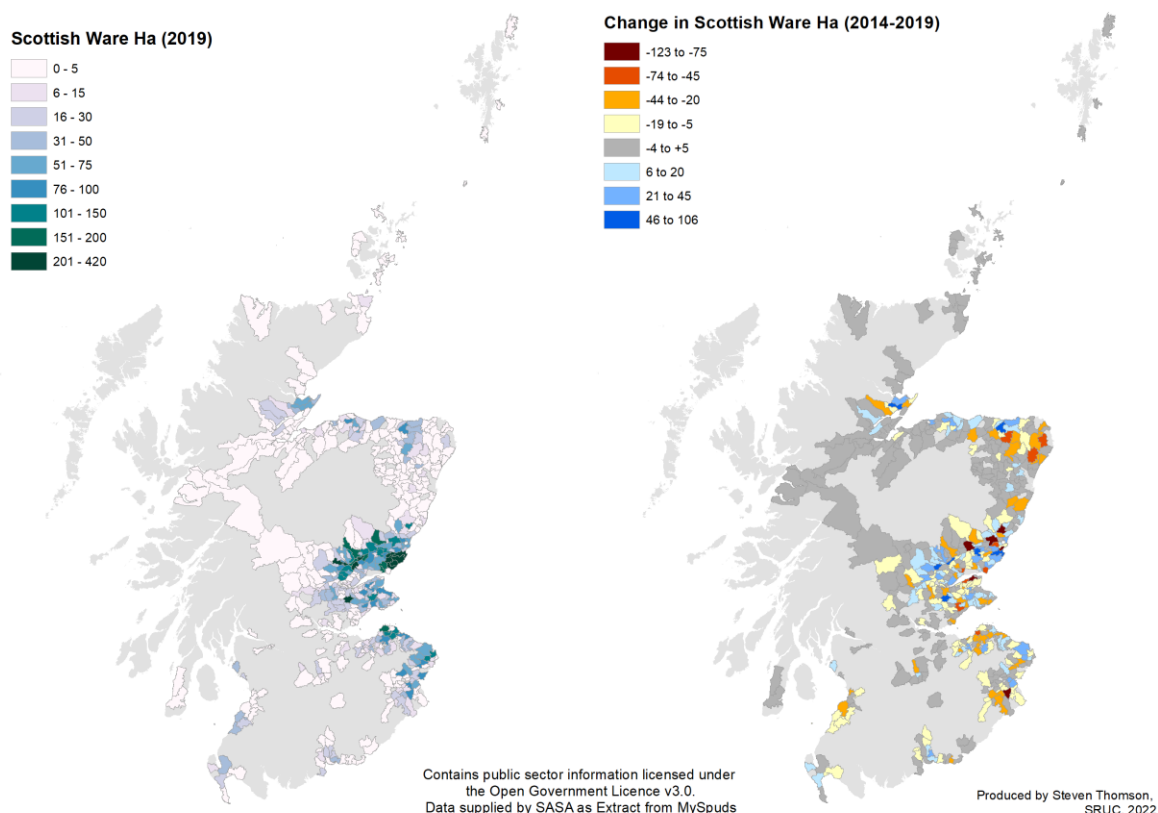


71. The map showing the 2019 ware potato area in Figure 24 reveals how dominant Angus is in terms of Scottish potato growing for human consumption – particularly between Carnoustie, Arbroath and Forfar, but also around Cupar Angus and Blairgowrie. Most of parishes in Fife grew ware potatoes in 2019 with further important growing areas in East Lothian, Berwickshire, Aberdeenshire and the Black Isle.
72. The map showing the change in area of ware potatoes grown within agricultural parishes between 2014 and 2019 reveals areas of reduced growing (maroon and orange) and areas of increased ware growing (blue). Whilst there were some

⁷³ For a review of this evidence see: V. Blok, J. Pickup, K. Davie, H. Kettle, D. Ewing, A. Roberts, L. Kuhfuss, A. Kleczkowski & B McDougall (2020). The Future Threat of PCN in Scotland. Project Final Report. PHC2018/16. Scotland's Centre of Expertise for Plant Health (PHC). DOI: 10.5281/zenodo.3889965 and P. Skelsey (2022). Modelling the spread of PCN in Scotland: Project Final Report. PHC2020/08. Scotland's Centre of Expertise for Plant Health (PHC). DOI: 10.5281/zenodo.7805729. Both available online at: [Publications | Plant Health Centre](#)

parishes in Angus with large decreases in area (Maroon), there generally was increased ware growing in the region – a reflection of a shift from seed growing to ware growing (possibly as PCN and other disease burdens reduce the area certifiable for seed growing).

Figure 24 Area of ware potato production by agricultural parish, 2019 and area change from 2014



4.2.1 Scotland – Demand for Clean Ground

73. The rules regarding Scotland's high grade seed potato status mean that there is high demand for high quality land that meets growers needs, but also complies with rules regarding rotations and freedom from specified pathogens. However, in the last 15 years there have been increased infections of PCN (*Globodera rostochiensis* and *G. pallida*) meaning it has become more challenging to meet one of the requisite regulations to grow and market Scottish seed potatoes. PCN infection has become increasingly problematic for the Scottish seed sector, as greater areas infected means that the challenge of finding 'clean ground' for seed becomes more difficult.
74. From 2010, if soil has been found to be infested by PCN no seed potato is permitted to be grown on the land – even for farm saved seed. Whilst ware potatoes can be grown on infested land, an officially approved PCN control programme should be in place to minimise the risks associated with spreading PCN.

75. Plant Health Centre (2019)⁷⁴ highlight that whilst varieties with high levels of resistance to *G. rostochiensis* are grown widely in Scotland, there are fewer varieties commercially grown with resistance to *G. pallida* (which is becoming dominant in Scotland): “*Potato varieties resistant to G. rostochiensis (50% of potatoes in Scotland) have largely halted its spread with soil infestations remaining constant. Resistance seems to be stable over last 10 years. There is little resistance to G. pallida and those that are available are found in processing varieties, which are not commonly grown (certainly for ware) in Scotland.*” It is, however noted that that *pallida* resistant varieties are increasingly coming to the market and that several of these (e.g. Elland) are starting to gain traction.⁷⁵
76. As previously highlighted, growing of potatoes is a specialised and concentrated sector, even though potatoes (and seed potatoes) are grown widely across the east coast of Scotland. Often the land where seed potatoes are grown is rented from other land owners – adding to the complexities around seed potato production statistics, but also in the regulation of crops and eligibility of ground. The statutory rules built into the SPSC conditions create demand for good quality ‘clean potato ground’ – i.e. land that meets the rotational (and increasingly PCN) specifications. With strict requirements for seed potato ground to be PCN ‘free’ – it puts an additional restriction on land availability (beyond rotation requirements), creating demand, and therefore high economic rents for that land. Anecdotally, evidence suggest that this means some seed growers are increasingly reliant on growing ‘at distance’ – moving equipment large distances to available ‘clean ground’. Further the pressures to meet the strict conditions, along with competition for other crops and land uses means that rents in some areas now command in excess of £1,000 per Ha.

4.3 Scotland – Crop Protection

77. Crop protection products account for c.25% of variable costs associated with growing potatoes. Ware and seed potatoes are prone to several weed, pest and disease problems that are controlled through the use of fungicides, herbicides/ desiccants, insecticides, molluscicides and seed treatments. Table 6 shows the estimated amount of crop protection products used in growing potatoes in Scotland in 2016, 2018 and 2020 (a breakdown by ware and seed potatoes is provided in Annex 4 – Crop protection used for ware and seed potatoes).
78. SASA estimate that in 2020:

⁷⁴ Plant Health Centre (2019) – Potato Cyst Nematode (PCN) species – *Globodera pallida*
https://www.planthealthcentre.scot/sites/www.planthealthcentre.scot/files/2019-10/phc_pest_review_pcn.pdf

⁷⁵ Pers Comm. Professor John Jones, James Hutton Institute October 2023

- 99.4% of the area of potatoes grown had a fungicide application. 240 tonnes of fungicide were used at an average of 8.59kg of active substance per hectare applied (basic area) – with an average of 14 treatments applied per crop.
- Growth regulators were only applied to 7.8% of the total area of ware potatoes grown. 3.8 tonnes of growth regulator were applied at an average of 3kg active substance per basic hectare (hectares treated), as a single treatment.
- 99.4% of the area grown had herbicides applied with 41 tonnes applied at an average of 1.45kg of active substance per basic hectare over 4 treatments.
- Insecticides were applied to 72% of the crop area. 9 tonnes were applied at an average of 0.45kg of active substance per basic hectare over 5 treatments.
- 4.9 tonnes of molluscicides were applied to 48% of the area grown, at an average of 0.37kg of active substance per basic hectare over 3.1 treatments.
- 87% of the area grown had seed treatments using 4.8 tonnes of active substance at an average rate of 0.2kg per basic hectare applied over a single treatment.

Table 6 Crop protection product use in Scottish ware potato production (2016, 2018 and 2020)

| Active Substance Group | Year | Crop Area (ha) | Basic Area (ha) | Treated Area (ha) | Active Ingredient Applied (kg) | % area treated | Average Kg Active Ingredient per Basic Ha | Average Number of treatments per Basic Ha |
|------------------------------|------|----------------|-----------------|-------------------|--------------------------------|----------------|---|---|
| Fungicide | 2020 | 28,297 | 28,128 | 398,600 | 240,045 | 99.4% | 8.59 | 14.17 |
| | 2018 | 27,358 | 25,713 | 306,927 | 166,693 | 94.0% | 6.48 | 11.94 |
| | 2016 | 27,525 | 27,266 | 370,694 | 175,214 | 99.1% | 6.43 | 13.60 |
| Growth Regulator (ware only) | 2020 | 16,294 | 1,276 | 1,276 | 3,829 | 7.8% | 3.00 | 1.00 |
| | 2018 | 15,267 | 322 | 322 | 775 | 2.1% | 2.41 | 1.00 |
| | 2016 | 14,765 | 2,514 | 2,514 | 7,337 | 17.0% | 2.92 | 1.00 |
| Herbicide | 2020 | 28,297 | 28,128 | 111,947 | 40,829 | 99.4% | 1.45 | 3.98 |
| | 2018 | 27,358 | 25,404 | 113,566 | 43,201 | 92.9% | 1.70 | 4.47 |
| | 2016 | 27,525 | 26,645 | 121,926 | 49,367 | 96.8% | 1.85 | 4.58 |
| Insecticide | 2020 | 28,297 | 20,437 | 102,686 | 9,095 | 72.2% | 0.45 | 5.02 |
| | 2018 | 27,358 | 20,214 | 90,684 | 7,674 | 73.9% | 0.38 | 4.49 |
| | 2016 | 27,525 | 17,629 | 78,718 | 10,166 | 64.0% | 0.58 | 4.47 |
| Molluscicide | 2020 | 28,297 | 13,495 | 41,905 | 4,943 | 47.7% | 0.37 | 3.11 |
| | 2018 | 27,358 | 9,838 | 21,676 | 2,954 | 36.0% | 0.30 | 2.20 |
| | 2016 | 27,525 | 12,425 | 33,431 | 3,506 | 45.1% | 0.28 | 2.69 |
| Seed Treatment | 2020 | 28,297 | 24,694 | 25,150 | 4,887 | 87.3% | 0.20 | 1.02 |
| | 2018 | 27,358 | 23,486 | 25,047 | 7,238 | 85.8% | 0.31 | 1.07 |
| | 2016 | 27,525 | 23,820 | 24,827 | 11,012 | 86.5% | 0.46 | 1.04 |
| Sulphur | 2016 | 14,765 | 264 | 264 | 423 | 1.8% | 1.60 | 1.00 |

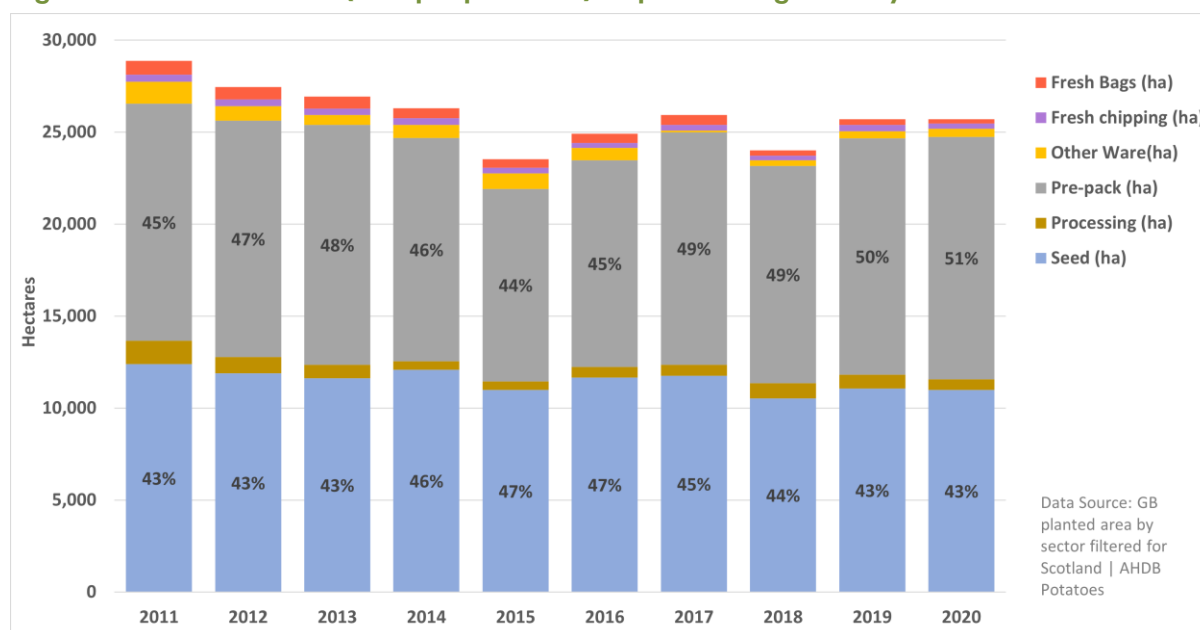
Data source: SASA's Scottish Pesticide Surveys Database (SCOPES)⁷⁶

⁷⁶ [Scottish Pesticide Surveys Database \(SCOPES\) – Arable Crops | SASA \(Science & Advice for Scottish Agriculture\)](#)

4.4 Scotland – Potato markets

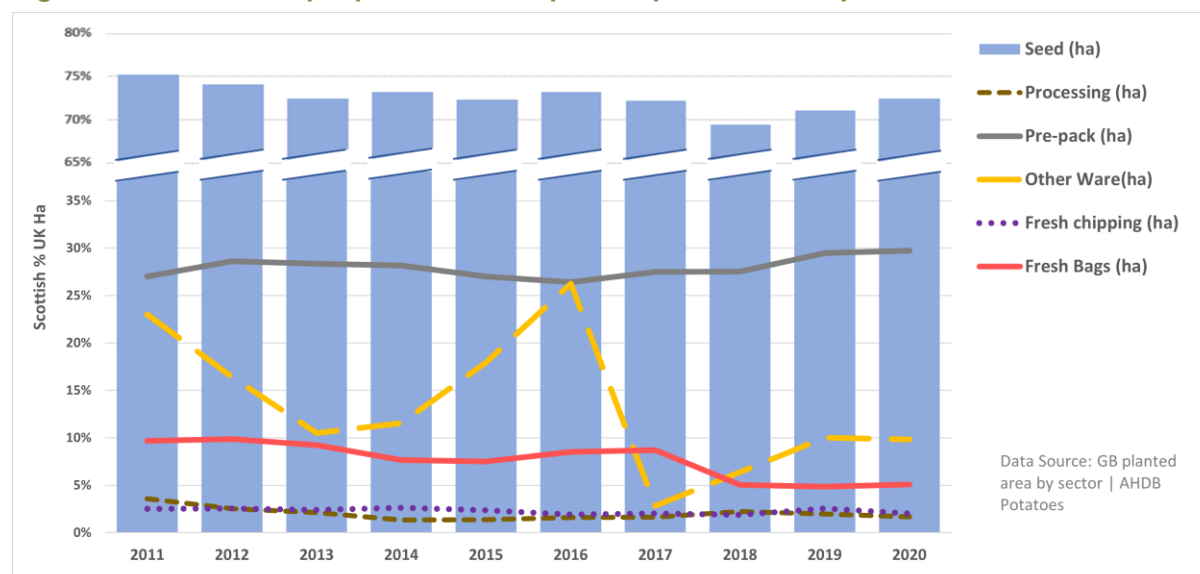
79. Figure 25 shows the estimated area of crop grown for different markets based on AHDB returns. Unlike England and Wales, there is less emphasis on producing for the processing market, with 51% of the Scottish area estimated to be grown for the pre-pack market in 2020, with 43% of the area grown for the seed market. Over the 2011-2020 period the area grown for processing only averaged 2.7% whilst the fresh-bag market accounted for 1.9% (but declining to only 0.9% in 2020) and area grown for chipping relatively stable around the average of 1.2%

Figure 25 Scottish area (and proportions) of potatoes grown by sector



80. It is recognised that Scotland's seed potato sector is important at a GB level as well as internationally. For example, in Scotland between 2011 and 2022 an average of 1.26 hectares of ware potatoes grown for every hectare of seed grown. This is in direct contrast with England and Wales where AHDB data suggests an average of 20.74 hectares of ware were grown per hectare of seed grown for the same period. Indeed, Figure 26 reveals that Scotland consistently accounted for 70-75% of the total GB seed potato area over the 2011 to 2020 period. Scotland also accounted for c.27-30% of GB's area of potatoes grown for the prepack market, but only c.3.5% of the fresh chipping and processing area grown in GB. Scotland's share of the GB area grown for fresh bag sector declined from 9.7% to 5.1% over the period,

Figure 26 Scotland's proportion of GB potato production by sector, 2011 to 2020



4.4.1 Scottish seed potato destinations

81. Using SASA seed labelling data Thomson and Bell (2019)⁷⁷ highlighted the highly concentrated nature of the seed sector, where the 20 largest growers accounted for 68% of Scotland's used certified seed in 2018/19. The sector has a very long tail of smaller seed potato producers growing relatively small amounts of marketable seed.
82. Thomson and Bell reported there were 183 certified Scottish seed potato growers in 2018/19 and they produced 254,000 tonnes with 59% for the domestic UK market and 41% for export markets (see Table 7). 40% of Scottish growers were not reliant on export markets at all and international markets in Egypt, Morocco and Spain were the main destinations for Scottish seed potatoes accounting for a quarter of total Scottish production. Only 10% of PB grade seed grown in Scotland was destined for export in 2018/19, compared to 18% of S grade, 51% of SE grade and 49% of E grade.

Table 7 Tonnage and % of certified Scottish seed potatoes by SPCS grade and destination, and proportion of grade by destination 2018/19

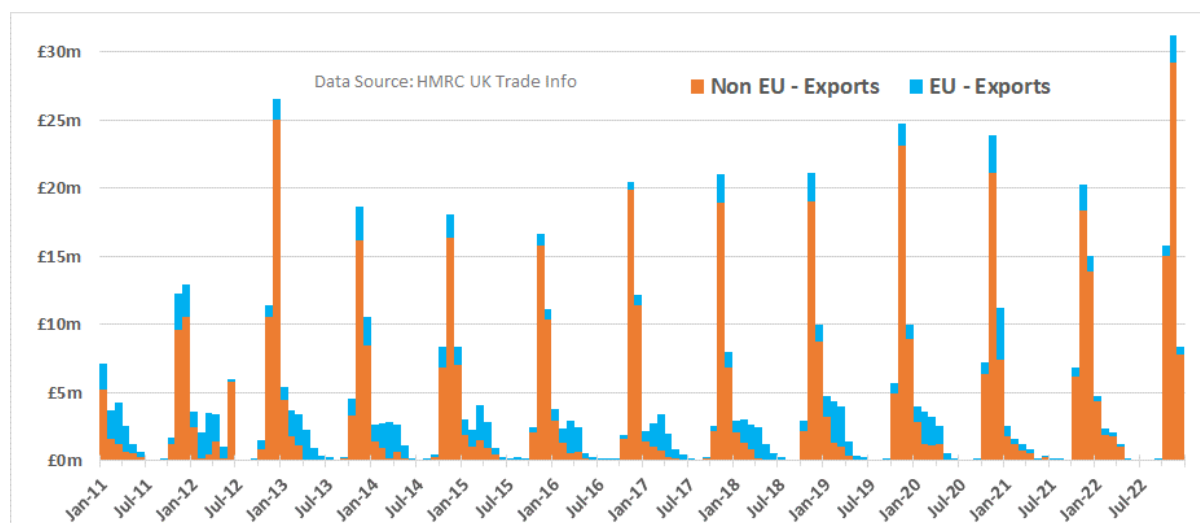
| | PB | | S | | SE | | E | | Total | |
|---------------|---------------|-----|----------------|-----|----------------|-----|-----------------|-----|-----------------|-------|
| EU | 767t | 10% | 6,724t | 11% | 6,810t | 12% | 7,946t | 6% | 22,246t | 8.7% |
| Rest of World | - | 0% | 4,162t | 7% | 23,291t | 39% | 55,865t | 43% | 83,318t | 32.7% |
| UK | 6,680t | 90% | 47,614t | 81% | 29,102t | 49% | 65,627t | 51% | 149,023t | 58.5% |
| Total | 7,447t | | 58,500t | | 59,203t | | 129,438t | | 254,587t | |

Extracted from data tables produced by Thomson and Bell (2019) using SASA seed certification data

⁷⁷ Thomson, S. and Bell, J. (2019) Scottish Seed Potato Sector- Potential Impacts from Brexit. An unpublished report for Scottish Government as part of underpinning support for policy advice in the 2016-2022 Strategic Research Programme

83. Thomson and Bells's analysis of SASA seed labelling data also found that the top 5 exporters accounted for 51,018 tonnes (48%) of Scottish seed potato exports (but only 12% of the Scotland's UK seed market). The top 10 exporters account for 59% of seed exports (25% of Scotland's UK market) and the top 20 exporters accounted for 73% of export volume and 39% of Scotland's seed volume destined for the UK. It should be noted that UK withdrawal from the EU since their report may have affected these patterns. In addition to the main seed market Thomson and Bell also reported trade in seed tubers –with an estimated 2.3 million sold in 2018/19 – mostly in the UK (1.2 million tubers).
84. HMRC data used by Thomson and Bell revealed the per tonne value of exports (as recorded by HMRC) to different destination countries. During 2018/19 the weighted average value of seed potato exports from UK was £557 per tonne to non-EU destinations and £506 per tonne to EU destinations. These values are not an accurate representation of returns to farmers for their product, rather the value of the product to the UK (largely Scottish) economy at the point of exit from the UK. The HMRC data therefore reflects various value elements that include, for example: farmer returns; dressing and packaging costs; plant-breeder royalties; transportation costs; inspection/certification and labelling costs; export costs; insurance, merchant profit margins. Thomson and Bell reported that there was higher value product (per tonne) being sold during the summer months but noted that this was extremely low quantities and was mainly high value specialist seed and propagation material (mini-tubers).
85. There is significant seasonality in seed potato exports with main shipments to Morocco and Egypt occurring from October to January annually – with the peak of trade leaving UK in November each year. Figure 27 shows the seasonal pattern to UK seed potato exports by value split between EU and non-EU destinations. Whilst EU exports generally were made during a longer period the data for 2021-2022 shows the shrinking of that market following the UK's withdrawal from the EU.

