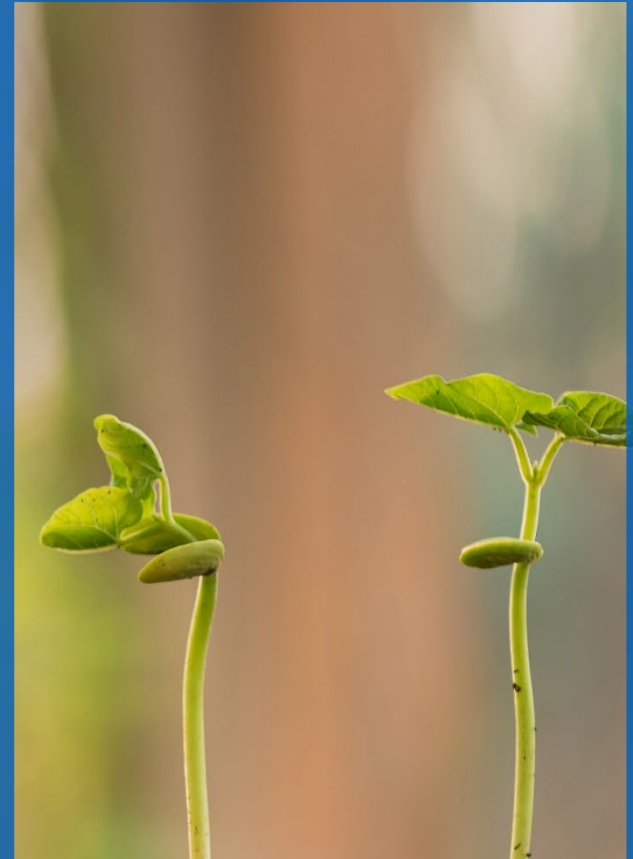




Opportunities for the Irish horticulture sector

Prepared for the Department of Agriculture,
Food and the Marine (DAFM)



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Note: **Appendix A** - Supporting analysis: case study analysis (Netherlands & New Zealand).
Appendix B - Supporting analysis: Organic sector. **Appendix C** – Sources

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About this report

Note that since the inception of this report, geopolitical events in Ukraine have created additional uncertainties whilst exacerbating key constraints for the sector. The findings of this report must be considered in conjunction with the heightened uncertainty and associated impacts of current geopolitical developments.

Context and key inputs are summarised below.

High-level scope

1 Review the current context for the horticulture industry in Ireland. Evaluate the sector's potential and ambition

2 Review the state of play in each of the seven sub-sectors (field crops, protected crops, soft fruit, top fruit, amenity, potatoes and mushrooms)

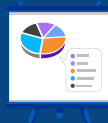
3 Consider international case studies. Identify growth opportunities and priority actions

Key sources for the report



Secondary sources including:

- **International reports:** OECD and FAO
- **Market reports and research:** DAFM, Teagasc, Bord Bia
- **Industry documentation:** Horticulture Industry Forum (HIF)
- **Industry data:** Bord Bia, CSO, DAFM, Statista, Teagasc, Trademap



Our collective knowledge of the sector, enhanced with:

- **Industry interviews** with producer committees, producer organisations, individual growers, Teagasc, Bord Bia, food and amenity retailers, international experts and academics
- **Workshop** with the Horticulture Industry Forum (HIF)
- **Workshop** with KPMG's Global Agri-food lead, Ian Proudfoot



Executive summary

A strategic ambition is needed to guide the co-ordinated pursuit of opportunities to realise the sector's potential.

The **horticulture sector is the 4th largest sector within agriculture**, with a farm gate value of ~€467m (2020). For the purposes of this report, the Irish horticulture sector is considered in terms of seven sub-sectors that include field crops, protected crops, soft fruit, top fruit (primarily apples), amenity, potatoes, and mushrooms.

The report provides an overview of the **current context** for the horticulture industry, the state of play in each of the seven **sub-sectors**, lessons from **international case studies** and highlights the **actions** that can help to address challenges and develop opportunities for the sector. Note that since the inception of this report, geopolitical events in Ukraine have created additional uncertainties whilst exacerbating key constraints for the sector. The findings of this report must be considered in conjunction with the heightened uncertainty and associated impacts of current geopolitical developments.

Whilst the sector **holds potential for growth, numerous challenges need to be addressed to ensure the future viability** of the sector. Accordingly, a **strategic ambition is needed** to guide the co-ordinated pursuit of opportunities to realise the sector's potential.

Such a strategic ambition should be to grow a more profitable value-added sector driven by sustainability and innovation. The most direct way to achieve this will come from giving existing growers and businesses the confidence to expand and diversify profitable enterprises. This report uses three illustrative scenarios to highlight different outcomes that could occur, relative to the level of policy action, co-ordination, and collaboration between the sector's key stakeholders. Scenario 1 presents the most preferred outcome, where the key challenges identified in this report are fully addressed:

| | | | | | |
|---------------|---|---------------|--|----------------|---|
| Growth | Scenario 1: A sustainable future - A thriving, viable and growing sector. All constraints are fully addressed, and opportunities fully developed | Stable | Scenario 2: Status Quo* - The sector remains stable, but growth is limited. Some constraints are addressed, few opportunities are developed | Decline | Scenario 3: A declining sector - The sector declines and stagnates. Constraints are not addressed; opportunities are not developed |
|---------------|---|---------------|--|----------------|---|

As part of the wider context, **Food Vision 2030** aims for Ireland to become a world leader in **Sustainable Food Systems (SFS)** over the next decade delivering benefits for the sector, for Irish society and the environment. A sustainable food system (SFS) is profitable (economic sustainability), has broad-based benefits for society (social sustainability) and a positive or neutral impact on the natural environment (environmental sustainability).

Horticulture is one of the **most carbon efficient**** sectors of Irish agriculture, presenting an opportunity to support Ireland's efforts to curb carbon emissions and enhance sustainability. Accordingly, the vision for the horticulture sector can focus on **sustainability in terms of environmental, economic, and social sustainability**, to strengthen the future viability of Irish horticulture.

*Notes: *The Status Quo may differ for some sub-sectors. For example, the Status Quo for the field vegetable is currently a declining sector. **For example, see Xu, X., Sharma, P., Shu, S. et al. Global greenhouse gas emissions from animal-based foods are twice those of plant-based foods. Nat Food 2, 724–732 (2021). <https://doi.org/10.1038/s43016-021-00358-x>*

Executive summary

The Irish trade deficit signals a lost value opportunity, however, as labour is a high cost-driver, simply incentivising production scale is not enough.

At present, the majority of horticulture output is **consumed domestically**. Only mushrooms and amenity horticulture are significant exporters (~85% of Irish mushroom production is exported). The majority of Ireland's **fruit and vegetables – including high value exotic fruits that we cannot grow here – are imported** (approximately 83%), implying a significant trade deficit in the sector. This is based on the flow of imports and exports, not imports as a percentage of domestic consumption. Ireland's **reliance on imports for fruit and vegetables** is linked to seasonality and some crops not being grown in Ireland. There is a potential **opportunity to displace some imports** with increased domestic production while expanding the share of products outside of current staples.

More than 90% of all Irish fresh produce retail is **sold by a mix of Irish and internationally owned branded retail chains**. Out of an estimated 1,000 growers in commercial operation, Teagasc estimates **the top 250 growers and producers supply 85% of output**. The top 250 growers and producers **directly sell** to consolidators and Supermarket Central Distribution Centres (CDCs).

Whilst each sub-sector presents its own **challenges and opportunities**, there are key **cross-cutting factors that are applicable to the overall sector**. Examples include rising input costs, labour supply and retention issues, constraints around pricing, margins, and scale, and the need for investment in research and development. The cross-cutting factors and the required actions relating to each of these are discussed in greater detail in section 2 of the report.

Approaches to horticulture in the **Netherlands and New Zealand** are considered as **case studies** and present several considerations for the Irish context. Key learnings that are identified include adopting and promoting market-led sustainable production systems, using the clustering effect to enhance knowledge exchange, product commercialisation, revenue, and job growth, developing circular bioeconomy opportunities, prioritising support for rapid mechanisation and offering a variety of funding options for Research and Development including sourcing technological solutions to routine tasks.

The **sub-sector analysis** in section 3 provides a snapshot, SWOT analysis and ambition for each of the sub-sectors. The actions needed to address the unique circumstances of each sub-sector form part of this analysis and are framed in terms of key priority areas.

*Notes: *Percentage is based on Eurostat data for the total value (in euros) of all fruit and veg (HS codes 07 and 08) handled within Ireland.*

Executive summary

Several cross-cutting factors need to be addressed to support the sustainability of the horticulture sector.