Figure 27 Monthly UK seed potato exports by value (£m) to EU and Non-EU destinations (2011-22)



86. Table 8 reveals the value of UK seed potato exports by destination country. Egypt remains the most important international market, worth £39m in 2022, followed by Morocco (£9m in 2022). There has been growth in the value of exports to Thailand, whilst exports to Spain, Netherlands and Ireland have declined since 2020 (although exports to the Canary Islands remain of value – some which Thomson and Bell suggested as being routed through Felixstowe destined for bulking in Rotterdam). Grangemouth was the exit port for 75% of the UK's £69m seed potato exports in 2022, with London Gateway (11%) and Greenock (3%) also playing important roles.

Table 8 Main UK seed potato export markets by value (£ millions), 2011-2022

| | Egypt | Morocco | Thailand | Spain | Indonesia | Saudi Arabia | Turkey | Israel | Netherlands | Ireland |
|-------------|--------|---------|----------|-------|-----------|--------------|--------|--------|-------------|---------|
| 2011 | £16.83 | £5.72 | £1.79 | £6.05 | £0.20 | £1.47 | £1.3 | | £3.13 | £2.33 |
| 2012 | £33.22 | £2.82 | £0.86 | £4.58 | | £1.86 | £1.0 | | £2.14 | £2.10 |
| 2013 | £23.24 | £7.75 | £1.51 | £5.86 | £0.17 | £0.65 | £0.3 | | £2.52 | £2.78 |
| 2014 | £25.55 | £1.94 | £2.11 | £6.22 | £0.63 | £2.13 | £0.8 | | £2.54 | £1.74 |
| 2015 | £23.86 | £3.25 | £0.40 | £3.26 | £0.97 | £1.87 | £2.1 | £0.11 | £2.95 | £1.89 |
| 2016 | £26.38 | £4.58 | £1.82 | £2.27 | £1.50 | £1.75 | £0.9 | £0.03 | £1.78 | £2.44 |
| 2017 | £20.78 | £3.61 | £1.97 | £4.34 | £1.20 | £1.64 | £0.4 | £0.01 | £2.08 | £3.19 |
| 2018 | £22.85 | £4.70 | £2.44 | £4.71 | £1.89 | £1.22 | £0.5 | | £1.73 | £3.33 |
| 2019 | £29.66 | £4.50 | £3.13 | £3.86 | £1.43 | £1.59 | £1.1 | £0.22 | £2.09 | £2.83 |
| 2020 | £24.62 | £4.44 | £3.49 | £4.36 | £1.59 | £2.38 | £2.0 | | £2.93 | £4.92 |
| 2021 | £32.10 | £2.94 | £3.05 | £2.88 | £1.57 | £0.89 | £0.9 | £0.11 | £1.31 | £1.29 |
| 2022 | £39.16 | £8.98 | £4.04 | £2.79 | £2.31 | £1.74 | £1.5 | £1.19 | £0.97 | £0.92 |

Data extracted from HMRC Trade Info⁷⁸ (harmonised system code: 070110 seed potatoes)

⁷⁸ [Overseas trade data table - UK Trade Info](#)

5 Estimating the Economic Contribution of the Potato Sector

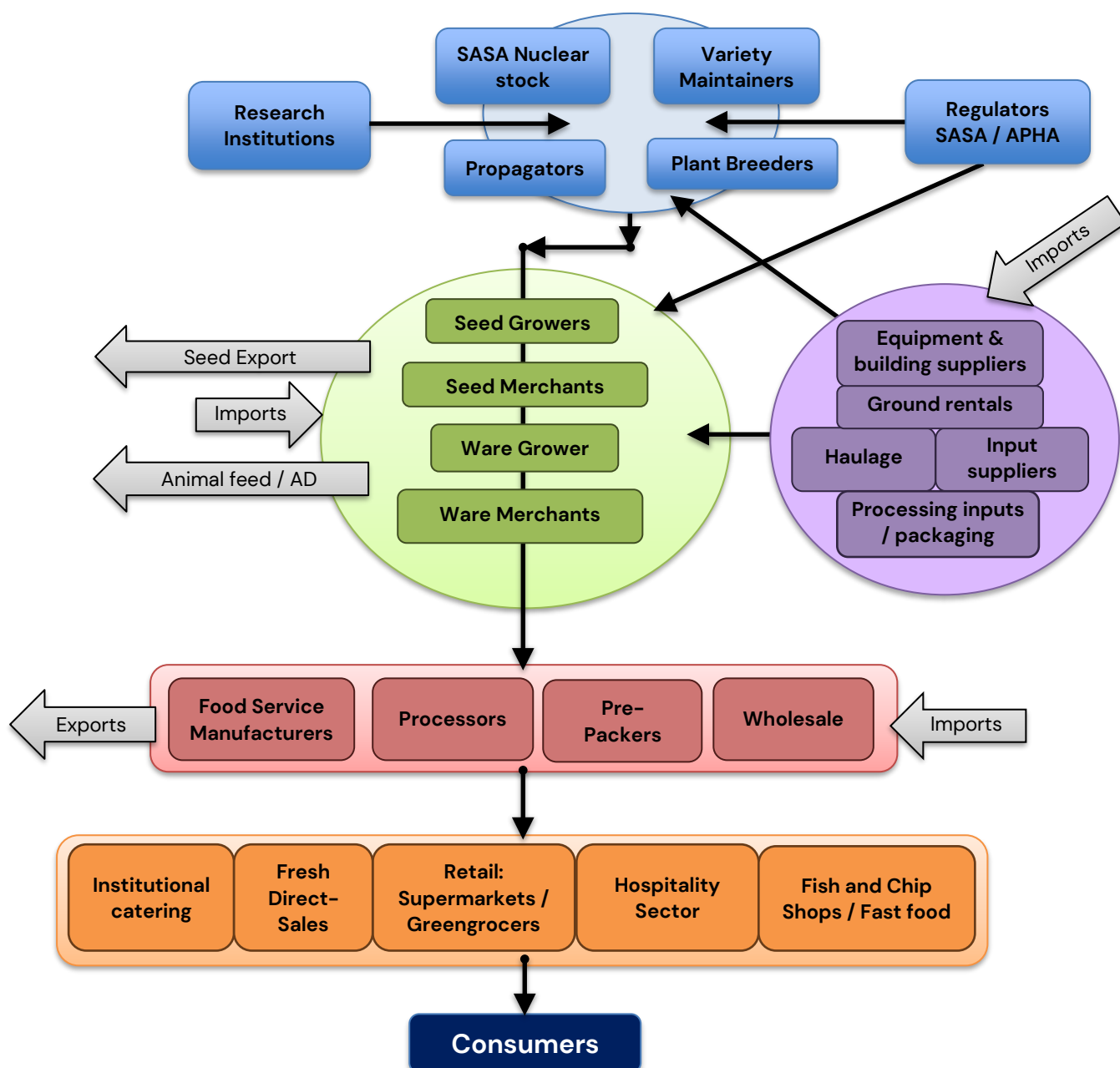
87. To date, there has been no systematic endeavour to estimate the total economic contribution that the seed and ware potato sectors make to the Scottish and UK economy after impacts on sectors upstream and downstream from the farmgate are accounted for. This section of the report uses established methodologies to demonstrate more holistic (but illustrative) estimates of the economic contribution that the wider potato supply chain makes to the economy – a contribution that is significantly underpinned by Scotland’s seed potato sector.

5.1 Farmgate output – an underestimate of economic contribution

88. There are many different ways of assessing the economic contribution of the potato sector in Scotland. The most often quoted figure relating to the sector is the value of farmgate output as estimated by the Scottish Government (based on area, yield and price estimates). The PCN Working Group report utilised this figure: *“The potato industry in Scotland employs over 2,000 people and is worth £250 million to the economy. It has a worldwide reputation for seed health and quality, supplying 77% of the seed for a £928 million GB potato industry and exports worth £55 million.”*
89. However, the Scottish potato sector does not exist in isolation, rather a complex chain of buyers and sellers of goods and services linked across multiple sectors of the economy (as well as geographies) form the ‘potato industry’ in the broadest sense. As such, it is misguided to consider the farmgate output as the extent of the economic contribution from the potato sector. Rather, it is important to consider the wider economic multiplier effects generated from activity in the Scottish potato sector.
90. Figure 28 provides a simplified conceptual illustration of the UK potato supply chain. There are a large number of ‘backward linked’ upstream suppliers (purple and blue) and ‘forward linked’ downstream users (red and orange) whose economic contribution is fully, or partially, derived from the potato growing sector (green). The nature of the potato industry means that a highly specialised supply chain has evolved to supply inputs to, and process and distribute outputs from potatoes grown in Scotland to wider UK, EU and international markets. High quality land, plant breeding, specialised machinery, fertilisers, agronomy, plant protection products, specialised storage and processing facilities, specialised haulage, important research and development and regulatory oversight services are all part of the well-established ‘infrastructure’ required for the sector. Consumers purchase potatoes

(considered a 'staple food'⁷⁹) through many retail and hospitality sectors for 'at-home' and 'eating-out' consumption.

Figure 28 Illustration of UK potato supply chain



Based on: AHDB Potatoes Market Intelligence 2016-2017⁸⁰

⁷⁹ See Stewart, D, and McDougall (2012) Potato; A nutritious, tasty but often maligned staple food. https://www.hutton.ac.uk/webfm_send/743

⁸⁰

<https://projectbluearchive.blob.core.windows.net/media/Default/Potato%20knowledge%20library/GB%20Potatoes%202016-2017.pdf>

5.2 Estimating Economic Contribution – Methodology

91. The use of input-output (IO) multipliers have been used in many international studies to demonstrate the economic contribution of potato sectors (Government of Prince Edward Island, 2020⁸¹; Galinato and Tozer, 2016⁸²; Knudson and Miller, 2023^{83,84}; Potato Growers of Alberta, 2023). Knudson and Miller stress that such approaches assess the contribution of the potato sector rather than estimating their total economic impact (which would require assessment of any displaced economic activity as supply chains in respond to changes in final demand for potatoes). The semantics and importance of recognising the differences between economic contribution and impacts are discussed by Watson et al (2007)⁸⁵ something Knudson and Miller (2023) acknowledge: “*economic contribution assessment does not require conjecturing the nature of agricultural production in the absence of potato production.*”
92. It should be acknowledged that IO tables and multipliers are built around strict assumptions that mean that their use, and that of derived multipliers must be caveated. For example: (i) input proportions are fixed in the production process; (ii) there are no price adjustments or supply constraints; (iii) the supply chain is fully responsive – meeting any new demand for product (even if production capacity is curtailed); (iii) local supply conditions are fixed, even though new inputs may be

5.2.1 Input Output Model

93. Input Output (IO) analysis is a well-known technique developed by Wassily Leontief (1966)⁸⁶ for the quantitative study of inter-industry (supply chain) relations in an economy. IO analysis explores the value of products and services bought and sold throughout the economy, the interdependencies between sectors within the economy which the production of goods and services depend, as well as producer and consumer relationships, and the role of imports and exports.
94. Supply and Use tables aggregate economic data from surveys and are the building blocks of IO analysis. The Supply Table estimates output of a large number of

⁸¹ Ibid.

⁸² Galinato, S.P. and Tozer P.R. (2016) The Economic Contribution of the Potato Industry in Washington [Economic Contribution of Potato Industry-Jan 2016 \(wsu.edu\)](https://www.wsu.edu/economic-contribution-of-potato-industry-jan-2016)

⁸³ Knudson, W., and Miller, S.R. (2023) Measuring the Economic Significance of the US Potato Sector. Michigan State University report for the National Potato Council. [NPCSpudNationReport.pdf \(nationalpotatocouncil.org\)](https://nationalpotatocouncil.org/NPCSpudNationReport.pdf)

⁸⁴ [Potato Growers of Alberta Announce Release of Economic Impact Report \(albertapotatoes.ca\)](https://albertapotatoes.ca/potato-growers-of-alberta-announce-release-of-economic-impact-report/)

⁸⁵ Watson, P., J. Wilson, D. D. Thilmany, and S. Winter. (2007) “Determining Economic Contributions and Impacts: What is the difference and why do we care?” *Journal of Regional Analysis and Policy* 37(2007):141–146. <https://jrap.scholasticahq.com/article/9291.pdf>

⁸⁶ Leontief, W.W. (1966) *Input-Output Economics*. Oxford University Press, Oxford.

different products within each industry (based on Standard Industrial Classification – SIC sectors) including an assessment of principle and secondary outputs. The Use Tables provide estimates of the inputs used to make products within an industry. These published tables do not provide nuanced insights on individual products, rather are shown at broad sectoral level. The Supply and Use Tables are used to model ‘industry by industry’ and ‘product by product’ interdependencies and calculation of economic multipliers. The Scottish Government publish the IO tables annually and provide an oversight of the different tables through their user-guide.⁸⁷

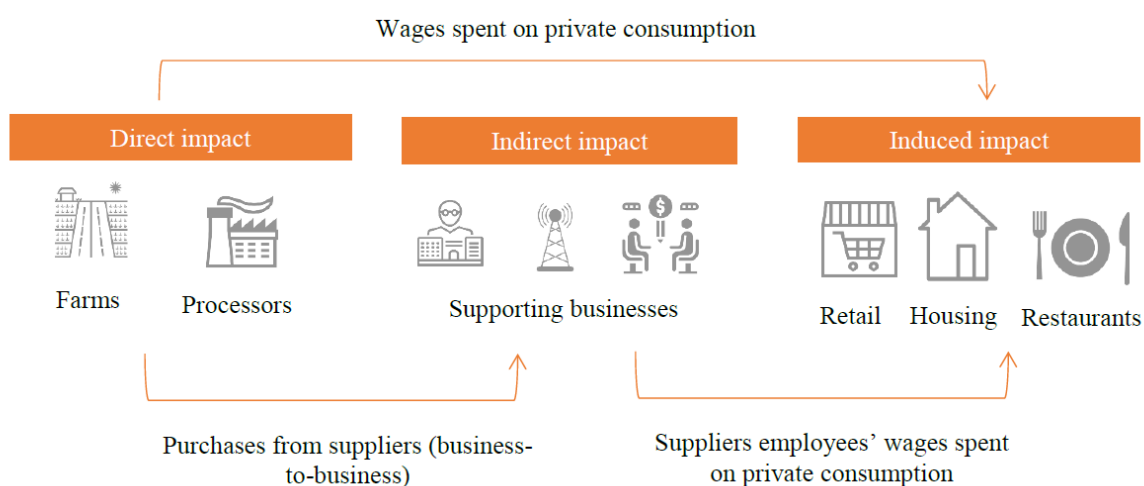
95. Due to the economy wide approach, IO analysis, therefore, enables economic contributions along the production and supply chains to be allocated to consumers, or groups of final products. It is worth noting that within the Scottish IO tables transactions with businesses and consumers in the rest of the UK are considered as exports or imports. This means the economic contribution derived from the Scottish IO tables are estimates of contribution to the Scottish economy alone, and any added value that occurs in the rest of the UK (‘leakage’) is not captured. This means that any added value from seed potato export to England and Wales for growing-on to produce raw material for processing, or for packing for direct sales as fresh potatoes is missing when using the Scottish IO model. The use of UK IO tables⁸⁸ somewhat addresses this problem, but then leads to other challenges in terms of using UK industry structures and interdependencies that are often heavily skewed by English business structures and networks (as previously described the Scottish potato sector differs significantly from that in England and Wales).
96. The direct impact of expenditure made by the potato sector in Scotland is evident – the farmgate value of seed and ware potatoes. However, potato production requires inputs from other sectors will in turn rely on purchases being made from other sectors that lead to what is called ‘multiplier effects’. For example, an increase in the supply of seed potatoes to meet additional demand would also result in increased demand for supplies from plant breeders and variety maintainers, agronomists, fuel, fertiliser, machinery, labour, regulators, etc. Those seed potatoes then may be used to produce ware potatoes that are packed and processed and sold through various outlets to consumers. Those supply chain purchases of goods and services upstream, coupled with the downstream value chain derived from home-grown potatoes all act to ‘multiply’ the economic contribution derived from the farmgate value of seed potatoes – so called ‘ripple effects’.

⁸⁷ > [Supply Table - Supply, Use and Input-Output Tables - gov.scot \(www.gov.scot\)](http://www.gov.scot)

⁸⁸ [UK input-output analytical tables, product by product - Office for National Statistics \(ons.gov.uk\)](http://ons.gov.uk)

97. Backward linkages describe how a change in final demand for a sector's output increases demand for its production inputs (e.g. machinery, agronomy advice, potato boxes). Forward linkages describe how a change in the output of one sector (e.g. potato growing) leads to increased economic activity in other sectors (e.g. haulage, processing, hospitality) and to final demand by consumers and exporters. These backward and forward linkage interactions set off a chain reaction of indirect and induced employment, income and output impacts as the economy adjusts to the new level of economic activity stimulated by changes in demand for a product / from an industry.
98. Using input-output approaches the strengths of backward 'upstream' and forward 'downstream' linkages can be assessed. In any industry demand for product contributes: (i) a 'direct' effect as supply responds and that leads to: (ii) secondary 'indirect' effects as producers purchase raw materials, and; (iii) further 'induced' impacts across the economy as workers and businesses spend their earnings (see Figure 29 for an illustration of broad impact categories).

Figure 29 Economic impact categories of potato sector



Source: Government of Prince Edward Island (2020)⁸⁹

99. To aid calculation of inter-industry linkages the Scottish Government also publish multipliers for each industry sector, derived from the IO tables. These multipliers provide a useful framework to estimate economic impacts and changes within an economy. Two types of multipliers are estimated.
- **Type 1 multipliers** deal with the "direct" (i.e. suppliers meeting demand) and "indirect" impacts (e.g. supply change impacts). These multipliers may

⁸⁹ Government of Prince Edward Island (2020). The Prince Edward Island Potato Sector: An Economic Impact Analysis. [PEI Potato Sector – Economic Impact Report | Government of Prince Edward Island](#)

potentially underestimate sectoral impacts on an economy as they do not estimate induced effects.

- **Type 2 multipliers** deal with **direct** and **indirect** impacts as well as “**induced**” impacts. Induced impacts arise from changes to household income (earned wages spent on goods and services) that are a consequence of changes in demand across all associated sectors of the economy (e.g. potato harvesters, fertilisers, sprays, hauliers, crisp manufacturers) driven by changes in final demand for a product by consumers (raw potatoes, crisps, chips, etc). It should be noted that the ONS no longer publish Type 2 multipliers for the UK that means induced impacts such as wage spend from downstream potato hauliers, processors and retailers is not available (**this is important as most of GB potato processing happens in England**).

100. A number of different economic and employment multipliers are derived from IO tables that can be utilised and can be used to provide better estimates of how a sector, or change in demand for a product, impacts on different measures of economic activity.⁹⁰

- The **Output Multiplier** can be used to show how changes to the final demand (the direct impact) of potato production on output/revenue throughout all sectors of the Scottish economy through indirect (supply chain) and induced (wage spend) impacts.
- The **Employment Multiplier** is used to estimate the number jobs that are created elsewhere in the economy as a result of an additional job in a potato sector (the direct change).
- The **Employment Effect** allows an estimate to be made of employment changes in the wider economy as a result of changes to the final demand (output) for potato products.
- The **Income Multiplier** show the estimated change in household income (salaries) that occurs throughout the wider economy as a result of a change in the direct incomes earned by potato growers.
- The **Income Effect** allows estimates to be made of the change in household incomes throughout the economy resulting from an changes in the final demand (output) for potato products.
- The **GVA Effect** provides an estimate of the impacts on the economy’s Gross Value Added (GVA) resulting from an increase in the final demand (output) for potato products.

101. Therefore, the output, employment and income ‘multipliers’ use the changes in sectoral output, employment and wages to estimate the total impacts on the

⁹⁰ <http://www.scotland.gov.uk/Topics/Statistics/Browse/Economy/Input-Output/Multipliers>

economy. The employment, income and GVA 'effects' all use the change in sectoral output to estimate the total economic impacts.

102. Using income and expenditure data from potato growers with IO multipliers permits the impacts arising from input purchases made by potato grower to be estimated for IO industry groups. For example, potato growers purchase of crop protection products ultimately affect the 'Inorganic chemicals, dyestuffs & agrochemicals' industry group in the IO tables. Thus these backward linkage impacts can be assessed from buying chemicals by using the appropriate multipliers.