Several actions are identified in terms of the cross-cutting factors, including the following:

- **Labour supply:** enhance the efficiency of labour permits and address the need for a seasonal permit scheme, while longer-term solutions, such as mechanisation and robotics, are being developed and implemented
- **Collaboration:** Increase grower participation in EU funded producer organisations, develop local working groups to facilitate knowledge sharing, and develop industry collaboration with retailers and facilitators (including around the benefits of producer organisations). Encourage collaboration with research organisations and other sectors
- **Research and development (R&D):** Establish a working group to develop a detailed research needs analysis for the sector which can then inform research calls, projects and opportunities conducted by organisations such as DAFM, Teagasc, Bord Bia and EI. Support the horticulture sector to access research and innovation funding, from both domestic and European sources
- **New Product Development (NPD) and innovation:** Secure funding to support NPD, develop innovation pathways, market insight and different product formats, while following international best practice
- **Knowledge transfer:** Develop a roadmap for integrating horticulture back into the broader Agriculture Knowledge and Innovation System (AKIS), increase resourcing of horticulture advisory services, create accelerated training programmes, augment the existing knowledge transfer programme, facilitate the role of growers as new knowledge creators, and follow international best practice
- **Education and training:** Develop and modernise the horticulture training and education offering, augment the curriculum in horticulture to reflect the latest plant production methodologies, develop a masters programme
 - linked to European colleges / institutions, provide relevant education to consumers and the trade sector, and attract new entrants by creating awareness about horticulture and the opportunities in the sector
- **Sustainability:** Develop “Horti-metrics” as a common measure to understand and communicate the sector’s environmental impact for example, fruit and vegetables have the smallest area of land use per kg of food produced. Leverage this data for the betterment of the horticulture sector. Provide education on the value of in-season produce across the retail and food services sectors. Develop controlled-environment agriculture (CEA) growing methods as well as integrated pest management (IPM) for unprotected crops
- **Insight and Intelligence:** Develop data and intelligence on the sector to inform evidence-led policy making and marketing initiatives that support the sector to achieve its full potential
- **Promotion (create awareness):** Develop and implement the levers that can support import substitution. Promote Irish grown produce in terms of the associated environmental benefits (low food miles and “Horti-metrics”) and the fresh / nutrition-based benefits through identifiable packaging. Highlighting “fresh, local and in-season”
- **Brexit:** Continually monitor developments, identify impacts, and communicate findings to the sector to ensure preparedness for challenges as they emerge. Develop support services to help growers navigate the increased administrative requirements. Harness positive attitude to Irish produce in UK local market, in particular promoting Irish Plant Health Status
- **Packaging and food waste:** Learn from and adopt international best practice, monitor global packaging trends, and identify solutions that minimise food waste. Ensure industry initiatives are communicated to the consumer

Executive summary

Policy action, co-ordination, and collaboration between the sector's key stakeholders is crucial.

In conclusion, policy action, co-ordination, and collaboration between the sector's key stakeholders is crucial to achieving an outcome where the horticulture sector can be viable, grow and thrive. This report presents a starting point for DAFM to develop and implement a fit for purpose strategy for the Irish horticulture sector.



Section 1

Context and ambition

Context and ambition: Overview

Overview



This section articulates a **strategic ambition**, underpinned by environmental, economic and social sustainability (aligned with Food Vision 2030). The vision is articulated under **three possible scenarios**, dependent on the extent of **policy interventions** and **collaboration** between the sector's key players. The **key players include** growers, DAFM, Teagasc, Bord Bia, HIF, IFA, producer organisations, retailers and facilitators. A **market overview, SWOT and PESTLE** analysis provide context for the horticulture sector and identify key strategic drivers. **Note that** the availability of data on the sector and sub-sectors varies. For this report, the latest available figures (2021 and 2020) have been used as far as possible.

Context and ambition
Strategic ambition: Horticulture

A strategic ambition is needed to guide the co-ordinated pursuit of opportunities that can help to realise the sector's potential.

Strategic ambition: To grow a more profitable value chain

Scenarios for the sector

01 Scenario 1: A sustainable future
A thriving, viable and growing sector. All constraints are fully addressed and opportunities fully developed.

02 Scenario 2
The sector remains viable but with some constraints. Some constraints are addressed.

03 Scenario 3
The sector is struggling. Significant constraints are not addressed.

Heightened uncertainty: The impact of geopolitical events in Ukraine have created additional uncertainties whilst exacerbating key constraints, for example, additional cost pressures on key inputs such as energy and fertiliser.

Sources: Stakeholder consultations and interviews. Notes: **The Status Quo may differ for some sub-sectors. For example, the Status Quo for the field vegetable sector.