5.2.2 Disaggregated IO Tables

103. Thomson *et al.* (2022)⁹¹ used econometric methods to disaggregate the agricultural sector in the UK and Scottish IO tables using data from the Annual Business Survey (ABS), and the annual Farm Business Survey (FBS), alongside data (locational, employment and revenue) extracted from the Inter-Departmental Business Register (IDBR). Whilst the disaggregation used the 2013 IO tables it provided insights into modelled potato sector linkages across the economy, as well as estimated economic multipliers associated with the potato sector.
104. Thomson *et al.* (2022) estimated Type I backward multipliers (see Table 9) suggest that for every £1 increase potato sector output in Scotland there would be an additional £0.42 economic contribution generated along the supply chain. Equally for every £1 in potato growing output there would be £1.27 generated in downstream sectors. The estimated Scottish Type II potato sector multiplier is very similar to Type I multiplier suggesting there is limited induced economic contribution to the wider economy from changes in sectoral output.
105. In comparison, reflecting greater added value and processing, the UK Type II multiplier (2.794) suggests that every £1 change in potato sector output (direct effect) leads to £0.77 indirect contribution along the supply chain, and leads to a further £1.02 contribution to the wider economy through households spending increased earnings. The higher UK Type I multipliers likely reflect the larger scale of the sector and less reliance on 'imports' in terms of inputs (e.g. fertilizers, sprays, etc).

Table 9 Estimated potato sector backward and forward output multipliers, 2013

| | Backward | Forward |
|--------------------------------------|----------|---------|
| Scotland Type I Output | 1.42 | 1.27 |
| Scotland Type II Output | 1.43 | |
| United Kingdom Type I Output | 1.77 | 1.68 |
| United Kingdom Type II Output | 2.79 | |

⁹¹ Thomson, S. Revoredo-Giha, C., Atterton, J., Meador, E., McMillan, J. (2022) Evaluating the significance of agri-supply chains in rural economies: Inter-industry dependency insights from disaggregating UK Input-Output tables. A report for Defra (unpublished)

5.3 Potato Sector Economic Data

5.3.1 Potato growing costs and returns

106. Following discussion with the wider PCN research team it was agreed to collect economic data directly from growers in the sector. Whilst there were useful discussions with individual growers, it quickly became apparent that data was presented in different formats and headings, and there was a sense of unease about directly sharing commercially sensitive information.
107. Following initial discussions with SAC Consulting it was suggested that the AHDB's Farmbench⁹² online benchmarking database may provide sufficient detail to undertake the required upstream economic contribution assessment. Reviewing entries from 5 anonymised farms it was decided that the consistent structure of the data, with multiple entries over a number of years would likely provide the best available economic data regarding on farm expenditure in producing both seed and ware potatoes in Scotland.
108. Following an approach to AHDB⁹³, SRUC were provided summary (average) data of seed and ware Farmbench entries made by Scottish growers between 2017 and 2021 – as well as the same data for ware growers in England and Wales for the same period. The importance of the AHDB data to this study is fully acknowledged and their support for this project was pivotal in cementing the methodological approach taken in assessing the upstream impacts of the sector.
109. Average financial data for ware and seed potato production (2017–2021) in Scotland, as well as England & Wales (note in England & Wales a limited number of seed potato entries, particularly as it is for a single year), was used and aligned to Standard Industrial Classification (SIC) sectors. 41.5 hectares between 2017 and 2021, yielding 36.9 tonnes per hectare worth £230 per tonne. In contrast Scottish Farmbench ware growers only grew 34.3 hectares on average, yielding 51.8 tonnes per hectare at £166 per tonne.
110. Table 10 shows the average area of seed potato grown by Scottish Farmbench users was 41.5 hectares between 2017 and 2021, yielding 36.9 tonnes per hectare worth £230 per tonne. In contrast Scottish Farmbench ware growers only grew 34.3 hectares on average, yielding 51.8 tonnes per hectare at £166 per tonne.

⁹² [Farmbench – a farm business comparison tool | AHDB](#)

⁹³ We are grateful to Mark Topliff (formerly of AHDB), and AHDB for provision of Farmbench data.

Table 10 Average area grown, yield and price of seed and ware potatoes across Scottish, and English & Welsh growers using Farmbench

| | AHDB FARBENCH | | 2017-21 | 2017-21 | 2017-21 | 2017-18 |
|-----------------------|---------------|----------|---------|---------|---------|---------|
| Enterprise Location | Scotland | Scotland | E&W | E&W | | |
| Enterprise type | Ware | Seed | Ware | Seed | | |
| Total area grown (ha) | 34.31 | 41.51 | 50.89 | 12.48 | | |
| Yield (t/ha) | 51.77 | 36.87 | 40.31 | 17.32 | | |
| Price (£/t) | £166 | £230 | £210 | £307 | | |

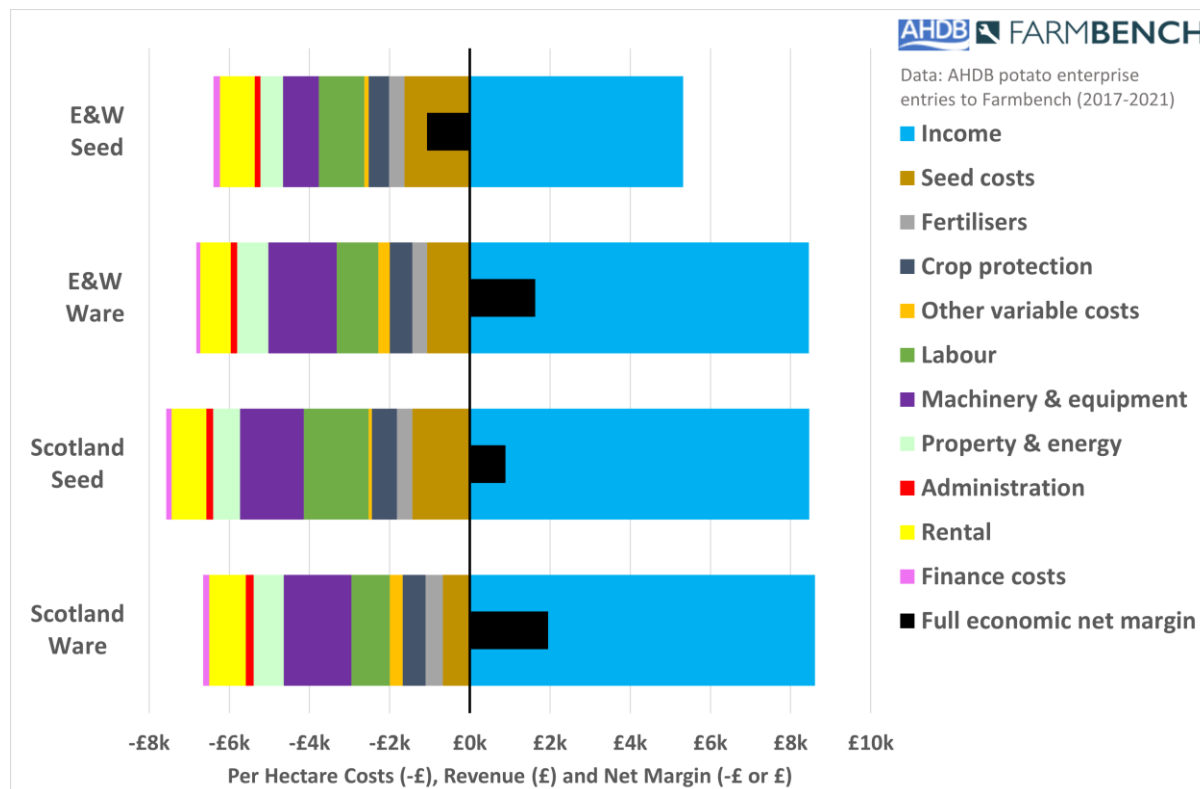
11. Details of the detailed comprehensive cost and revenue entries, along with allocation of cost elements to SIC codes is provided in Annex 5 – AHDB average Farmbench potato costs & returns. Figure 30 shows the average income, costs of production (by broad category) and net margin for AHDB Farmbench seed and ware potato enterprises for Scotland and England and Wales for the 2017–2021 period.⁹⁴ The average revenues ranged from £5.3k/Ha for seed producers in England and Wales to £8.6k/Ha for ware growers in Scotland. Some key observations include:

- Higher seed costs were a clear difference between seed and ware growers – with seed growers paying c.£760/Ha more than ware growers in Scotland (with £564 the corresponding figure in England & Wales), that partially reflects the use of more expensive, higher grade seeds, but also the payment of royalties to plant breeders for some varieties.
- Scottish seed growers were also spending (c.£660/Ha) more on labour that reflects greater labour intensity on grading, etc activities. (21% of costs compared to 14% for ware growers). Seed producers had considerably greater reliance on paid labour compared to ‘unpaid’ family labour (which has been given a notional value)./
- Reflecting demand for clean ground, seed growers were paying c.£260/ha more for rented grounds, whilst ware growers were more reliant on using their own ground (where a notional rental payment is made).
- Crop protection costs were marginally higher (c.£40/ha) for seed growers in Scotland. The English data is skewed due to only a single year of seed growing costs being made available – and Section 5 (Scotland – Crop Protection) reveals considerable variation in crop protection product use between growing seasons.
- Ware growers in Scotland were spending c.£106/Ha more on machinery and equipment, and notably on haulage (c.£250/Ha more) than seed growers.

⁹⁴ Note that seed potato data for England and Wales is based on relatively few entries from a single year (2017/18).

- Net margins for ware potatoes were c.20% of income/turnover (23% in Scotland and 19% in England & Wales). For Scottish seed producers' net margins were lower at c.11% of income/turnover.

Figure 30 Summary costs and net returns (£/Ha) to AHDB Farmbench potato enterprises by region of production, 2017–2021



5.3.2 Potato research and governance costs

112. In addition to the on-farm expenditure a number of industry and Government sponsored research projects run annually. These research projects, alongside plant-breeders inhouse research, are instrumental in safeguarding and growing the economic contribution of the Scottish seed and ware sectors. It was estimated that SRUC and JHI were undertaking potato research worth c.£3m annually.
113. In addition to the research costs, Scotland's high health status for seed potatoes leads to associated costs from regulating the industry and in maintaining royalty free varieties and in providing nuclear stock for micro-propagators. SASA currently employ c.200 FTEs of which 80 are principally involved in the seed potato sector. SASA's annual staff costs are c.£10m and running costs extend to c.£4m. This means

c.£4m in staff costs and c.£1m in running costs⁹⁵ are attributable to governance and regulation of the Scottish seed potato sector.

5.3.3 Linking Farmbench to IO Multipliers

114. Each of the AHDB Farmbench potato growing cost categories were allocated to SIC codes⁹⁶ using expert opinion and online lookup tools⁹⁷. These SIC codes were then matched to the IO industry groupings⁹⁸ (see Table 11).

Table 11 Mapping Farmbench to SIC Codes and IO Industry Groups

| Farmbench Category | SIC Description | SIC Code | IO Industry Group |
|---|--|-----------------|-------------------------|
| Purchased seed | Growing of vegetables & melons, roots & tubers | 01130 | Agriculture |
| Organic fertilisers | Raising of dairy cattle / other cattle & buffaloes | 01410/ 01420 | |
| Agronomy fees | Support activities for crop production | 01610 | |
| General contracting | | | |
| Enterprise specific contracting | | | |
| Third party storage | Post-harvest crop activities | 01630 | |
| Paid rent | Growing of non-perennial crops | 011 | |
| Imputed rent on owned land | | | |
| Trace elements | Manufacture of lime & plaster | 23520 | Cement lime & plaster |
| Lime cost share | | | |
| Paid labour | N/A | N/A | Compensation of workers |
| Unpaid labour | | | |
| Property repairs | Construction of commercial buildings | 41201 | Construction |
| General farm maintenance | | | |
| Buildings, structures & drainage depreciation | | | |
| Store maintenance | | | |
| Electricity | Trade of electricity | 35140 | Electricity |
| Drying & storage energy | | | |
| Overdraft interest & fees | Banks | 64191 | Financial services |

⁹⁵ This was adjusted after discussions with SASA to better reflect the cost of services that are not paid for by growers

⁹⁶ See <http://www.siccodesupport.co.uk/>

⁹⁷ See [SIC Code Search - What is my SIC Code?](#)

⁹⁸

<https://www.gov.scot/binaries/content/documents/govscot/publications/statistics/2019/08/input-output-latest/documents/suts-sic2007-classification-pdf/suts-sic2007-classification-pdf/govscot%3Adocument/SUT-Classifications-SIC07.pdf>

| Farmbench Category | SIC Description | SIC Code | IO Industry Group | | |
|-------------------------------|---|----------|--|---|-----------------------|
| Bank charges & fees | | | | | |
| Loan interest & fees | | | | | |
| Hire purchase interest & fees | Other credit granting | 64929 | | | |
| Inorganic fertiliser | Manufacture of fertilisers & nitrogen compounds | 20150 | Inorganic chemicals, dyestuffs & agrochemicals | | |
| Seed treatment | Manufacture of pesticides & other agrochemical products | 20200 | | | |
| Herbicides | | | | | |
| Fungicides | | | | | |
| Insecticides | | | | | |
| Nematicides | | | | | |
| Molluscicides | | | | | |
| Other crop protection | | | | | |
| Sprout suppression | | | | | |
| Insurance | | | | Insurance, reinsurance & pension funding, except compulsory social security | 65 |
| Equipment depreciation | | | Manufacture of agricultural & forestry machinery | 283 | Machinery & equipment |
| Mole ploughing cost share | Manufacture of agricultural & forestry machinery (other than agricultural tractors) | 28302 | | | |
| Soil conditioners cost share | | | | | |
| Haulage | Freight transport by road | 49410 | Other land transport | | |
| Subscriptions | Other professional, scientific & technical activities (not including environmental consultancy or quantity surveying) nec | 74 | Other professional services | | |
| Professional fees | | | | | |
| Seed certification | Regulation of & contribution to more efficient operation of businesses | 84130 | Public administration & defence | | |
| Levy | | | | | |
| Equipment hire & leasing | Renting & leasing of agricultural machinery & equipment | 77310 | Rental & leasing services | | |
| Equipment spares & repairs | Repair of fabricated metal products, machinery & equipment | 331 | Repair & maintenance | | |
| Sundries | Retail trade, except of motor vehicles & motorcycles | 47 | Retail - excl vehicles | | |
| Telephone & office | Telecommunications | 61 | Telecommunications | | |
| Fleece | Manufacture of other textiles | 139 | Textiles | | |
| Water | Water collection, treatment & supply | 36 | Water & sewerage | | |
| Fuel | Wholesale of petroleum & petroleum products | 46711 | Wholesale - excl vehicles | | |

115. The Type I and Type II economic multipliers for each upstream (input suppliers) IO industry group that potato growers purchase from were extracted to estimate the upstream economic contribution of the seed and ware potato sectors. These multipliers are shown for Scotland (2019) in Table 12.

Table 12 Scottish Type I and Type II multipliers for potato sector upstream purchases, 2019

| Industry Grouping | Output Multiplier | | Income Effect | | Employment Effect | | GVA Effect | |
|--|-------------------|---------|---------------|---------|-------------------|---------|------------|---------|
| | Type1 | Type II | Type1 | Type II | Type1 | Type II | Type1 | Type II |
| Agriculture | 1.50 | 1.63 | 0.24 | 0.27 | 12.48 | 13.54 | 0.68 | 0.60 |
| Cement lime & plaster | 1.57 | 1.75 | 0.35 | 0.40 | 9.54 | 11.09 | 0.66 | 0.55 |
| Construction | 1.53 | 1.73 | 0.37 | 0.42 | 12.33 | 13.97 | 0.80 | 0.68 |
| Electricity | 1.66 | 1.77 | 0.19 | 0.22 | 3.90 | 4.75 | 0.72 | 0.66 |
| Financial services | 1.36 | 1.55 | 0.36 | 0.41 | 6.90 | 8.51 | 0.82 | 0.70 |
| Inorganic chemicals, dyestuffs & agrochemicals | 1.25 | 1.41 | 0.31 | 0.35 | 5.77 | 7.13 | 0.77 | 0.67 |
| Insurance & pensions | 1.40 | 1.51 | 0.20 | 0.23 | 4.06 | 4.94 | 0.62 | 0.56 |
| Machinery & equipment | 1.34 | 1.55 | 0.40 | 0.45 | 8.04 | 9.80 | 0.70 | 0.57 |
| Other land transport | 1.28 | 1.53 | 0.46 | 0.52 | 14.98 | 17.00 | 0.80 | 0.65 |
| Other professional services | 1.33 | 1.61 | 0.51 | 0.58 | 17.35 | 19.62 | 0.89 | 0.72 |
| Public administration & defence | 1.28 | 1.55 | 0.51 | 0.58 | 10.42 | 12.69 | 0.91 | 0.74 |
| Rental and leasing services | 1.26 | 1.45 | 0.34 | 0.39 | 11.18 | 12.69 | 0.87 | 0.75 |
| Repair & maintenance | 1.21 | 1.47 | 0.48 | 0.55 | 6.18 | 8.31 | 0.89 | 0.73 |
| Research & development | 1.46 | 1.72 | 0.49 | 0.55 | 11.54 | 13.69 | 0.81 | 0.65 |
| Retail – excl vehicles | 1.26 | 1.53 | 0.50 | 0.57 | 19.39 | 21.60 | 0.98 | 0.82 |
| Telecommunications | 1.20 | 1.45 | 0.47 | 0.53 | 11.36 | 13.42 | 0.94 | 0.79 |
| Textiles | 1.30 | 1.57 | 0.51 | 0.58 | 12.80 | 15.03 | 0.84 | 0.67 |
| Water and sewerage | 1.26 | 1.37 | 0.21 | 0.24 | 4.82 | 5.74 | 0.87 | 0.80 |
| Wholesale – excl vehicles | 1.33 | 1.55 | 0.40 | 0.45 | 9.34 | 11.08 | 0.82 | 0.69 |

6 Results – upstream economic contribution of the Scottish potato sector

116. Gross value added (GVA) derived from Scottish potato production can be calculated by summing labour costs, self employment returns and retained profits. Thus, the GVA generated from Scottish potato growers amounted to £78.3m (average 2017–2021). Of that £26.2m was attributable to seed potato growing and £52.1m to ware potato growing.

6.1 Estimates of Upstream ‘backward’ linked economic contribution

117. Combining the area of potatoes grown, with AHDB Farmbench data and economic multipliers derived from IO tables the estimated backward linked (upstream) economic contribution of the sector can be estimated.

6.1.1 Seed potatoes

118. From 10,453 hectares of Scottish seed potatoes (average 2017–2021⁹⁹) total farm returns of c.£88.5 million (£8,465/Ha) and total farm costs (including on farm labour at £16.9m) of c.£79.2m (£7,573/Ha) were estimated. **Error! Reference source not found.** shows that from direct non-staff expenditure of c.£62m this supported total economic output of c.£98m along upstream supply chains, and through direct purchases, indirect supply chain impacts and induced expenditure arising from wages earned along the input supply chain. When research and development costs (£3.2m) and SASA running costs (£1m) attributable to seed potatoes were added the total upstream economic contribution arising from Scottish seed potato expenditure extended to c.£105m from c.£67m expenditure. That total direct expenditure was estimated to contribute c.£24m to Scottish household incomes from the workforce along the seed potato sector supply chain on top of c.£17m earned by farm workers and SASA staff after deduction for estimated tax, pension and National Insurance contributions of 20%.
119. It was estimated that 675 Full Time Equivalent (FTE) jobs were supported along the seed potato supply chain (including the research and regulatory running cost input supply chain) with 557 FTEs estimated to be employed directly on farm (on-farm estimated at £17 per hour cost and 2,080 hours per FTE) and by SASA. Seed potato growers were estimated to have generated c.£89m in revenue, with c.£9m retained as profit. The contribution to Scottish Gross Value Added (GVA) was estimated to be c.£50m including research and regulation contributions and c. £26m on farm.