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Context and ambition
Strategic ambition and illustrative scenarios

Strategic ambition and illustrative scenarios

Lightbulb icon

Context and ambition
Three areas of sustainability to underpin the ambition

The future viability of Irish horticulture can be strengthened by focusing on sustainability in terms of environmental, economic and social sustainability.

Environmental

An expanded horticulture sector can play an important role towards realising the Missions set out in the Food Vision 2030 strategy. Horticultural systems can contribute to carbon sequestration help to enhance biodiversity and contribute towards a climate-neutral sector by 2050

Economic

The value of a

Social

A sustainable food system (SFS) and a positive impact on sustainability and a positive impact on sustainability

Sources: DAFM Food Vision 2030, Stakeholder consultations

Context and ambition
Market overview

The horticulture sector makes a strong contribution to gross agricultural output with a farm gate value of ~€467m (2020).

Farm gate value by sub-sector Horticulture sector 2020, €m

| Sub-sector | Value (€m) |
|--------------------------------|------------|
| Mushrooms | 124 |
| Amenity | 98 |
| Potatoes | 82 |
| Field vegetables | 60 |
| Protected fruit and vegetables | 77 |
| Outdoor fruit and vegetables | 9 |

Mushrooms and potatoes make up ~44% of the total farmgate value of €467m

Breakdown of amenity horticulture Value share by product 2020, %

| Product | Value share (%) |
|--------------------------------------|-----------------|
| Nursery Stock | 10% |
| Protected Crops | 15% |
| Christmas trees | 35% |
| Cut Florage, Outdoor Flowers & Bulbs | 25% |
| Turf Grass | 15% |

Sources: CSO, DAFM, Teagasc, Bord Bia (Kantar). Notes: **Final estimates will be published in June 2022, ***at wholesale prices.

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Key takeaways

- Based on CSO estimates*, Ireland's agricultural output (at basic prices) was ~€10bn in 2021 (~€8.9bn in 2020).
- Horticulture is the 4th largest sector within agriculture, with a farm gate value of ~€467m (2020). Edible horticulture accounts for €377m of this total.
- Mushrooms and potatoes are the top value crops (44% of total) in horticulture overall, out of the seven categories measured.
- In spite of a reduction in the number of growers over the past two decades, the level of output has remained broadly constant.
- The majority of horticulture output is consumed domestically. Only mushrooms and amenity horticulture are significant exporters (~80% of Irish mushroom production is exported).
- The fresh produce retail market was valued at ~€1.7bn in 2021. Fruit accounted for €835m, vegetables for €830m and potatoes for €240m.
- The food service market** for fresh produce was valued at ~€444m in 2019.
- The retail amenity (gardening) market at consumer level was worth ~€1.5bn in 2021.

Market overview, SWOT and PESTLE analysis

Line graph icon

Strategic ambition: Horticulture

Becoming a value-added sector will require expansion beyond primary production, to include value-added production.

A strategic ambition is needed to guide the co-ordinated pursuit of opportunities that can help to realise the sector's potential.



Strategic ambition: To grow a more profitable value-added sector driven by sustainability and innovation.

Scenarios for the sector's future:

01

Scenario 1: A sustainable future

A thriving, viable and growing sector. All constraints are fully addressed and opportunities fully developed.



Policy action: The likelihood of achieving the sector's strategic ambition will depend partly on the extent of policy actions to address the sector's constraints while maximising opportunities for growth.

02

Scenario 2: Status Quo*

The sector remains stable but growth is limited. Some constraints are addressed, few opportunities are developed.

Collaboration: Collaboration between the sector's key players is equally important.

03

Scenario 3: A declining sector

The sector declines and stagnates. Constraints are not addressed, opportunities are not developed.