⁹⁹ Area entered for certification to SASA

Table 13 Estimated upstream economic contribution from the Scottish seed potato sector (average 2017–2021) using Type II IO multipliers (2019)

| Farmbench Cost Category | Spend per Ha | Upstream impacts (direct, indirect and induced impacts) | | | |
|--------------------------------------|---------------|--|---------------|-------------------|---------------|
| | | Output Multiplier | Income Effect | Employment Effect | GVA Effect |
| Buildings depreciation | £106.61 | £1.9m | £0.5m | 16 FTEs | £0.9m |
| Contacting | £184.33 | £3.1m | £0.5m | 26 FTEs | £1.3m |
| Crop protection | £677.67 | £10.0m | £2.5m | 51 FTEs | £5.5m |
| Electricity | £355.34 | £6.6m | £0.8m | 18 FTEs | £2.7m |
| Equipment Hire & Leasing | £80.85 | £1.2m | £0.3m | 11 FTEs | £0.7m |
| Equipment spares & repairs | £262.92 | £4.0m | £1.5m | 23 FTEs | £2.4m |
| Finance | £133.41 | £2.2m | £0.6m | 12 FTEs | £1.1m |
| Fuel | £335.57 | £5.4m | £1.6m | 39 FTEs | £2.9m |
| Inorganic fertiliser | £371.04 | £5.5m | £1.4m | 28 FTEs | £3.0m |
| Insurance | £72.82 | £1.1m | £0.2m | 4 FTEs | £0.5m |
| Lime & Trace Elements | £16.65 | £0.3m | £0.1m | 2 FTEs | £0.1m |
| Machinery depreciation | £727.05 | £11.8m | £3.4m | 74 FTEs | £5.3m |
| Office & Admin | £38.38 | £0.6m | £0.2m | 5 FTEs | £0.4m |
| Professional fees | £69.86 | £1.2m | £0.2m | 10 FTEs | £0.5m |
| Property repairs & Maintenance | £181.10 | £3.3m | £0.8m | 26 FTEs | £1.5m |
| Regulation | £98.98 | £1.6m | £0.6m | 13 FTEs | £0.9m |
| Rent | £868.89 | £14.8m | £2.5m | 123 FTEs | £6.2m |
| Seed | £1,320.81 | £22.5m | £3.8m | 187 FTEs | £9.4m |
| Sprout suppressant | £3.22 | £0.0m | £0.0m | 0 FTEs | £0.0m |
| Sundries | £25.24 | £0.4m | £0.2m | 6 FTEs | £0.3m |
| Transport | £4.77 | £0.1m | £0.0m | 1 FTEs | £0.0m |
| Water | £21.24 | £0.3m | £0.1m | 1 FTEs | £0.2m |
| Total non-staff growing costs | £62.3m | £98.0m | £21.6m | 675 FTEs | £46.0m |
| Research & development | £3.2m | £5.5m | £1.8m | 44 FTEs | £2.6m |
| SASA running costs | £1.0m | £1.6m | £0.6m | 13 FTEs | £0.9m |
| Total non-staff contribution | £66.5m | £105.1m | £24.0m | 731 FTEs | £49.5m |
| Labour costs | | | | | |
| On farm labour | £16.9m | (£1,616/ha) | | 478 FTEs | |
| SASA Staff | £4.0m | | | 80 FTEs | |
| Revenue & retained profit | | | | | |
| Farm Revenue | £88.5m | | | | |
| Farm Retained Profits | £9.3m | (£892/ha) | | | |

6.1.2 Ware potatoes

120. From 17,917 hectares of Scottish ware potatoes (2017–2021 average¹⁰⁰) total farm output of c.£154 million (£8,608/ha) and costs of c.£119m (£6,654/ha) were estimated. Table 14 shows that direct non staff expenditure of c.£102m made by ware growers supported total economic output of c.£160m through direct purchases, indirect supply chain impacts and induced expenditure arising from

¹⁰⁰ Calculated by subtracting area of seed entered to SASA for inspection from June Agricultural Census total area (which is in turn derived from Single Application Form entries to the Scottish Government)

wages earned along the input supply chain. That total direct expenditure was estimated to contribute c.£37m to Scottish household incomes of workers along the ware potato sector upstream supply chain – on top of the estimated c.£17m direct on-farm earnings by farm workers (after estimated tax, pension and National Insurance contributions of 20%).

Table 14 Estimated upstream economic contribution from the Scottish ware potato sector using Type II IO multipliers, 2019

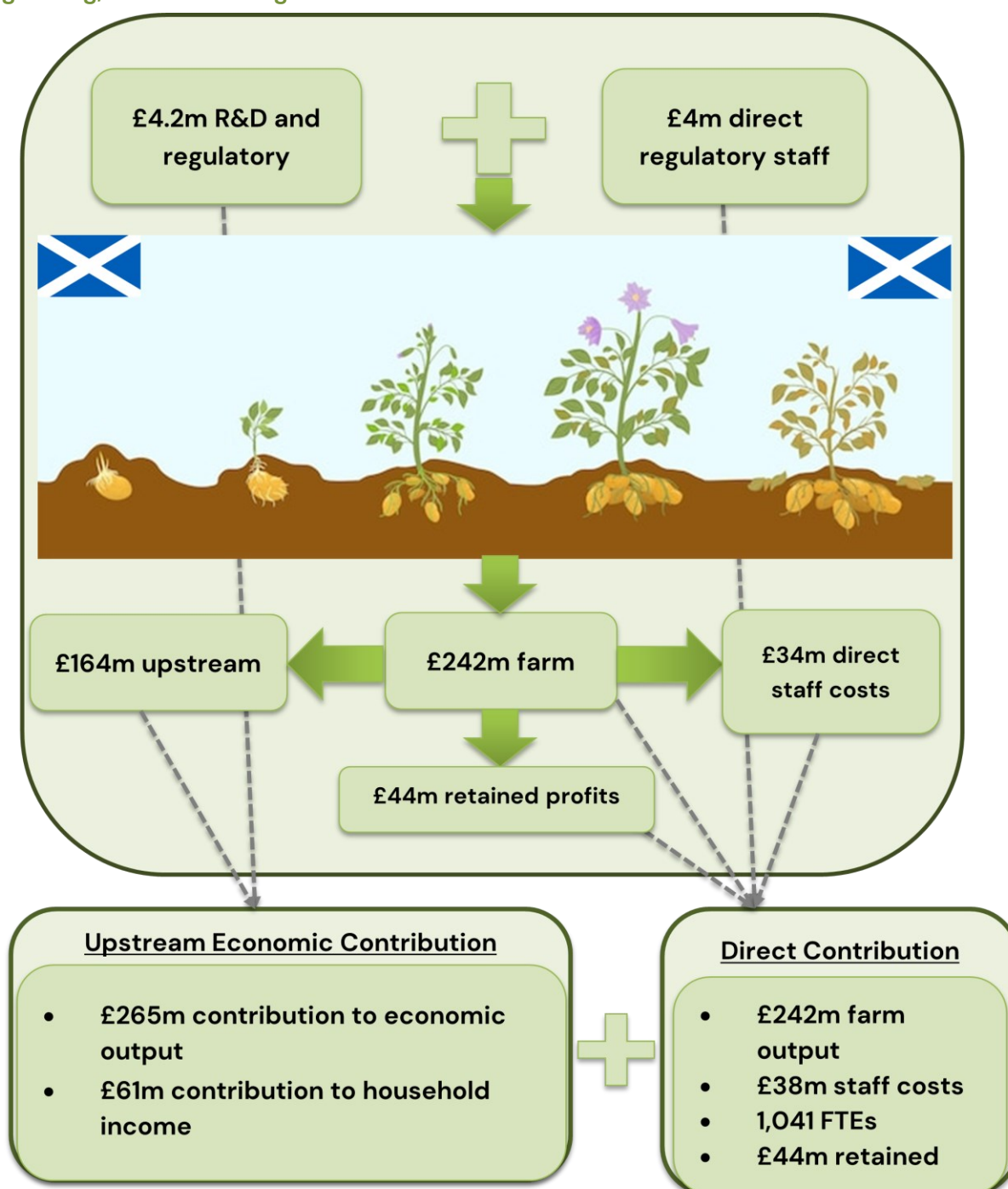
| Farmbench Cost Category | Spend per Ha | Upstream impacts (direct, indirect and induced impacts) | | | |
|--------------------------------------|----------------|--|---------------|-------------------|---------------|
| | | Output Multiplier | Income Effect | Employment Effect | GVA Effect |
| Buildings depreciation | £161.10 | £5.0m | £1.2m | 40 FTEs | £2.3m |
| Contacting | £211.19 | £6.2m | £1.0m | 51 FTEs | £2.6m |
| Crop protection | £620.39 | £15.7m | £3.9m | 79 FTEs | £8.6m |
| Electricity | £326.18 | £10.3m | £1.3m | 28 FTEs | £4.2m |
| Equipment Hire & Leasing | £103.07 | £2.7m | £0.7m | 23 FTEs | £1.6m |
| Equipment spares and repairs | £330.30 | £8.7m | £3.2m | 49 FTEs | £5.2m |
| Finance | £149.67 | £4.2m | £1.1m | 23 FTEs | £2.2m |
| Fleece | £1.68 | £0.0m | £0.0m | 0 FTEs | £0.0m |
| Fuel | £356.49 | £9.9m | £2.9m | 71 FTEs | £5.2m |
| Inorganic fertiliser | £383.25 | £9.7m | £2.4m | 49 FTEs | £5.3m |
| Insurance | £95.90 | £2.6m | £0.4m | 8 FTEs | £1.1m |
| Lime & Trace Elements | £32.69 | £1.0m | £0.2m | 6 FTEs | £0.4m |
| Machinery depreciation | £696.60 | £19.4m | £5.6m | 122 FTEs | £8.7m |
| Office and Admin | £28.97 | £0.8m | £0.3m | 7 FTEs | £0.5m |
| Organic fertiliser | £13.04 | £0.4m | £0.1m | 3 FTEs | £0.2m |
| Professional fees | £78.34 | £2.3m | £0.4m | 19 FTEs | £1.0m |
| Property repairs & Maintenance | £166.40 | £5.2m | £1.3m | 42 FTEs | £2.4m |
| Regulation | £44.27 | £1.2m | £0.5m | 10 FTEs | £0.7m |
| Rent | £972.72 | £28.4m | £4.7m | 236 FTEs | £11.9m |
| Seed | £623.86 | £18.2m | £3.0m | 151 FTEs | £7.6m |
| Sprout suppressant | £15.71 | £0.4m | £0.1m | 2 FTEs | £0.2m |
| Sundries | £16.75 | £0.5m | £0.2m | 6 FTEs | £0.3m |
| Transport | £255.27 | £7.0m | £2.4m | 78 FTEs | £3.6m |
| Water | £16.57 | £0.4m | £0.1m | 2 FTEs | £0.3m |
| Total non-staff growing costs | £102.1m | £160.1m | £37.0m | 1,108 FTEs | £76.2m |
| Labour costs | | | | | |
| On farm labour | £17.1m | (£954/Ha) | | 483 FTEs | |
| Revenue & retained profit | | | | | |
| Revenue | £154.2m | (£1,954/Ha) | | | |
| Retained Profits | £35.0m | | | | |

121. It was estimated that 1,108 FTE jobs were supported along the ware potato upstream supply chain with 483 FTEs estimated to be employed directly on farm (assuming £17 per hour cost and 2,080 hours per FTE). Seed potato growers were estimated to have generated c.£154m in revenue, with c.£35m retained as profit. The contribution to Scottish Gross Value Added (GVA) was estimated to be c.£76m through backward (upstream) linkages and c.£52m on farm.

6.1.3 Total Potatoes

122. Figure 31 summarises the upstream economic contribution arising from potato growing (including research and regulation) in Scotland, alongside the direct impacts arising through staff costs (assume 80% of costs are household income) and retained potato grower profits. The full table with breakdown by Farmbench categories is provided in Annex 6 – Total upstream economic contribution to Scotland's Economy from the potato growing sector.

Figure 31 Illustrative total upstream and direct impacts from Scottish potato growing, research and governance



7 Results – downstream economic contribution of the Scottish potato sector

123. Curtis (2020)¹⁰¹ reported that in 2019 c.1.4 million tonnes of potatoes were processed by the Potato Producer Association (PPA)¹⁰² at a purchase cost of c.£240m from growers. He further estimated that c.13,000 people were directly employed in the UK potato processing sector and that c.71% of the value of retail sales of potatoes and derived products were processed. PPA further suggest that with 30% of GB potato area destined for processing half of the area specifically grown for processing is located in Yorkshire and East of England, where processors naturally locate.
124. The potato packing and processing sector is dominated by very large corporations whilst retail sales of potatoes and potato products is dominated by very few multinational retailers¹⁰³. Disaggregating multinational company economic activities to countries and regions becomes really challenging from published accounts, particularly when many businesses include non-potato packing or processing activities. For example:
125. Albert Bartlett¹⁰⁴ Holdings Limited had turnover¹⁰⁵ of c.£216m in 2021/22 from sales of fresh, frozen and chilled potato and vegetable products (with 98% destined for UK markets). Costs of sales were 74% of sales and 1,237 staff cost c.£38m. The holding company includes subsidiaries such as: Albert Bartlett & Sons (Airdrie) Limited (growing, packing and marketing of vegetables); Scotty Brand Limited (sale and marketing of Scottish produce); Albert Bartlett USA Inc. (growing, packing and marketing of vegetables); Albert Bartlett & Sons (Jersey) Limited (growing, packing and marketing of vegetables).
126. Branston Limited¹⁰⁶ (a subsidiary of Branston Holdings Limited) had a turnover of c.£187m in 2021–22 with cost of sales accounting for 88% of turnover. Located in Lincoln, Somerset and Perth their 799 staff cost c.£26m in their growing (including seed), processing and packing of potatoes.
127. McCain Foods (GB) Limited¹⁰⁷ is one of the main manufacturers of frozen potato products in the UK targeting both the ‘in home’ and ‘out of home’ consumer

¹⁰¹ committees.parliament.uk/writtenevidence/5368/pdf/

¹⁰² [Potato Processors Association \(ppauk.org\)](https://www.ppa.uk/)

¹⁰³ <https://www.retailsector.co.uk/top-10-uk-retailers-2022-23/>

¹⁰⁴ [Albert Bartlett | The Potato People](https://www.albertbartlett.com/)

¹⁰⁵ <https://find-and-update.company-information.service.gov.uk/company/SC531407/filing-history> see annual audited accounts

¹⁰⁶ [Homepage | Branston](https://www.branston.com/)

¹⁰⁷ [MCCAIN FOODS \(G.B.\) LIMITED overview – Find and update company information – GOV.UK \(company-information.service.gov.uk\)](https://find-and-update.company-information.service.gov.uk/company/02062014)

markets. They had a turnover of c.£596m in 2021–22 with costs of sales accounting for 72% of turnover. Their 1,300 staff had staff costs of c.£69m. McCains¹⁰⁸ claim to be the UK's largest purchaser of potatoes (15% of annual crop from 250 growers) and have five factories across the UK and a seed potato business in Scotland. McCain Foods (GB) is a subsidiary of Canadian company McCain¹⁰⁹ that now operates from 51 sites globally, with c.20,000 employees generating \$1bn (Canadian dollars) – equivalent to c.£6.5bn.

128. Walkers Snack Foods Limited¹¹⁰ are a subsidiary of PepsiCo Inc¹¹¹, the multinational snacks and drinks producer. Part of Walkers Snack Foods is the Walkers brands of potato crisps – but many other products are part of their range. In 2021 the company turned over c.£244m with cost of sales at 82% of turnover. 2,831 staff cost c.£123m
129. In contrast to the examples above Taylors Snacks¹¹² Ltd (formerly Mackie's at Taypack Limited) are a Scottish based producer of potato crisps, popcorn and lentil crisps. In 2022 they turned over c.£11m with costs of goods sold accounting for 87% of the turnover. The company had 66 staff with total staff costs of c.£1.9m.
130. Miller & Mann (2020)¹¹³ provides a shrewd insight that “measuring potatoes’ share of value becomes increasingly murky moving down the supply chain, as potatoes are intermingled with other inputs, value-added activities, and internationally traded goods and services”. For example, with c.10,500 UK fish and chip shops it is estimated that £1.2 billion is spent on 382 million meals every year¹¹⁴, but of course an unknown proportion of that is attributable to the potato sector.

7.1 Estimate of downstream revenues derived from potato growers

131. Using Defra estimates¹¹⁵ of per capita weekly expenditure on potatoes with Office for National Statistics¹¹⁶ / National Records of Scotland¹¹⁷ population data, consumer expenditure on different categories fresh and processed potatoes were estimated for Scotland and the UK.

¹⁰⁸ [About Us | McCain Foods](#)

¹⁰⁹ [Our Business & Brands | McCain Foods](#)

¹¹⁰ [WALKERS SNACK FOODS LIMITED overview – Find and update company information – GOV.UK \(company-information.service.gov.uk\)](#)

¹¹¹ [PepsiCo Home | PepsiCo.co.uk](#)

¹¹² [Taylors Snacks, formerly Mackie's – Delicious Crisps & Popcorn](#)

¹¹³ <https://www.nationalpotatocouncil.org/wp-content/uploads/2023/02/NPCSpudNationReport.pdf>

¹¹⁴ National Federation of Fish friers <https://www.nfff.co.uk/pages/fish-and-chips>

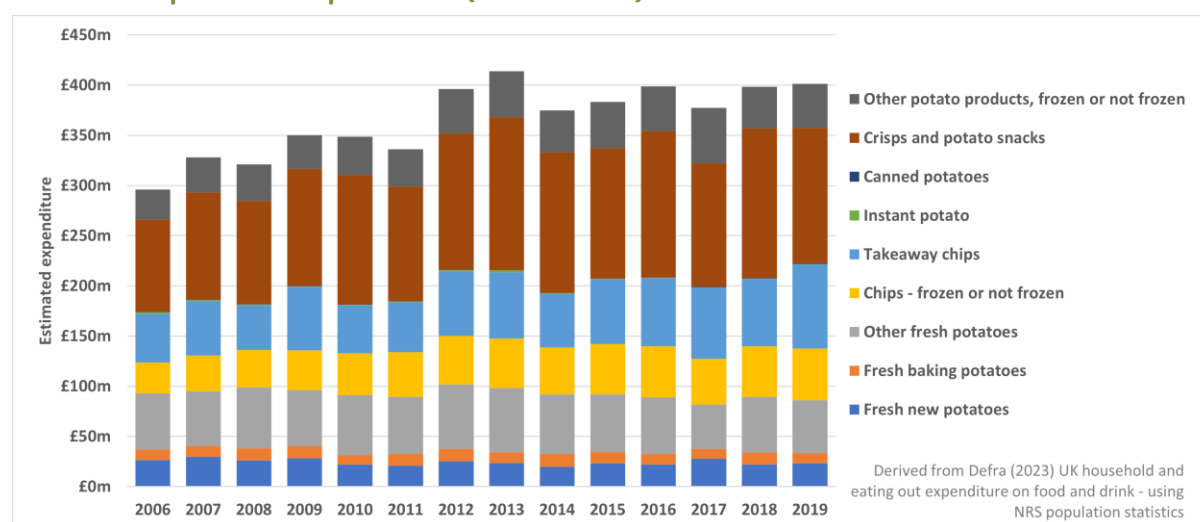
¹¹⁵ See expenditure data sets at [Family food datasets – GOV.UK \(www.gov.uk\)](#)

¹¹⁶ [United Kingdom population mid-year estimate – Office for National Statistics \(ons.gov.uk\)](#)

¹¹⁷ [Population Estimates Time Series Data | National Records of Scotland \(nrscotland.gov.uk\)](#)

132. It was estimated (see Figure 32) that Scottish consumers spent £401m on fresh, frozen and processed potatoes in 2019. This represented a 48% increase from 2006 that was partly attributable to 6.4% growth in Scotland population, partly due to food price inflation and partly due to changing potato product mix consumed. In 2022 c.£86m (21%) was estimated to have been spent by Scottish consumers on fresh potatoes (fresh new potatoes £23m, fresh baking potatoes £10m, other fresh potatoes 13%). Many of these fresh potatoes will be sourced in Scotland. c.£315m (79%) was estimated to have been spent on processed potatoes with crisps and potato snacks accounting for c.£134m (34% of total potato spend), takeaway chips c.£84m (21%) and frozen chips c.£52m (13%). Between 2006 and 2019 estimated Scottish expenditure on takeaway chips increased by 69%, crisp and potato snack expenditure increased by 11% and spend on other potato products, frozen or not frozen increased 47%. The spend of fresh baking potatoes fell by 11% over the period.

Figure 32- Estimated nominal¹¹⁸ value of Scottish household expenditure on fresh, frozen and processed potatoes (2006-2019)



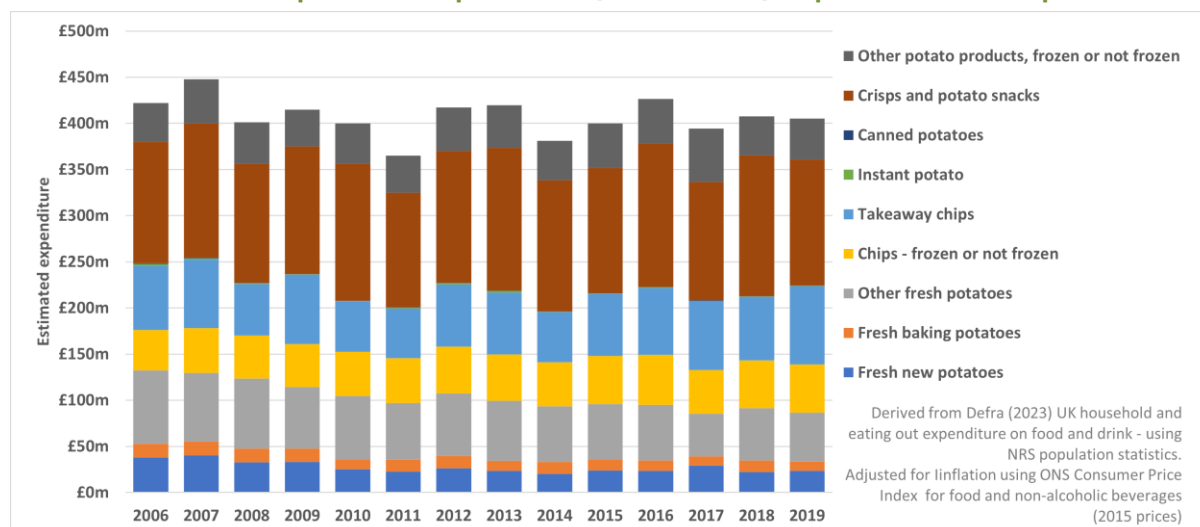
133. When the consumer expenditure is adjusted for inflation (using the Office for National Statistic (ONS) Consumer Price Index including Housing (CPIH) for Food and Non Alcoholic Beverages¹¹⁹) Figure 33 shows the estimated real, inflation adjusted, consumer expenditure on potatoes and potato products in Scotland expressed in 2021 prices. In real terms Scottish consumption fluctuated between £365m (2011) and £448m between 2006 and 2019. In real terms there was a 38% decline in expenditure on fresh new potatoes over the period, with 32% real term decline in fresh baking potatoes and 33% decline in other fresh potatoes. Over the same period there was 22% increase in real expenditure on takeaway chips, 19%

¹¹⁸ Un-adjusted for inflation

¹¹⁹ <https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/l523/mm23>

increase in chips – frozen or not frozen, and a 4% increase in expenditure on crisps and potato snacks.

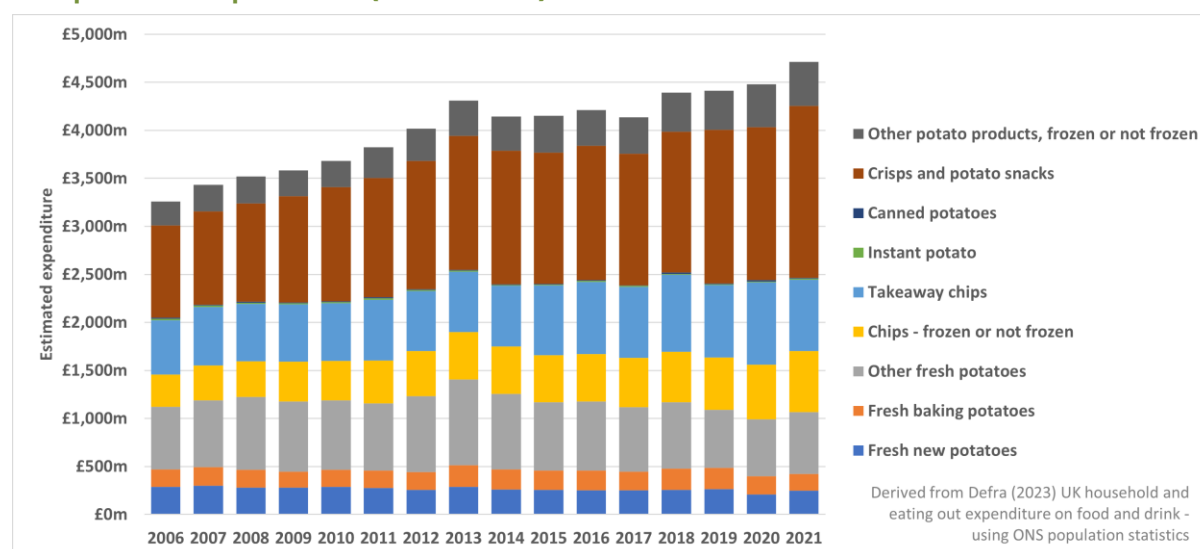
Figure 33 Estimated real, inflation adjusted, value of Scottish household expenditure on fresh, frozen and processed potatoes (2006–2019) expressed in 2021 prices



134. The UK consumption market for potato products is estimated to be over £4.7bn per annum¹²⁰. As Scottish seed potato is integral to the success of the wider GB / UK ware potato sector the UK figure perhaps is a better measure of the potential downstream added value (before exports of products like chips and potato snacks are considered). Figure 34 shows that UK consumer expenditure on potatoes increased from c.£3.3bn in 2006 to c.£4.7bn in 2021. In 2021 it was estimated that fresh potatoes accounted for 21% of the UK spend at c.£1.1bn (down 5% from 2006). In 2021 fresh new potatoes accounted for 5% of consumer value, fresh baking potatoes 4% and other fresh potatoes 14% (down 15%, 2% and 2% respectively from 2006).
135. The expenditure on processed potatoes (c.£3.6bn in 2021) was estimated to have increased by 71% since 2006. Spend on crisps and potato snacks accounted for c.£1.8bn (38%) of UK consumer spend on potatoes in 2021 – up 87% from 2006. Takeaway chips expenditure (c.£741m, 16% in 2021) increased by 31% between 2006 and 2021, whilst chips – frozen or not frozen (c.£638m, 14% in 2021) increased by 91% over the same period

¹²⁰ 67 million people * 52 weeks * (105p processed, 31p fresh) Extracted from Defra Expenditure and Food Survey 2001-02 to 2007 and Living Costs and Food Survey 2008 onwards

Figure 34 Estimated nominal¹²¹ value of UK household expenditure on fresh, frozen and processed potatoes (2006–2019)

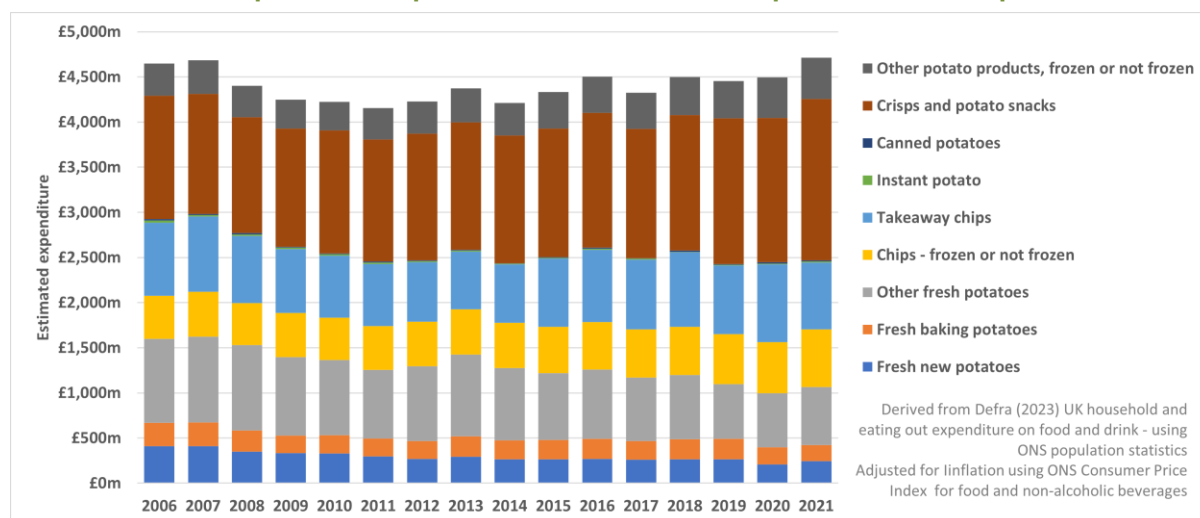


136. When the consumer expenditure is adjusted for inflation (using the ONS CPIH Food and Non Alcoholic Beverages¹²²) Figure 35 shows the estimated real, inflation adjusted, consumer expenditure on potatoes and potato products in the UK, expressed in 2021 prices. In real terms the value of UK potato consumption fluctuated between £4.2bn (2011) and £4.7bn between 2006 and 2021. In real terms there was a 35% decline in expenditure on fresh new potatoes across the UK between 2006 and 2021, with 13% real term decline in fresh baking potatoes and 35% decline in other fresh potatoes. Over the same period there was 6% real term decrease in takeaway chips expenditure across the UK, but a 16% increase in chips – frozen or not frozen spend, and an 18% real increase in expenditure on crisps and potato snacks.

¹²¹ Un-adjusted for inflation

¹²² <https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/l523/mm23>

Figure 35 Estimated real, inflation adjusted, value of UK household expenditure on fresh, frozen and processed potatoes (2006–2019) expressed in 2021 prices



137. These consumer expenditure estimates reveals that considerable additional economic value is added to UK ware potato production post farmgate (either as exports or through packing, processing, retail and hospitality sectors). Whilst the final potato derived earned revenue can be estimated from this, it is impossible to disentangle the downstream the downstream cost components and therefore added value.
138. However, Table 15 uses farmgate, import, export and consumption data for the UK (see previous sections) to demonstrates the total revenue streams generated from downstream sectors from ware sales for human consumption. For example, in 2021 was estimated that £649m of ware potatoes for human consumption generated net c.£1bn fresh potato sales to UK consumers (after adjusting for imports) and £54m in exports. The £649m farmgate sales also were the basis of £155m processed potato exports in 2021, and c.£3.1bn processed potato sales in the UK (after adjusting for processed potato imports). In 2021 this suggests that £649m farmgate ware sales for human consumption led to a final revenue of £4.3bn from consumers and exports – an equivalent of £6.71 downstream revenue from every £1 farmgate sales for consumption.
139. The data in Table 15 also reveals relatively static farmgate sales value but significant increase in UK derived processed sales to consumers and exports. This likely reflects increased processing, distribution, retail and hospitality sector costs (labour, energy, machinery, etc).
140. Whilst the £6.71 for each £1 of farmgate potato revenue suggests that Scottish on-farm production of £242m may contributes towards £1.6bn of downstream revenues it must be acknowledged that the majority of Scotland's ware area is grown for the pre-pack sector with limited processing. However, here are strong arguments that since Scotland grows c.75% of the UK's seed potato area that a

considerable proportion of the final UK derived potato sales shown in Table 15 are attributable to the importance of a viable and vibrant Scottish seed potato sector.

Table 15 Estimated downstream revenue derived from UK ware potato growing, 2011–2021

| Year | Farmgate sales for consumption | Net fresh consumption from UK | Fresh & chilled exports | Net processed consumption from UK | Processed Exports | Total Downstream Revenue | Downstream revenue per £1 farmgate sales |
|------|--------------------------------|-------------------------------|-------------------------|-----------------------------------|-------------------|--------------------------|--|
| 2011 | £633m | £1,088m | £64m | £2,262m | £145m | £3,559m | £5.62 |
| 2012 | £620m | £1,130m | £52m | £2,383m | £147m | £3,712m | £5.98 |
| 2013 | £772m | £1,236m | £58m | £2,396m | £159m | £3,848m | £4.99 |
| 2014 | £541m | £1,194m | £36m | £2,413m | £150m | £3,793m | £7.01 |
| 2015 | £565m | £1,116m | £43m | £2,549m | £153m | £3,860m | £6.83 |
| 2016 | £727m | £1,110m | £56m | £2,565m | £175m | £3,906m | £5.37 |
| 2017 | £658m | £1,046m | £51m | £2,426m | £217m | £3,741m | £5.68 |
| 2018 | £635m | £1,104m | £56m | £2,587m | £241m | £3,988m | £6.28 |
| 2019 | £648m | £1,003m | £79m | £2,613m | £231m | £3,927m | £6.06 |
| 2020 | £633m | £910m | £47m | £2,868m | £221m | £4,046m | £6.39 |
| 2021 | £649m | £1,027m | £54m | £3,118m | £155m | £4,355m | £6.71 |

8 Conclusions

141. The report has created a consolidated information resource on the Scottish, and wider GB and UK, potato sector. This draws together information on seed varieties, areas grown, imports, exports, consumption volume, consumer expenditure, as well as on farm economic data.
142. The economic data provided by AHDB was used with SASA and Scottish Government production data to estimate the on farm economic contributions from growing seed and ware potatoes in Scotland, alongside associated economic impacts from farm expenditure on 'upstream' input supplies.
143. The total economic contribution of the on-farm seed and ware potato sectors and associated upstream impacts are shown in Table 14. From c.28k hectares of potatoes grown in Scotland (average 2017–2021) £242m output was generated on farm creating c.960 FTE jobs, with a further 80 FTE jobs in SASA regulating the sector. Direct GVA on potato growing farms was estimated to be c.£78m. When upstream supply chain impacts were added the total economic output from potato growing and associated purchases was c.£507m with c.2,880 FTEs and GVA contribution of £204m.
144. Much of the UK's potato processing occurs in England. However, Scotland accounts for c.75% of the area of seed potato grown in the UK. Thus, the economic impact of Scotland's seed potato sector is far reaching – including use by growers in Scotland,

the rest of the UK and internationally (particularly Egypt) – with seed potato exports from the UK worth c.£66m. In 2021 across the UK £649m farmgate ware sales generated net c.£1bn fresh potato sales to UK consumers (after adjusting for imports) and £54m in exports. Those sales also formed the basis of £155m processed potato exports, and c.£3.1bn processed potato sales within the UK (after adjusting for processed potato imports). This suggests that £649m farmgate ware sales for human consumption led to a final revenue of £4.3bn from consumers and exports – an equivalent of £6.71 downstream revenue from every £1 farmgate sales for consumption.

Table 16 Summary of economic impacts from Scottish potato growers and associated upstream impacts on the input supply chain

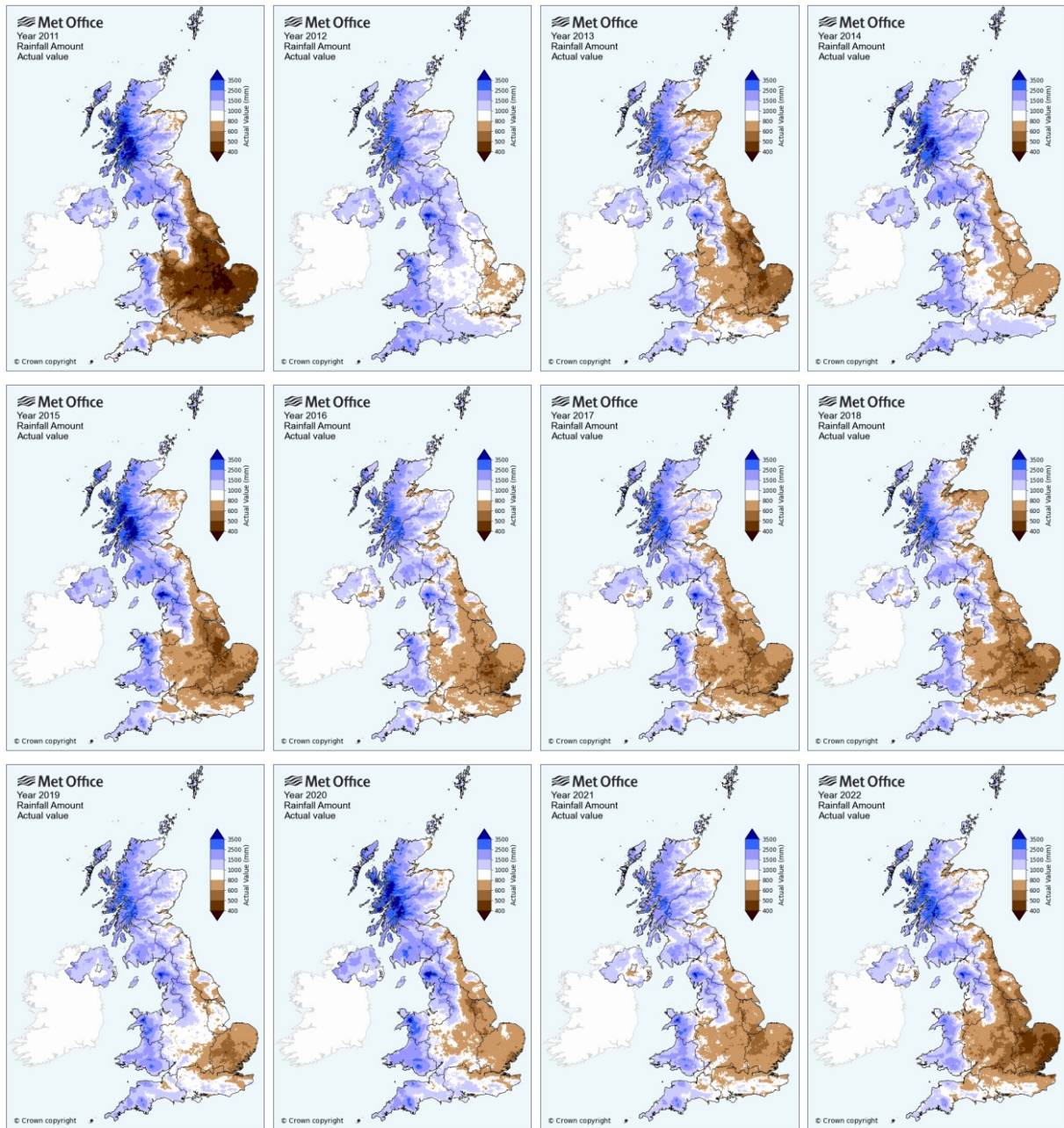
| | Seed | Ware | Total |
|--|---------------|------------|---------------|
| Area grown | 10,453Ha | 17,917Ha | 28,370Ha |
| Potato Growers | | | |
| Output | £88.4m | £154.2m | £242.7m |
| Non-labour costs | £62.3m | £119.2m | £198.4m |
| Labour (SASA) costs | £16.9m (£4m)) | £17.1m | £34m (£4m) |
| Labour (SASA) FTEs | 478 (80) FTEs | 483 FTEs | 961 (80) FTEs |
| GVA | £26.2m | £52.1m | £78.3m |
| Upstream suppliers | | | |
| Output | £105m | £160m | £265m |
| Labour FTEs | 731 FTEs | 1,108 FTEs | 1,839 FTEs |
| GVA | £49.5m | £76.2m | £125.7m |
| Total Upstream & farmgate impacts | | | |
| Output | £193.6m | £314.3m | £507.9 m |
| Labour (FTES) | 1,289 FTEs | 1,589 FTEs | 2,880 FTEs |
| GVA | £75.7m | £128.3m | £204m |

145. This economic assessment provides a modelling basis to estimate the economic consequences associated with various policy, regulatory, climate or disease scenarios for the seed and ware potato sectors in Scotland. Through the “*Delivering a sustainable potato industry for Scotland through management of Potato cyst nematode (PCN)*” project estimates of different PCN control strategies will be estimated.

ENDS

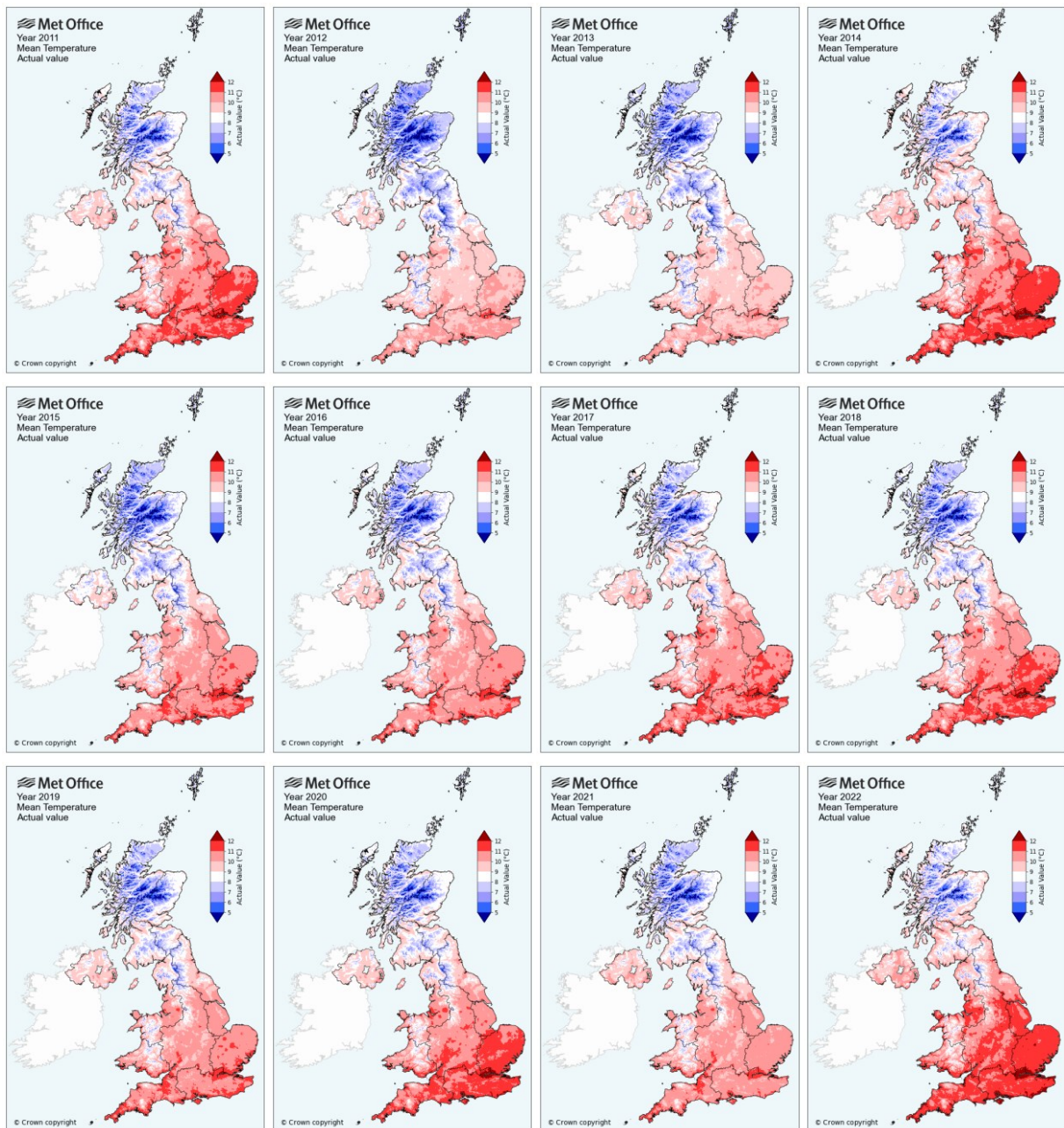
Annex 1 – Weather maps

Figure 36 Met Office annual rainfall 2011–2022¹²³



¹²³ <https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-actual-and-anomaly-maps>

Figure 37 Met Office annual mean temperature 2011-2022¹²⁴



¹²⁴ <https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-actual-and-anomaly-maps>

Annex 2 – International Trade

Harmonised System Codes for Potatoes

- [Potatoes, fresh or chilled: 07 010701](#)
 - [Seed potatoes: 07 01 10070110](#)
 - [Seed potatoes Commodity code: 07 01 10 0007011000](#)
 - [Fresh or chilled potatoes \(excl. seed\): 07 01 90070190](#)
- [Potatoes for manufacture of starch, fresh or chilled: 07 01 90 1007019010](#)
- [Fresh or chilled new potatoes from 1 January to 30 June: 07 01 90 5007019050](#)
- [Potatoes, fresh or chilled \(excl. new potatoes from 1 January to 30 June, seed potatoes and potatoes for manufacture of starch\): 07 01 90 9007019090](#)
- [Potatoes, uncooked or cooked by steaming or by boiling in water, frozen: 07 10 10071010](#)
- [Potatoes, uncooked or cooked by steaming or by boiling in water, frozen: 07 10 10 0007101000](#)
- [Dried potatoes, whether or not cut or sliced, but not further prepared: 07 12 90 0507129005](#)
- [Flour, meal, powder, flakes, granules and pellets of potatoes: 11 051105](#)
 - [Flour, meal and powder of potatoes: 11 05 10110510](#)
 - [Flour, meal and powder of potatoes: 11 05 10 0011051000](#)
 - [Flakes, granules and pellets of potatoes 11 05 20110520](#)
 - [Flakes, granules and pellets of potatoes: 11 05 20 0011052000](#)
- [Potato starch: 11 08 13110813](#)
 - [Potato starch: 11 08 13 0011081300](#)
- [Potatoes, prepared or preserved otherwise than by vinegar or acetic acid, frozen: 20 04 10200410](#)
 - [Cooked potatoes, frozen: 20 04 10 1020041010](#)
 - [Potatoes, prepared or preserved in the form of flour, meal or flakes, frozen: 20 04 10 9120041091](#)
 - [Potatoes, prepared or preserved otherwise than by vinegar or acetic acid, frozen \(excl. cooked only and in the form of flour, meal or flakes\): 20 04 10 9920041099](#)
- [Potatoes, prepared or preserved otherwise than by vinegar or acetic acid \(excl. frozen\): 20 05 20200520](#)
- [Potatoes in the form of flour, meal or flakes \(excl. frozen\): 20 05 20 1020052010](#)
- [Potatoes in thin slices, cooked in fat or oil, whether or not salted or flavoured, in airtight packings, suitable for direct consumption, not frozen: 20 05 20 2020052020](#)
- [Potatoes, prepared or preserved otherwise than by vinegar or acetic acid, not frozen \(excl. potatoes in the form of flour, meal or flakes, and thinly sliced, cooked in fat or oil, whether or not salted or flavoured, in airtight packings, suitable for direct consumption\): 20 05 20 8020052080](#)
- [Potato-diggers and potato harvesters: 84335310](#)

Table 17 Value of UK potato trade with EU and Non EU countries by HS code 2011 to 2022

| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| EU - Exports | £165.7m | £153.0m | £177.0m | £145.4m | £146.3m | £171.8m | £206.6m | £234.7m | £239.9m | £205.4m | £133.5m | £149.4m |
| 07011000 Seed potatoes | £15.6m | £12.4m | £14.8m | £13.7m | £10.0m | £8.8m | £11.8m | £12.9m | £12.6m | £15.3m | £6.1m | £4.8m |
| 07019010 Potatoes for manufacture of starch, fresh or chilled | £0.7m | £0.0m | £0.1m | £0.1m | £0.1m | £0.1m | £0.3m | £0.6m | £0.3m | £0.8m | £0.6m | £1.3m |
| 07019050 Fresh or chilled new potatoes from 1 January to 30 June | £9.0m | £3.4m | £1.7m | £1.0m | £0.9m | £1.7m | £1.9m | £1.2m | £2.5m | £1.1m | £2.6m | £0.6m |
| 07019090 Potatoes, fresh or chilled (excl. new potatoes from 1 January to 30 June, seed potatoes and potatoes for manufacture of starch) | £47.2m | £45.4m | £53.3m | £33.0m | £39.6m | £51.7m | £46.5m | £51.4m | £73.0m | £43.3m | £47.7m | £63.9m |
| 07101000 Potatoes, uncooked or cooked by steaming or by boiling in water, frozen | £1.9m | £3.2m | £6.4m | £4.9m | £6.3m | £7.1m | £9.9m | £11.3m | £20.0m | £12.8m | £1.3m | £1.9m |
| 07129005 Dried potatoes, whether or not cut or sliced, but not further prepared | £0.0m | £0.0m | £0.0m | £0.0m | £0.0m | £0.1m | £0.1m | £0.8m | £0.4m | £1.0m | £0.2m | £0.2m |
| 11051000 Flour, meal and powder of potatoes | £1.1m | £1.4m | £1.8m | £1.7m | £1.7m | £1.8m | £2.4m | £2.8m | £2.5m | £1.6m | £0.8m | £0.6m |
| 11052000 Flakes, granules and pellets of potatoes | £0.2m | £0.3m | £0.4m | £0.3m | £0.4m | £0.3m | £0.2m | £0.3m | £0.4m | £0.4m | £4.5m | £4.7m |
| 20041010 Cooked potatoes, frozen | £9.4m | £8.9m | £11.2m | £9.6m | £10.9m | £13.3m | £19.6m | £23.1m | £17.6m | £19.3m | £10.4m | £15.6m |
| 20041091 Potatoes, prepared or preserved in the form of flour, meal or flakes, frozen | £0.6m | £0.4m | £0.3m | £0.4m | £0.5m | £1.0m | £1.3m | £1.3m | £0.6m | £0.3m | £0.0m | £0.0m |
| 20041099 Potatoes, prepared or preserved otherwise than by vinegar or acetic acid, frozen (excl. cooked only and in the form of flour, meal or flakes) | £20.2m | £18.5m | £22.8m | £21.1m | £20.2m | £20.9m | £22.2m | £33.8m | £21.1m | £15.7m | £12.7m | £11.0m |
| 20052010 Potatoes in the form of flour, meal or flakes (excl. frozen) | £0.9m | £0.4m | £0.5m | £1.0m | £0.6m | £0.6m | £5.6m | £11.8m | £10.1m | £9.8m | £1.1m | £1.7m |
| 20052020 Potatoes in thin slices, cooked in fat or oil, whether or not salted or flavoured, in airtight packings, suitable for direct consumption, not frozen | £51.1m | £52.1m | £58.1m | £52.6m | £49.2m | £57.2m | £77.6m | £76.3m | £71.5m | £78.4m | £40.1m | £38.0m |
| 20052080 Potatoes, prepared or preserved otherwise than by vinegar or acetic acid, not frozen (excl. potatoes in the form of flour, meal or flakes, and thinly sliced, cooked in fat or oil, whether or not salted or flavoured, in airtight packings, suitable for direct consumption) | £8.1m | £6.5m | £5.7m | £6.0m | £6.0m | £7.2m | £7.1m | £7.0m | £7.3m | £5.6m | £5.5m | £5.0m |

| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|-------------|--------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Non EU - Exports | £88m | £104m | £88m | £87m | £93m | £106m | £104m | £108m | £126m | £119m | £124m | £147m |
| 07011000 Seed potatoes | £31m | £47m | £36m | £34m | £34m | £39m | £32m | £35m | £43m | £41m | £43m | £61m |
| 07019010 Potatoes for manufacture of starch, fresh or chilled | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £1m | £2m |
| 07019050 Fresh or chilled new potatoes from 1 January to 30 June | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | | £0m | £1m | £0m |
| 07019090 Potatoes, fresh or chilled (excl. new potatoes from 1 January to 30 June, seed potatoes and potatoes for manufacture of starch) | £7m | £3m | £2m | £2m | £2m | £3m | £2m | £3m | £3m | £2m | £1m | £4m |
| 07101000 Potatoes, uncooked or cooked by steaming or by boiling in water, frozen | £1m | £0m | £1m | £1m | £1m | £1m | £0m | £1m | £1m | £1m | £0m | £1m |
| 07129005 Dried potatoes, whether or not cut or sliced, but not further prepared | £0m | £0m | £0m | £0m | | £0m | £0m | £0m | £0m | £0m | £0m | |
| 11051000 Flour, meal and powder of potatoes | £1m | £1m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m |
| 11052000 Flakes, granules and pellets of potatoes | £0m | £1m | £1m | £0m | £0m | £0m | £0m | £0m | £1m | £1m | £2m | £3m |
| 20041010 Cooked potatoes, frozen | £0m | £2m | £1m | £0m | £1m | £1m | £4m | £4m | £2m | £3m | £3m | £4m |
| 20041091 Potatoes, prepared or preserved in the form of flour, meal or flakes, frozen | £0m | £0m | | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m |
| 20041099 Potatoes, prepared or preserved otherwise than by vinegar or acetic acid, frozen (excl. cooked only and in the form of flour, meal or flakes) | £0m | £1m | £0m | £2m | £1m | £1m | £1m | £1m | £1m | £2m | £2m | £5m |
| 20052010 Potatoes in the form of flour, meal or flakes (excl. frozen) | £0m | £0m | £0m | £2m | £2m | £1m | £1m | £0m | £3m | £2m | £1m | £1m |
| 20052020 Potatoes in thin slices, cooked in fat or oil, whether or not salted or flavoured, in airtight packings, suitable for direct consumption, not frozen | £6m | £9m | £10m | £10m | £14m | £16m | £14m | £12m | £16m | £18m | £17m | £21m |
| 20052080 Potatoes, prepared or preserved otherwise than by vinegar or acetic acid, not frozen (excl. potatoes in the form of flour, meal or flakes, and thinly sliced, cooked in fat or oil, whether or not salted or flavoured, in airtight packings, suitable for direct consumption) | £41m | £39m | £36m | £35m | £38m | £45m | £50m | £52m | £56m | £50m | £52m | £45m |

| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| EU - Imports | £437m | £476m | £629m | £505m | £465m | £506m | £629m | £668m | £758m | £646m | £525m | £955m |
| 07011000 Seed potatoes | £10m | £9m | £14m | £9m | £7m | £6m | £5m | £5m | £3m | £5m | £2m | £3m |
| 07019010 Potatoes for manufacture of starch, fresh or chilled | £0m | £1m | £3m | £5m | £6m | £1m | £2m | £2m | £1m | £0m | £0m | £0m |
| 07019050 Fresh or chilled new potatoes from 1 January to 30 June | £11m | £6m | £9m | £5m | £3m | £3m | £4m | £4m | £3m | £3m | £4m | £2m |
| 07019090 Potatoes, fresh or chilled (excl. new potatoes from 1 January to 30 June, seed potatoes and potatoes for manufacture of starch) | £25m | £74m | £117m | £33m | £26m | £41m | £44m | £42m | £63m | £61m | £24m | £19m |
| 07101000 Potatoes, uncooked or cooked by steaming or by boiling in water, frozen | £37m | £29m | £62m | £48m | £42m | £45m | £43m | £45m | £51m | £51m | £50m | £28m |
| 07129005 Dried potatoes, whether or not cut or sliced, but not further prepared | £1m | £1m | £0m | £3m | £3m | £3m | £4m | £5m | £5m | £5m | £2m | £0m |
| 11051000 Flour, meal and powder of potatoes | £14m | £14m | £15m | £13m | £12m | £15m | £18m | £19m | £18m | £13m | £11m | £17m |
| 11052000 Flakes, granules and pellets of potatoes | £20m | £20m | £20m | £17m | £16m | £15m | £18m | £26m | £30m | £34m | £28m | £32m |
| 20041010 Cooked potatoes, frozen | £185m | £181m | £206m | £225m | £218m | £242m | £311m | £324m | £372m | £301m | £255m | £589m |
| 20041091 Potatoes, prepared or preserved in the form of flour, meal or flakes, frozen | £5m | £1m | £0m | £0m | £0m | £1m | £1m | £1m | £4m | £2m | £2m | £1m |
| 20041099 Potatoes, prepared or preserved otherwise than by vinegar or acetic acid, frozen (excl. cooked only and in the form of flour, meal or flakes) | £90m | £96m | £131m | £98m | £96m | £94m | £123m | £131m | £152m | £112m | £102m | £172m |
| 20052010 Potatoes in the form of flour, meal or flakes (excl. frozen) | £3m | £2m | £2m | £2m | £1m | £3m | £2m | £12m | £3m | £2m | £2m | £2m |
| 20052020 Potatoes in thin slices, cooked in fat or oil, whether or not salted or flavoured, in airtight packings, suitable for direct consumption, not frozen | £14m | £20m | £25m | £24m | £16m | £14m | £29m | £24m | £19m | £25m | £21m | £29m |
| 20052080 Potatoes, prepared or preserved otherwise than by vinegar or acetic acid, not frozen (excl. potatoes in the form of flour, meal or flakes, and thinly sliced, cooked in fat or oil, whether or not salted or flavoured, in airtight packings, suitable for direct consumption) | £22m | £22m | £24m | £22m | £19m | £24m | £26m | £30m | £34m | £31m | £24m | £60m |

| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Non EU - Imports | £34m | £24m | £44m | £23m | £22m | £29m | £31m | £25m | £26m | £29m | £23m | £27m |
| 07011000 Seed potatoes | £0m | | £0m | £0m | £0m | £0m | £0m | £0m | | | | £0m |
| 07019050 Fresh or chilled new potatoes from 1 January to 30 June | £29m | £19m | £33m | £17m | £14m | £10m | £11m | £6m | £4m | £4m | £3m | £3m |
| 07019090 Potatoes, fresh or chilled (excl. new potatoes from 1 January to 30 June, seed potatoes and potatoes for manufacture of starch) | £2m | £2m | £6m | £1m | £3m | £12m | £11m | £12m | £14m | £14m | £8m | £6m |
| 07101000 Potatoes, uncooked or cooked by steaming or by boiling in water, frozen | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m |
| 07129005 Dried potatoes, whether or not cut or sliced, but not further prepared | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £1m | £0m | £0m | £0m |
| 11051000 Flour, meal and powder of potatoes | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £1m | £1m | £2m | £1m | £1m |
| 11052000 Flakes, granules and pellets of potatoes | £0m | £1m | £2m | £2m | £2m | £2m | £2m | £2m | £3m | £5m | £7m | £8m |
| 20041010 Cooked potatoes, frozen | £0m | £0m | £0m | £1m | £1m | £1m | £0m | £0m | £0m | £0m | £0m | £0m |
| 20041091 Potatoes, prepared or preserved in the form of flour, meal or flakes, frozen | | | | | | | | | | | £0m | £0m |
| 20041099 Potatoes, prepared or preserved otherwise than by vinegar or acetic acid, frozen (excl. cooked only and in the form of flour, meal or flakes) | £0m | £1m | £1m | £0m | £1m | £1m | £1m | £0m | £0m | £0m | £0m | £3m |
| 20052010 Potatoes in the form of flour, meal or flakes (excl. frozen) | £0m | £0m | £0m | £0m | £0m | £0m | £3m | £2m | £1m | £1m | £1m | £2m |
| 20052020 Potatoes in thin slices, cooked in fat or oil, whether or not salted or flavoured, in airtight packings, suitable for direct consumption, not frozen | £1m | £1m | £1m | £1m | £1m | £2m | £2m | £1m | £2m | £2m | £2m | £3m |
| 20052080 Potatoes, prepared or preserved otherwise than by vinegar or acetic acid, not frozen (excl. potatoes in the form of flour, meal or flakes, and thinly sliced, cooked in fat or oil, whether or not salted or flavoured, in airtight packings, suitable for direct consumption) | £0m | £0m | £0m | £0m | £0m | £0m | £1m | £0m | £1m | £0m | £1m | £1m |

Annex 3 – GB certified seed area 2022 and seed variety maintainers

Table 18 GB certified seed area 2022, variety maintainers and area grown in Scotland and England & Wales

| Variety | Variety Maintainer (s) | Scotland (Ha) | Scotland (% of GB) | E&W (Ha) | E&W (% of GB) | GB Total (Ha) |
|----------------|---------------------------------|---------------|--------------------|----------|---------------|---------------|
| MARIS PIPER | SASA | 1,301.68 | 96% | 57.21 | 4% | 1,358.89 |
| CARA | IPM Scotland | 1,042.54 | 100% | | 0% | 1,042.54 |
| HERMES | Cygnnet Pep Ltd | 912.86 | 100% | | 0% | 912.86 |
| MARKIES | Agrico UK Ltd | 305.55 | 60% | 205.35 | 40% | 510.90 |
| INNOVATOR | HZPC - UK Limited | 383.19 | 75% | 127.03 | 25% | 510.22 |
| DESIREE | SASA | 436.66 | 97% | 12.39 | 3% | 449.05 |
| SAGITTA | SASA | 58.00 | 14% | 367.40 | 86% | 425.40 |
| ROYAL | Danespo A/S | 351.69 | 97% | 11.80 | 3% | 363.49 |
| ATLANTIC | Cygnnet Pep Ltd | 354.76 | 100% | | 0% | 354.76 |
| MARIS PEER | SASA | 222.72 | 65% | 121.74 | 35% | 344.46 |
| LADY ROSETTA | Meijer Seed Potato Ltd | 210.37 | 63% | 124.65 | 37% | 335.02 |
| BROOKE | Pepsico International Ltd | 235.07 | 75% | 79.99 | 25% | 315.06 |
| TAURUS | SASA | 18.48 | 6% | 285.93 | 94% | 304.41 |
| VR808 | Stet Potato Ltd | 176.29 | 66% | 89.59 | 34% | 265.88 |
| MELODY | Meijer Seed Potato Ltd | 30.61 | 12% | 215.11 | 88% | 245.72 |
| MARFONA | Agrico UK Ltd | 94.18 | 51% | 90.66 | 49% | 184.84 |
| LANORMA | Solana Seeds United Kingdom Ltd | 87.72 | 52% | 79.94 | 48% | 167.66 |
| DAISY | Germicopa UK Ltd | 138.71 | 90% | 14.89 | 10% | 153.60 |
| JAZZY | Meijer Seed Potato Ltd | 52.93 | 35% | 100.24 | 65% | 153.17 |
| KING EDWARD | DARD/SASA | 129.51 | 85% | 22.18 | 15% | 151.69 |
| NECTAR | IPM Scotland | 102.73 | 68% | 48.26 | 32% | 150.99 |
| KINGSMAN | Cygnnet Potato Breeders Limited | 135.79 | 98% | 2.50 | 2% | 138.29 |
| CHARLOTTE | Greenseed International Ltd | 96.68 | 79% | 25.57 | 21% | 122.25 |
| BURREN | IPM Scotland | 119.31 | 100% | | 0% | 119.31 |
| RUSSET BURBANK | McCain Potatoes - A Division | 112.22 | 100% | | 0% | 112.22 |
| PENTLAND DELL | SASA | 108.35 | 98% | 2.71 | 2% | 111.06 |
| ACCORD | Meijer Seed Potato Ltd | 14.83 | 14% | 94.79 | 86% | 109.62 |
| BABY LOU | Solana Seeds United Kingdom Ltd | 41.56 | 39% | 65.19 | 61% | 106.75 |
| SAXON | Cygnnet Potato Breeders Limited | 106.74 | 100% | | 0% | 106.74 |
| MOZART | HZPC - UK Limited | 7.19 | 7% | 95.99 | 93% | 103.18 |
| ARSENAL | Agrico UK Ltd | 93.82 | 94% | 5.71 | 6% | 99.53 |
| BANBA | IPM Scotland | 99.32 | 100% | | 0% | 99.32 |
| SLANEY | IPM Scotland | 97.75 | 100% | | 0% | 97.75 |
| SHEPODY | McCain Potatoes - A Division | 52.44 | 56% | 40.73 | 44% | 93.17 |
| SPUNTA | Cygnnet Pep Ltd | 87.75 | 100% | | 0% | 87.75 |
| MANHATTAN | Cygnnet Potato Breeders Limited | 69.74 | 80% | 17.10 | 20% | 86.84 |
| ROOSTER | IPM Scotland | 86.60 | 100% | | 0% | 86.60 |

| Variety | Variety Maintainer (s) | Scotland (Ha) | Scotland (% of GB) | E&W (Ha) | E&W (% of GB) | GB Total (Ha) |
|--------------|--|---------------|--------------------|----------|---------------|---------------|
| VENEZIA | Greenvale AP Plc | 32.65 | 40% | 48.20 | 60% | 80.84 |
| LADY CLAIRE | Meijer Seed Potato Ltd | 66.90 | 83% | 13.28 | 17% | 80.18 |
| EUROSTAR | Stet Potato Ltd | 56.82 | 72% | 22.42 | 28% | 79.24 |
| IVORY RUSSET | HZPC - UK Limited | 45.40 | 57% | 33.74 | 43% | 79.14 |
| PREMIERE | Agrico UK Ltd | 55.17 | 72% | 21.56 | 28% | 76.73 |
| ELLAND | Cygnets Potato Breeders Limited | 75.69 | 100% | | 0% | 75.69 |
| KING RUSSET | Solana Seeds United Kingdom Ltd | 75.60 | 100% | | 0% | 75.60 |
| GEMSON | Grampian Growers (Services) Ltd | 56.36 | 78% | 16.00 | 22% | 72.36 |
| PICASSO | Agrico UK Ltd | 69.21 | 100% | | 0% | 69.21 |
| ESTIMA | Scott & Newman Ltd | 37.33 | 54% | 31.51 | 46% | 68.84 |
| CHALLENGER | HZPC - UK Limited | 4.84 | 7% | 63.10 | 93% | 67.94 |
| ELECTRA | IPM Scotland | 46.68 | 75% | 15.92 | 25% | 62.60 |
| JELLY | Greenvale AP Plc | 6.97 | 11% | 54.98 | 89% | 61.95 |
| TYSON | Stet Potato Ltd | 41.29 | 68% | 19.04 | 32% | 60.33 |
| FONTANE | Agrico UK Ltd | 8.34 | 14% | 50.69 | 86% | 59.03 |
| WILJA | SASA | 57.23 | 98% | 1.30 | 2% | 58.53 |
| EDISON | Solana Seeds United Kingdom Ltd | 20.52 | 36% | 36.07 | 64% | 56.59 |
| OPAL | Solana Seeds United Kingdom Ltd | 12.26 | 22% | 42.52 | 78% | 54.77 |
| SHELFORD | Pepsico International Ltd | 44.35 | 83% | 9.30 | 17% | 53.65 |
| MANITOU | Agrico UK Ltd | 45.94 | 90% | 5.00 | 10% | 50.94 |
| GALACTICA | IPM Scotland | 50.83 | 100% | | 0% | 50.83 |
| CULTRA | Cullen Allen Ltd | 48.99 | 100% | | 0% | 48.99 |
| RAMOS | Stet Potato Ltd | 48.67 | 100% | | 0% | 48.67 |
| ORCHESTRA | Meijer Seed Potato Ltd | 16.30 | 35% | 29.79 | 65% | 46.09 |
| LA STRADA | Cygnets Potato Breeders Limited | 45.95 | 100% | | 0% | 45.95 |
| GEORGINA | Branston Ltd | 11.00 | 25% | 33.48 | 75% | 44.48 |
| OSPREY | Caledonia Potatoes Ltd | 42.12 | 100% | | 0% | 42.12 |
| BARNA | IPM Scotland | 42.05 | 100% | | 0% | 42.05 |
| ARCADE | Mercian Ltd | 21.85 | 52% | 19.96 | 48% | 41.81 |
| SORAYA | Cullen Allen Ltd | 37.61 | 92% | 3.20 | 8% | 40.81 |
| MARABEL | Albert Bartlett And Sons (Airdrie) Ltd | 20.63 | 52% | 19.38 | 48% | 40.01 |
| HERACLEA | HZPC - UK Limited | 2.11 | 6% | 36.14 | 94% | 38.25 |
| CAMEL | Stet Potato Ltd | 11.12 | 30% | 26.34 | 70% | 37.46 |
| VIVALDI | SASA | 23.78 | 66% | 12.39 | 34% | 36.17 |
| VALOR | Caledonia Potatoes Ltd | 35.68 | 100% | | 0% | 35.68 |
| CARUSO | Solana Seeds United Kingdom Ltd | 35.67 | 100% | | 0% | 35.67 |
| BABYLON | Agrico UK Ltd | 20.49 | 58% | 14.90 | 42% | 35.39 |
| MARIS BARD | SASA | 23.93 | 71% | 9.98 | 29% | 33.92 |
| PIROL | Cullen Allen Ltd | 27.22 | 82% | 6.16 | 18% | 33.38 |
| MIRANDA | Solana Seeds United Kingdom Ltd | 13.96 | 46% | 16.62 | 54% | 30.58 |
| VERDI | Solana Seeds United Kingdom Ltd | 13.74 | 45% | 16.63 | 55% | 30.37 |
| SH C 1010 | Stet Potato Ltd | 15.66 | 54% | 13.22 | 46% | 28.88 |
| ALEXANDRA | Albert Bartlett And Sons (Airdrie) Ltd | 16.25 | 58% | 11.69 | 42% | 27.94 |

| Variety | Variety Maintainer (s) | Scotland (Ha) | Scotland (% of GB) | E&W (Ha) | E&W (% of GB) | GB Total (Ha) |
|------------------|--|---------------|--------------------|----------|---------------|---------------|
| BELANA | NAC Ltd | 8.02 | 29% | 19.75 | 71% | 27.77 |
| PANTHER | HZPC - UK Limited | 5.91 | 22% | 20.60 | 78% | 26.51 |
| LUCERA | McCreight Potatoes Ltd | 18.33 | 71% | 7.40 | 29% | 25.73 |
| NIETA | Bennett Seed Exports Ltd | 24.42 | 100% | | 0% | 24.42 |
| GWENNE | Germicopa UK Ltd | 0.18 | 1% | 23.13 | 99% | 23.31 |
| ACOUSTIC | Meijer Seed Potato Ltd | 6.47 | 28% | 16.81 | 72% | 23.28 |
| TRIPLE7 | HZPC - UK Limited | 1.06 | 5% | 21.77 | 95% | 22.83 |
| MORENE | SASA | 9.21 | 41% | 13.43 | 59% | 22.64 |
| ELFE | Albert Bartlett And Sons (Airdrie) Ltd | 10.73 | 49% | 11.27 | 51% | 22.00 |
| ROCKET | Cygnets Potato Breeders Limited | 21.98 | 100% | | 0% | 21.98 |
| BAMBINO | Cygnets Potato Breeders Limited | 21.85 | 100% | | 0% | 21.85 |
| MARIOLA | Albert Bartlett And Sons (Airdrie) Ltd | 10.18 | 49% | 10.68 | 51% | 20.86 |
| ORLA | IPM Scotland | 9.32 | 47% | 10.43 | 53% | 19.75 |
| AMANDA | Solana Seeds United Kingdom Ltd | 13.71 | 70% | 5.80 | 30% | 19.51 |
| PARIS | Mercian Ltd | 3.51 | 19% | 15.31 | 81% | 18.82 |
| LADY ANNA | Meijer Seed Potato Ltd | 18.66 | 100% | | 0% | 18.66 |
| FANDANGO | IPM Scotland | 14.82 | 80% | 3.75 | 20% | 18.57 |
| AMORA | Mercian Ltd | 11.46 | 62% | 7.00 | 38% | 18.46 |
| LAURA | Branston Ltd | 1.12 | 6% | 16.73 | 94% | 17.85 |
| RED CARA | IPM Scotland | 17.67 | 100% | | 0% | 17.67 |
| SAFIYAH | M Higgins Ltd | 17.59 | 100% | | 0% | 17.59 |
| AGRIA | Agrico UK Ltd | 3.68 | 21% | 13.76 | 79% | 17.44 |
| OLYMPUS | M Higgins Ltd | 10.20 | 60% | 6.80 | 40% | 17.00 |
| KERR'S PINK | DARD/SASA | 16.61 | 100% | | 0% | 16.61 |
| LADY BALFOUR | James Hutton Ltd | 16.56 | 100% | | 0% | 16.56 |
| KESTREL | Caledonia Potatoes Ltd | 16.44 | 100% | | 0% | 16.44 |
| SIENA | Mercian Ltd | 3.32 | 21% | 12.72 | 79% | 16.04 |
| SENSATION | IPM Scotland | 2.71 | 17% | 12.89 | 83% | 15.60 |
| KENNEBEC | SASA | 15.43 | 100% | | 0% | 15.43 |
| DIVAA | Global Crops Ltd | 6.40 | 42% | 9.00 | 58% | 15.40 |
| CASABLANCA | Cygnets Potato Breeders Limited | 15.08 | 100% | | 0% | 15.08 |
| SWIFT | Caledonia Potatoes Ltd | 14.98 | 100% | | 0% | 14.98 |
| MARVEL | Caledonia Potatoes Ltd | 14.28 | 100% | | 0% | 14.28 |
| CABARET | Cygnets Potato Breeders Limited | 14.27 | 100% | | 0% | 14.27 |
| ARGOS | Classified Crops Limited | 14.20 | 100% | | 0% | 14.20 |
| ANNABELLE | HZPC - UK Limited | | 0% | 13.95 | 100% | 13.95 |
| COMMANDO | IPM Scotland | 13.19 | 100% | | 0% | 13.19 |
| CALEDONIAN ROSE | Caledonia Potatoes Ltd | 13.03 | 100% | | 0% | 13.03 |
| PENTLAND JAVELIN | SASA | 12.60 | 100% | | 0% | 12.60 |
| HARRY | Cullen Allen Ltd | 12.08 | 100% | | 0% | 12.08 |
| ADIB | Cullen Allen Ltd | 10.90 | 100% | | 0% | 10.90 |
| LADY TERRA | Meijer Seed Potato Ltd | | 0% | 10.88 | 100% | 10.88 |

| Variety | Variety Maintainer (s) | Scotland (Ha) | Scotland (% of GB) | E&W (Ha) | E&W (% of GB) | GB Total (Ha) |
|----------------------|---------------------------------|---------------|--------------------|----------|---------------|---------------|
| LA VIE | HZPC - UK Limited | 0.87 | 8% | 9.77 | 92% | 10.64 |
| HARMONY | Caledonia Potatoes Ltd | 10.30 | 100% | | 0% | 10.30 |
| SHANNON | IPM Scotland | 5.28 | 52% | 4.80 | 48% | 10.08 |
| DRUID | IPM Scotland | 9.94 | 100% | | 0% | 9.94 |
| SAPHIRE | Stet Potato Ltd | 5.85 | 63% | 3.47 | 37% | 9.32 |
| LADY TERRA | Meijer Seed Potato Ltd | 9.07 | 100% | | 0% | 9.07 |
| GATSBY | Cygnnet Potato Breeders Limited | 9.00 | 100% | | 0% | 9.00 |
| LADY JO | Meijer Seed Potato Ltd | 8.45 | 94% | 0.50 | 6% | 8.95 |
| LADY CHRISTL | Meijer Seed Potato Ltd | | 0% | 8.94 | 100% | 8.94 |
| TORNADO | IPM Scotland | 8.30 | 100% | | 0% | 8.30 |
| LILLY | Solana Seeds United Kingdom Ltd | 8.26 | 100% | 0.03 | 0% | 8.29 |
| VANILLA | IPM Scotland | 8.26 | 100% | | 0% | 8.26 |
| KARELIA | NAC Ltd | 0.70 | 8% | 7.55 | 92% | 8.25 |
| LADY AMARILLA | Meijer Seed Potato Ltd | 8.02 | 100% | | 0% | 8.02 |
| GOLDEN WONDER | SASA | 7.82 | 100% | | 0% | 7.82 |
| PUNCHY | Germicopa UK Ltd | 0.08 | 1% | 7.72 | 99% | 7.80 |
| PERFORMER | Agrico UK Ltd | 7.50 | 100% | | 0% | 7.50 |
| BUFFALO | IPM Scotland | 7.44 | 100% | | 0% | 7.44 |
| BRITISH QUEEN | DARD | 7.18 | 100% | | 0% | 7.18 |
| LAPERLA | Solana Seeds United Kingdom Ltd | 4.92 | 69% | 2.17 | 31% | 7.09 |
| BARAKA | Cygnnet Pep Ltd | 6.80 | 100% | | 0% | 6.80 |
| JESTER | Greenvale AP Plc | 6.64 | 100% | | 0% | 6.64 |
| ISABELIA | NAC Ltd | | 0% | 6.60 | 100% | 6.60 |
| FRANCIS | Cygnnet Potato Breeders Limited | 0.22 | 4% | 5.98 | 96% | 6.20 |
| SUNITA | SASA | | 0% | 6.05 | 100% | 6.05 |
| ASTERIX | HZPC - UK Limited | 6.00 | 100% | | 0% | 6.00 |
| DUKE OF YORK | SASA | 5.82 | 100% | | 0% | 5.82 |
| ARRAN PILOT | SASA | 5.81 | 100% | | 0% | 5.81 |
| INTERNATIONAL KIDNEY | SASA | 4.92 | 86% | 0.79 | 14% | 5.71 |
| SUNSET | DARD | 5.69 | 100% | | 0% | 5.69 |
| SARPO MIRA | Potato House Ltd | 5.60 | 100% | | 0% | 5.60 |
| NAVAN | Cygnnet Potato Breeders Limited | 5.55 | 100% | | 0% | 5.55 |
| RED DUKE OF YORK | Rosefield Farm | 5.55 | 100% | | 0% | 5.55 |
| APACHE | Caledonia Potatoes Ltd | 5.22 | 100% | | 0% | 5.22 |
| WINSTON | Caledonia Potatoes Ltd | 5.11 | 100% | | 0% | 5.11 |
| MERLIN | Classified Crops Limited | 5.00 | 100% | | 0% | 5.00 |
| CALEDONIAN PEARL | Caledonia Potatoes Ltd | 4.97 | 100% | | 0% | 4.97 |
| STEMSTER | Caledonia Potatoes Ltd | 4.85 | 100% | | 0% | 4.85 |
| ALANIS | Cygnnet Potato Breeders Limited | 4.67 | 100% | | 0% | 4.67 |
| NADINE | Caledonia Potatoes Ltd | 4.60 | 100% | | 0% | 4.60 |
| ALOUETTE | Agrico UK Ltd | 2.50 | 56% | 2.00 | 44% | 4.50 |
| CELANDINE | HZPC - UK Limited | | 0% | 4.50 | 100% | 4.50 |

| Variety | Variety Maintainer (s) | Scotland (Ha) | Scotland (% of GB) | E&W (Ha) | E&W (% of GB) | GB Total (Ha) |
|--------------------|---|---------------|--------------------|----------|---------------|---------------|
| LADY ALICIA | C Meijer Bv | 4.47 | 100% | | 0% | 4.47 |
| PINK FIR APPLE | Jamieson Brothers/Wcf-Phoenix Seed Potato Specialists | 4.20 | 100% | | 0% | 4.20 |
| RED LADY | Solana Seeds United Kingdom Ltd | | 0% | 4.00 | 100% | 4.00 |
| ENDEAVOUR | Solana Seeds United Kingdom Ltd | 0.04 | 1% | 3.92 | 99% | 3.96 |
| NICOLA | SASA | 3.90 | 100% | | 0% | 3.90 |
| SPECTRA | Agrico UK Ltd | 3.85 | 100% | | 0% | 3.85 |
| LORIMER | M Higgins Ltd | 3.80 | 100% | | 0% | 3.80 |
| SETANTA | IPM Scotland | 3.80 | 100% | | 0% | 3.80 |
| TWINNER | Agrico UK Ltd | 2.13 | 56% | 1.65 | 44% | 3.78 |
| ATHLETE | Agrico UK Ltd | 1.55 | 42% | 2.13 | 58% | 3.68 |
| RUDOLPH | Agrico UK Ltd | 2.87 | 80% | 0.70 | 20% | 3.57 |
| MADEIRA | NAC Ltd | | 0% | 3.49 | 100% | 3.49 |
| ALEXIA | Mercian Ltd | | 0% | 3.45 | 100% | 3.45 |
| PAROLI | Cullen Allen Ltd | 0.14 | 4% | 3.29 | 96% | 3.43 |
| FOREMOST | SASA | 3.40 | 100% | | 0% | 3.40 |
| SHARPE'S EXPRESS | DARD/SASA | 3.32 | 100% | | 0% | 3.32 |
| SANTIAGO | IPM Scotland | 3.06 | 100% | | 0% | 3.06 |
| BUSTER | IPM Scotland | 3.03 | 100% | | 0% | 3.03 |
| COLLEEN | IPM Scotland | 3.00 | 100% | | 0% | 3.00 |
| LEONTINE | HZPC - UK Limited | | 0% | 2.87 | 100% | 2.87 |
| CORINNA | NAC Ltd | | 0% | 2.85 | 100% | 2.85 |
| LOMOND | Cullen Allen Ltd | 2.84 | 100% | | 0% | 2.84 |
| CAROLUS | Agrico UK Ltd | 1.83 | 65% | 1.00 | 35% | 2.83 |
| BUTE | Caledonia Potatoes Ltd | 2.82 | 100% | | 0% | 2.82 |
| AMBO | IPM Scotland | 2.80 | 100% | | 0% | 2.80 |
| BELMONDA | Solana Seeds United Kingdom Ltd | 2.71 | 98% | 0.07 | 2% | 2.78 |
| MEERA | McCreight Potatoes Ltd | 2.75 | 100% | | 0% | 2.75 |
| ANNA | IPM Scotland | 2.66 | 100% | | 0% | 2.66 |
| CAROUSEL | Greenvale AP Plc | 2.62 | 100% | | 0% | 2.62 |
| ROSEGARDEN | McCreight Potatoes Ltd | 2.54 | 100% | | 0% | 2.54 |
| CAESAR | HZPC - UK Limited | 2.52 | 100% | | 0% | 2.52 |
| CHOPIN | HZPC - UK Limited | | 0% | 2.45 | 100% | 2.45 |
| DAMASK | McCreight Potatoes Ltd | 2.31 | 100% | | 0% | 2.31 |
| CALEDONIAN PHOENIX | Caledonia Potatoes Ltd | 2.29 | 100% | | 0% | 2.29 |
| EPICURE | SASA | 2.22 | 100% | | 0% | 2.22 |
| BONNATA KWS | Stet Potato Ltd | | 0% | 2.19 | 100% | 2.19 |
| SATURNA | SASA | 2.18 | 100% | | 0% | 2.18 |
| BABY ROSE | HZPC - UK Limited | | 0% | 2.00 | 100% | 2.00 |
| SKYWALKER | Cygnets Potato Breeders Limited | 1.98 | 100% | | 0% | 1.98 |
| CELEBRATION | McCreight Potatoes Ltd | 1.97 | 100% | | 0% | 1.97 |
| ULSTER PRINCE | DARD/SASA | 1.90 | 100% | | 0% | 1.90 |
| JAVA | IPM Scotland | 1.79 | 100% | | 0% | 1.79 |

| Variety | Variety Maintainer (s) | Scotland (Ha) | Scotland (% of GB) | E&W (Ha) | E&W (% of GB) | GB Total (Ha) |
|-------------------|--|---------------|--------------------|----------|---------------|---------------|
| ANYA | Albert Bartlett And Sons (Airdrie) Ltd | | 0% | 1.79 | 100% | 1.79 |
| SH C 909 | Stet Potato Ltd | 1.27 | 81% | 0.30 | 19% | 1.57 |
| FOXY | Global Crops Ltd | 1.50 | 100% | | 0% | 1.50 |
| ALMONDA | Solana Seeds United Kingdom Ltd | 1.43 | 100% | | 0% | 1.43 |
| BALTIC ROSE | Cullen Allen Ltd | 1.34 | 100% | | 0% | 1.34 |
| BLAUE ANNELIESE | Skea Organics Ltd | 1.30 | 100% | | 0% | 1.30 |
| RECORD | DARD/SASA | 1.28 | 100% | | 0% | 1.28 |
| AXONA | Sarvari Research Trust | 1.20 | 100% | | 0% | 1.20 |
| HOME GUARD | DARD/SASA | 1.10 | 100% | | 0% | 1.10 |
| MONDEO | McCreight Potatoes Ltd | 1.08 | 100% | | 0% | 1.08 |
| PIPPA | Strathmore Potatoes Ltd | 1.02 | 100% | | 0% | 1.02 |
| HEIDEROT | Skea Organics Ltd | 1.00 | 100% | | 0% | 1.00 |
| UMATILLA RUSSET | McCain Potatoes - A Division | 0.80 | 100% | | 0% | 0.80 |
| JACKY | Agrico UK Ltd | 0.71 | 100% | | 0% | 0.71 |
| SARPO UNA | Sarvari Research Trust | 0.70 | 100% | | 0% | 0.70 |
| SANTE | | 0.70 | 100% | | 0% | 0.70 |
| YUKON GOLD | McCain Potatoes - A Division | 0.70 | 100% | | 0% | 0.70 |
| ARRAN VICTORY | DARD/SASA | 0.60 | 100% | | 0% | 0.60 |
| ASPARGES | SASA | 0.60 | 100% | | 0% | 0.60 |
| BERMUDA | IPM Scotland | 0.52 | 100% | | 0% | 0.52 |
| RED KING EDWARD | SASA | 0.51 | 100% | | 0% | 0.51 |
| PENTLAND CROWN | SASA | 0.50 | 100% | | 0% | 0.50 |
| SHARPE'S EXPRESS | DARD/SASA | | 0% | 0.50 | 100% | 0.50 |
| ULSTER SCEPTRE | SASA | 0.10 | 20% | 0.40 | 80% | 0.50 |
| EFERA | McCreight Potatoes Ltd | 0.42 | 100% | | 0% | 0.42 |
| SUNLIGHT | IPM Scotland | 0.42 | 100% | | 0% | 0.42 |
| AMOUR | Jamieson Brothers | 0.40 | 100% | | 0% | 0.40 |
| BELLE DE FONTENAY | SASA | 0.40 | 100% | | 0% | 0.40 |
| CLEO | Global Crops Ltd | 0.40 | 100% | | 0% | 0.40 |
| ALBERTA | Perran Potatoes | 0.37 | 100% | | 0% | 0.37 |
| MONTE CARLO | Mercian Ltd | 0.02 | 5% | 0.33 | 95% | 0.34 |
| NOYA | Solana Seeds United Kingdom Ltd | 0.34 | 100% | | 0% | 0.34 |
| ALEX | James Hutton Ltd | 0.30 | 100% | | 0% | 0.30 |
| BLUE BELLE | Jamieson Brothers | 0.30 | 100% | | 0% | 0.30 |
| BLUE DANUBE | Sarvari Research Trust | 0.30 | 100% | | 0% | 0.30 |
| CONSTANCE | Agrico UK Ltd | 0.30 | 100% | | 0% | 0.30 |
| KIFLI | Sarvari Research Trust | 0.30 | 100% | | 0% | 0.30 |
| VITABELLA | McCreight Potatoes Ltd | 0.30 | 100% | | 0% | 0.30 |
| ANNALISA | Perran Potatoes | 0.23 | 100% | | 0% | 0.23 |
| CAMMEO | | 0.20 | 100% | | 0% | 0.20 |
| CATRIONA | SASA | 0.20 | 100% | | 0% | 0.20 |
| EMILY | Cullen Allen Ltd | 0.20 | 100% | | 0% | 0.20 |

| Variety | Variety Maintainer (s) | Scotland (Ha) | Scotland (% of GB) | E&W (Ha) | E&W (% of GB) | GB Total (Ha) |
|-----------------|--|---------------|--------------------|----------|---------------|---------------|
| KONDOR | Rosefield Farm | 0.20 | 100% | | 0% | 0.20 |
| FLIPPER | IPM Scotland | 0.15 | 100% | | 0% | 0.15 |
| TWISTER | Agrico UK Ltd | 0.14 | 100% | | 0% | 0.14 |
| 7 FOUR 7 | Solana Seeds United Kingdom Ltd | 0.10 | 100% | | 0% | 0.10 |
| ALEGRIA | Cullen Allen Ltd | 0.10 | 100% | | 0% | 0.10 |
| DUNBAR ROVER | DARD/SASA | 0.10 | 100% | | 0% | 0.10 |
| DUNBAR STANDARD | DARD/SASA | 0.10 | 100% | | 0% | 0.10 |
| DUNLUCE | Jamieson Brothers | 0.10 | 100% | | 0% | 0.10 |
| EDZELL BLUE | SASA | 0.10 | 100% | | 0% | 0.10 |
| HUTTON HERO | James Hutton Ltd | 0.10 | 100% | | 0% | 0.10 |
| INCA ROSA | Branston Ltd | 0.10 | 100% | | 0% | 0.10 |
| LUNAROSSA | Branston Ltd | 0.10 | 100% | | 0% | 0.10 |
| SCAPA | Farewell Farms | 0.10 | 100% | | 0% | 0.10 |
| PALACE | Agrico UK Ltd | 0.07 | 100% | | 0% | 0.07 |
| EMILIANA | NAC Ltd | | 0% | 0.06 | 100% | 0.06 |
| DECIBEL | Germicopa UK Ltd | 0.04 | 100% | | 0% | 0.04 |
| OLIVIA | Albert Bartlett And Sons (Airdrie) Ltd | 0.04 | 100% | | 0% | 0.04 |
| PURPLE MAJESTY | Albert Bartlett And Sons (Airdrie) Ltd | | 0% | 0.04 | 100% | 0.04 |
| CRISTINA | IPM Scotland | 0.02 | 100% | | 0% | 0.02 |
| LADY JANE | C Meijer Bv | 0.01 | 100% | | 0% | 0.01 |
| AUSTIN | Cygnnet Potato Breeders Limited | 0.01 | 100% | | 0% | 0.01 |
| MONTIS | Cygnnet Potato Breeders Limited | 0.01 | 100% | | 0% | 0.01 |
| POSEIDON | Cygnnet Potato Breeders Limited | 0.01 | 100% | | 0% | 0.01 |
| MAYAN GOLD | James Hutton Ltd | 0.00 | 100% | | 0% | 0.00 |

Annex 4 – Crop protection used for ware and seed potatoes

Table 19 Crop protection product use in Scottish ware potato production (2016, 2018 and 2020)



| Group | Year | Crop Area (ha) | Basic Area (ha) | Treated Area (ha) | Active Ingredient Applied (kg) | % area treated | Average Kg Active Ingredient per Basic Ha | Average Number of treatments per Basic Ha |
|------------------|------|----------------|-----------------|-------------------|--------------------------------|----------------|---|---|
| Fungicide | 2020 | 16,294 | 16,125 | 252,673 | 160,160 | 99% | 9.93 | 15.67 |
| | 2018 | 15,267 | 14,998 | 184,668 | 105,169 | 98% | 7.01 | 12.31 |
| | 2016 | 14,765 | 14,506 | 216,810 | 104,861 | 98% | 7.23 | 14.95 |
| Growth Regulator | 2020 | 16,294 | 1,276 | 1,276 | 3,829 | 8% | 3.00 | 1.00 |
| | 2018 | 15,267 | 322 | 322 | 775 | 2% | 2.41 | 1.00 |
| | 2016 | 14,765 | 2,514 | 2,514 | 7,337 | 17% | 2.92 | 1.00 |
| Herbicide | 2020 | 16,294 | 16,125 | 68,054 | 25,270 | 99% | 1.57 | 4.22 |
| | 2018 | 15,267 | 14,693 | 68,630 | 26,232 | 96% | 1.79 | 4.67 |
| | 2016 | 14,765 | 14,506 | 65,808 | 27,481 | 98% | 1.89 | 4.54 |
| Insecticide | 2020 | 16,294 | 9,391 | 18,964 | 6,412 | 58% | 0.68 | 2.02 |
| | 2018 | 15,267 | 9,832 | 23,297 | 1,493 | 64% | 0.15 | 2.37 |
| | 2016 | 14,765 | 7,521 | 12,820 | 7,895 | 51% | 1.05 | 1.70 |
| Molluscicide | 2020 | 16,294 | 9,431 | 34,094 | 3,910 | 58% | 0.41 | 3.62 |
| | 2018 | 15,267 | 7,142 | 16,340 | 2,156 | 47% | 0.30 | 2.29 |
| | 2016 | 14,765 | 8,129 | 21,184 | 2,177 | 55% | 0.27 | 2.61 |
| Seed Treatment | 2020 | 16,294 | 13,803 | 14,259 | 2,025 | 85% | 0.15 | 1.03 |
| | 2018 | 15,267 | 13,486 | 14,812 | 3,253 | 88% | 0.24 | 1.10 |
| | 2016 | 14,765 | 12,951 | 13,575 | 4,992 | 88% | 0.39 | 1.05 |
| Sulphur | 2016 | 14,765 | 264 | 264 | 423 | 2% | 1.60 | 1.00 |

Table 20 Crop protection product use in Scottish seed potato production (2016, 2018 and 2020)

| Group | Year | Crop Area (ha) | Basic Area (ha) | Treated Area (ha) | Active Ingredient Applied (kg) | % area treated | Average Kg Active Ingredient per Basic Ha | Average Number of treatments per Basic Ha |
|----------------|------|----------------|-----------------|-------------------|--------------------------------|----------------|---|---|
| Fungicide | 2020 | 12,003 | 12,003 | 145,927 | 79,885 | 100% | 6.66 | 12.16 |
| | 2018 | 12,091 | 10,715 | 122,259 | 61,524 | 89% | 5.74 | 11.41 |
| | 2016 | 12,760 | 12,760 | 153,884 | 70,353 | 100% | 5.51 | 12.06 |
| Herbicide | 2020 | 12,003 | 12,003 | 43,893 | 15,559 | 100% | 1.30 | 3.66 |
| | 2018 | 12,091 | 10,711 | 44,936 | 16,969 | 89% | 1.58 | 4.20 |
| | 2016 | 12,760 | 12,139 | 56,118 | 21,886 | 95% | 1.80 | 4.62 |
| Insecticide | 2020 | 12,003 | 11,046 | 83,722 | 2,683 | 92% | 0.24 | 7.58 |
| | 2018 | 12,091 | 10,382 | 67,387 | 6,181 | 86% | 0.60 | 6.49 |
| | 2016 | 12,760 | 10,108 | 65,898 | 2,271 | 79% | 0.22 | 6.52 |
| Molluscicide | 2020 | 12,003 | 4,064 | 7,811 | 1,033 | 34% | 0.25 | 1.92 |
| | 2018 | 12,091 | 2,696 | 5,336 | 798 | 22% | 0.30 | 1.98 |
| | 2016 | 12,760 | 4,296 | 12,247 | 1,329 | 34% | 0.31 | 2.85 |
| Seed Treatment | 2020 | 12,003 | 10,891 | 10,891 | 2,862 | 91% | 0.26 | 1.00 |
| | 2018 | 12,091 | 10,000 | 10,235 | 3,985 | 83% | 0.40 | 1.02 |
| | 2016 | 12,760 | 10,869 | 11,252 | 6,020 | 85% | 0.55 | 1.04 |

Annex 5 – AHDB average Farmbench potato costs & returns

Table 21 Farmbench costs, returns and margins (£/Ha) for seed and ware potatoes, Scotland / England & Wales (2017–2021 average), and cost element allocation to SIC code

| | |  | |  | | |
|-------------------------------------|--|---|-----------------|--|----------------|--|
| | | 2017-21 | 2017-21 | 2017-21 | 2017-18 | |
| Enterprise Details | | Scotland | Scotland | E&W | E&W | SIC Code Allocation |
| Enterprise identifier | | Ware | Seed | Ware | Seed* | |
| Total area grown (ha) | | 34.31 | 41.51 | 50.89 | 12.48 | |
| Yield (t/ha) | | 51.77 | 36.87 | 40.31 | 17.32 | |
| Price (£/t) | | £166 | £230 | £210 | £307 | |
| Income (Per hectare) | | | | | | |
| Primary market | | £8,263 | £6,710 | £8,127 | £3,071 | |
| Secondary market | | £296 | £864 | £220 | £0 | |
| Other | | £16 | £127 | £52 | £0 | Output |
| Used on farm | | £33 | £764 | £54 | £2,253 | |
| Total income | | £8,608 | £8,465 | £8,452 | £5,324 | |
| Variable costs (Per hectare) | | | | | | |
| Purchased seed | | £624 | £1,321 | £1,045 | £1,475 | Agriculture |
| Seed certification | | £5 | £56 | £0 | £86 | Other professional services |
| Seed treatment | | £45 | £60 | £20 | £69 | Inorganic chemicals, dyestuffs & agrochemicals |
| Total seed costs | | £675 | £1,437 | £1,066 | £1,629 | |
| Inorganic fertiliser | | £383 | £371 | £329 | £353 | Inorganic chemicals, dyestuffs & agrochemicals |
| Organic fertilisers e.g manure | | £13 | £0 | £28 | £0 | Agriculture |
| Trace elements | | £31 | £16 | £11 | £35 | Oil & gas extraction, metal ores & other |
| Total fertilisers | | £427 | £387 | £368 | £388 | |
| Herbicides | | £73 | £84 | £96 | £177 | |
| Fungicides | | £279 | £314 | £268 | £141 | |
| Insecticides | | £29 | £115 | £42 | £184 | Inorganic chemicals, dyestuffs & agrochemicals |
| Nematicides | | £119 | £44 | £102 | £0 | |
| Molluscicides | | £46 | £25 | £22 | £0 | |
| Other crop protection | | £29 | £36 | £31 | £7 | |
| Total crop protection | | £575 | £618 | £562 | £509 | |
| Agronomy fees | | £8 | £12 | £26 | £43 | Other professional services |
| Levy | | £39 | £43 | £37 | £38 | |
| Fleece | | £2 | £0 | £13 | £0 | Textiles |
| Haulage | | £255 | £5 | £186 | £27 | Other land transport |
| Sundries | | £17 | £25 | £22 | £0 | Retail – excl vehicles |
| Total other variable costs | | £320 | £85 | £284 | £107 | |
| Total variable costs | | £1,997 | £2,527 | £2,280 | £2,634 | |
| Gross margin | | £6,610 | £5,938 | £6,172 | £2,691 | |

| Enterprise Details | 2017-21 Scotland | 2017-21 Scotland | 2017-21 E&W | 2017-18 E&W | SIC Code Allocation |
|---|---------------------|---------------------|----------------|----------------|--|
| Overheads (Per hectare) | | | | | |
| Paid labour | £815 | £1,595 | £978 | £1,101 | Compensation of workers |
| Unpaid labour | £139 | £22 | £60 | £30 | |
| Total labour | £954 | £1,616 | £1,038 | £1,130 | |
| Equipment spares and repairs | £330 | £263 | £437 | £304 | Repair & maintenance |
| Fuel | £356 | £336 | £314 | £202 | Coke, petroleum & petrochemicals |
| Equipment hire and leasing | £103 | £81 | £147 | £116 | Machinery & equipment |
| General contracting | £120 | £40 | £85 | £0 | |
| Enterprise specific contracting | £91 | £144 | £196 | £0 | Agriculture |
| Equipment depreciation | £695 | £726 | £527 | £279 | Wholesale - excl vehicles |
| Total machinery and equipment | £1,696 | £1,590 | £1,706 | £900 | |
| Property repairs | £83 | £89 | £63 | £42 | |
| General farm maintenance | £51 | £66 | £28 | £0 | |
| Buildings, structures and drainage depreciation | £161 | £107 | £74 | £35 | Construction |
| Store maintenance | £33 | £26 | £17 | £1 | |
| Water | £17 | £21 | £63 | £36 | Water and sewerage |
| Electricity | £147 | £101 | £98 | £75 | Electricity |
| Drying and storage energy | £179 | £254 | £231 | £102 | |
| Sprout suppression | £16 | £3 | £17 | £12 | Inorganic chemicals, dyestuffs & agrochemicals |
| Third party storage | £58 | £5 | £189 | £254 | Agriculture |
| Lime cost share | £2 | £1 | £0 | £0 | Oil & gas extraction, metal ores & other |
| Mole ploughing cost share | £0 | £0 | £0 | £0 | |
| Soil conditioners cost share | £1 | £1 | £0 | £0 | Wholesale - excl vehicles |
| Total property and energy costs | £747 | £674 | £779 | £556 | |
| Telephone and office | £29 | £38 | £38 | £32 | Telecommunications |
| Subscriptions | £21 | £19 | £13 | £11 | Other professional services |
| Professional fees | £49 | £39 | £37 | £26 | |
| Insurance | £96 | £73 | £73 | £74 | Insurance & pensions |
| Total administration costs | £195 | £169 | £161 | £143 | |
| Paid rent | £509 | £776 | £582 | £874 | Agriculture |
| Imputed rent on owned land | £406 | £88 | £177 | £0 | |
| Total rental value | £915 | £864 | £759 | £874 | Agriculture |
| Overdraft interest and fees | £38 | £13 | £24 | £18 | Financial services |
| Loan interest and fees | £62 | £71 | £60 | £84 | |
| Hire purchase interest and fees | £32 | £26 | £7 | £26 | |
| Bank charges and fees | £18 | £24 | £9 | £26 | |
| Total finance costs | £150 | £133 | £100 | £154 | |
| Total overheads | £4,657 | £5,046 | £4,543 | £3,757 | |
| Cost of production and margins (Per hectare) | | | | | |
| Full economic cost of production | £6,654 | £7,573 | £6,824 | £6,391 | |
| Full economic net margin | £1,954 | £892 | £1,629 | -£1,067 | |
| Cash only cost of production | £5,253 | £6,631 | £5,985 | £6,048 | |
| Cash only net margin | £3,354 | £1,834 | £2,467 | -£724 | |

Annex 6 – Total upstream economic contribution to Scotland’s Economy from the potato growing sector

| Scottish IO sector | Upstream (direct, indirect & induced impacts) | | | | |
|---|---|-------------------|-------------------------|-------------------|----------------|
| | Direct Expenditure | Output Multiplier | Income Effect | Employment Effect | GVA Effect |
| Buildings depreciation | £4.0m | £6.9m | £1.7m | 56 FTE | £3.2m |
| Contracting | £5.7m | £9.3m | £1.6m | 77 FTE | £3.9m |
| Crop protection | £18.2m | £25.7m | £6.4m | 130 FTE | £14.1m |
| Electricity | £9.6m | £16.9m | £2.1m | 45 FTE | £6.9m |
| Equipment Hire & Leasing | £2.7m | £3.9m | £1.0m | 34 FTE | £2.3m |
| Equipment spares and repairs | £8.7m | £12.8m | £4.7m | 72 FTE | £7.7m |
| Finance | £4.1m | £6.3m | £1.7m | 35 FTE | £3.4m |
| Fleece | £0.0m | £0.0m | £0.0m | 0 FTE | £0.0m |
| Fuel | £9.9m | £15.3m | £4.4m | 110 FTE | £8.1m |
| Inorganic fertiliser | £10.7m | £15.2m | £3.8m | 77 FTE | £8.3m |
| Insurance | £2.5m | £3.7m | £0.6m | 12 FTE | £1.5m |
| Lime & Trace Elements | £0.8m | £1.3m | £0.3m | 8 FTE | £0.5m |
| Machinery depreciation | £20.1m | £31.2m | £9.1m | 197 FTE | £14.1m |
| Office and Admin | £0.9m | £1.3m | £0.5m | 12 FTE | £0.9m |
| Organic fertiliser | £0.2m | £0.4m | £0.1m | 3 FTE | £0.2m |
| Professional fees | £2.1m | £3.5m | £0.6m | 29 FTE | £1.5m |
| Property repairs & Maintenance | £4.9m | £8.4m | £2.1m | 68 FTE | £3.9m |
| Regulation | £1.8m | £2.8m | £1.1m | 23 FTE | £1.7m |
| Rent | £26.5m | £43.2m | £7.2m | 359 FTE | £18.1m |
| Seed | £25.0m | £40.7m | £6.8m | 338 FTE | £17.1m |
| Sprout suppressant | £0.3m | £0.4m | £0.1m | 2 FTE | £0.2m |
| Sundries | £0.6m | £0.9m | £0.3m | 12 FTE | £0.6m |
| Transport | £4.6m | £7.1m | £2.4m | 79 FTE | £3.7m |
| Water | £0.5m | £0.7m | £0.1m | 3 FTE | £0.5m |
| On farm Contribution | £164.4m | £258.1m | £58.6m | 1,782 FTE | £122.2m |
| Research & development | £3.2m | £5.5m | £1.8m | 44 FTE | £2.6m |
| SASA running costs | £1.0m | £1.6m | £0.6m | 13 FTE | £0.9m |
| Total non-staff contribution | £168.6m | £265.1m | £61.0m | 1,839 FTE | £125.7m |
| Direct Farm Labour Costs | £34.0m | | | 961 FTE | |
| SASA Staff Costs | £4.0m | | | 80 FTE | |
| Total Direct Labour Contribution | £38.0m | | | 1,041 FTE | |
| Total Farm Returns | £242.7m | | Retained Profits | £44.3m | |

Annex 7 Estimated consumer expenditure on fresh, frozen and processed potatoes

| UNITED KINGDOM | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Population | 60.8m | 61.3m | 61.8m | 62.3m | 62.8m | 63.3m | 63.7m | 64.1m | 64.6m | 65.1m | 65.6m | 66.0m | 66.4m | 66.8m | 67.1m | 67.0m |
| Fresh new potatoes | £288m | £300m | £280m | £280m | £288m | £274m | £257m | £289m | £259m | £256m | £254m | £252m | £257m | £264m | £207m | £246m |
| Fresh baking potatoes | £180m | £193m | £185m | £164m | £176m | £182m | £185m | £225m | £208m | £203m | £205m | £194m | £218m | £222m | £190m | £177m |
| Other fresh potatoes | £653m | £697m | £759m | £732m | £726m | £700m | £789m | £891m | £789m | £709m | £719m | £673m | £695m | £602m | £595m | £642m |
| Fresh potatoes | £1.1b | £1.2b | £1.2b | £1.2b | £1.2b | £1.2b | £1.2b | £1.4b | £1.3b | £1.2b | £1.2b | £1.1b | £1.2b | £1.1b | £1.0b | £1.1b |
| Chips – frozen or not frozen | £334m | £363m | £372m | £415m | £410m | £446m | £468m | £495m | £494m | £492m | £492m | £511m | £524m | £546m | £566m | £638m |
| Takeaway chips | £566m | £608m | £595m | £595m | £600m | £634m | £627m | £630m | £634m | £726m | £751m | £741m | £803m | £754m | £859m | £741m |
| Instant potato | £16m | £14m | £13m | £14m | £12m | £15m | £10m | £11m | £7m | £9m | £11m | £10m | £6m | £6m | £9m | £11m |
| Canned potatoes | £12m | £9m | £11m | £7m | £7m | £11m | £8m | £8m | £6m | £7m | £9m | £6m | £15m | £10m | £14m | £11m |
| Crisps & potato snacks | £959m | £973m | £1,023m | £1,104m | £1,189m | £1,242m | £1,335m | £1,392m | £1,391m | £1,364m | £1,400m | £1,369m | £1,467m | £1,598m | £1,594m | £1,790m |
| Other potato products, frozen or not frozen | £249m | £273m | £279m | £270m | £274m | £320m | £338m | £370m | £355m | £386m | £372m | £381m | £408m | £408m | £447m | £456m |
| Processed potatoes | £2.1b | £2.2b | £2.3b | £2.4b | £2.5b | £2.7b | £2.8b | £2.9b | £2.9b | £3.0b | £3.0b | £3.0b | £3.2b | £3.3b | £3.5b | £3.6b |
| Fresh & processed potatoes | £3.3b | £3.4b | £3.5b | £3.6b | £3.7b | £3.8b | £4.0b | £4.3b | £4.1b | £4.2b | £4.2b | £4.1b | £4.4b | £4.4b | £4.5b | £4.7b |

| SCOTLAND | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Population | 5.1m | 5.2m | 5.2m | 5.2m | 5.3m | 5.3m | 5.3m | 5.3m | 5.3m | 5.4m | 5.4m | 5.4m | 5.4m | 5.5m |
| Fresh new potatoes | £27m | £30m | £26m | £28m | £22m | £21m | £25m | £23m | £20m | £23m | £22m | £28m | £22m | £23m |
| Fresh baking potatoes | £11m | £11m | £12m | £12m | £10m | £12m | £12m | £11m | £13m | £12m | £11m | £10m | £12m | £10m |
| Other fresh potatoes | £56m | £55m | £61m | £56m | £60m | £57m | £64m | £64m | £59m | £58m | £56m | £44m | £55m | £53m |
| Fresh potatoes | £93m | £95m | £99m | £96m | £91m | £89m | £102m | £98m | £92m | £92m | £89m | £82m | £89m | £86m |
| Chips – frozen or not frozen | £31m | £36m | £37m | £39m | £42m | £44m | £48m | £50m | £47m | £50m | £51m | £45m | £51m | £52m |
| Takeaway chips | £49m | £54m | £45m | £63m | £48m | £50m | £64m | £66m | £53m | £65m | £68m | £71m | £67m | £84m |
| Instant potato | £1m | £1m | £1m | £0m | £1m | £1m | £1m | £2m | £1m | £1m | £0m | £0m | £0m | £0m |
| Canned potatoes | £1m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £0m | £1m | £1m | £1m |
| Crisps & potato snacks | £92m | £107m | £103m | £117m | £129m | £114m | £136m | £152m | £140m | £130m | £146m | £123m | £149m | £135m |
| Other potato products, frozen or not frozen | £30m | £35m | £36m | £34m | £38m | £37m | £44m | £46m | £42m | £46m | £44m | £55m | £41m | £44m |
| Processed potatoes | £203m | £233m | £222m | £254m | £257m | £247m | £294m | £316m | £283m | £291m | £310m | £295m | £309m | £315m |
| Fresh & processed potatoes | £296m | £328m | £321m | £350m | £349m | £336m | £396m | £414m | £375m | £383m | £399m | £377m | £398m | £401m |



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