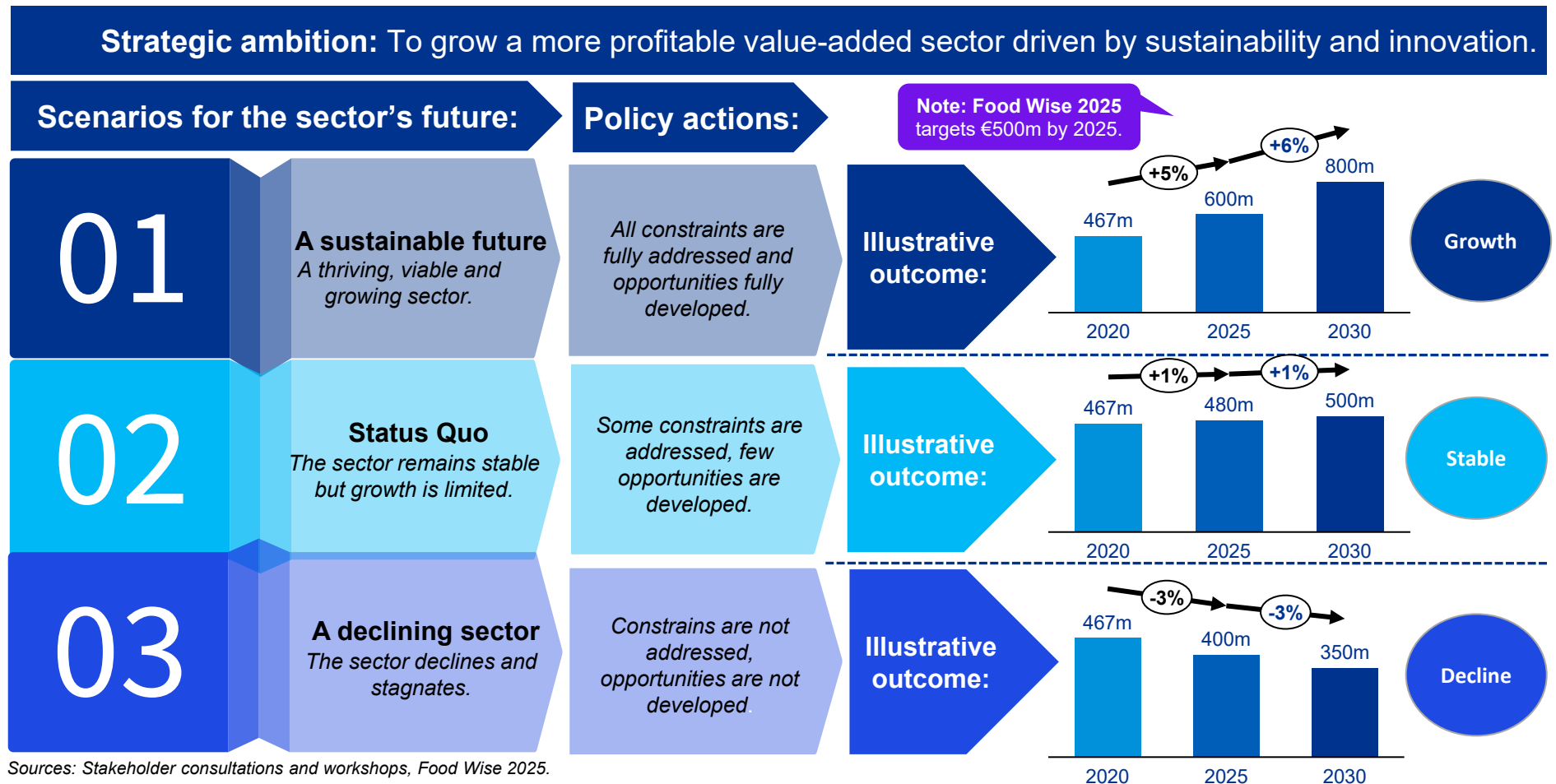
Heightened uncertainty: The impact of geopolitical events in Ukraine have created additional uncertainties whilst exacerbating key constraints, for example, additional cost pressure on key inputs such as energy and fertiliser.

Sources: Stakeholder consultations and workshops.

Notes:*The Status Quo may differ for some sub-sectors. For example, the Status Quo for the field vegetable is currently a declining sector. See the sector snapshot section for more detail.

Strategic ambition: Horticulture

The extent of policy actions will influence the likelihood of achieving the sector's strategic ambition.



Sources: Stakeholder consultations and workshops, Food Wise 2025.

Three areas of sustainability to underpin the ambition

The future viability of Irish horticulture can be strengthened by focusing on sustainability in terms of environmental, economic and social sustainability.



Horticulture is one of the most carbon efficient sectors of Irish agriculture

Environmental

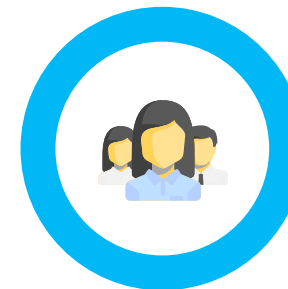
An expanded horticulture sector can play an important role towards realising the Missions set out in the Food Vision 2030 strategy. Horticultural systems can contribute to carbon sequestration, help to enhance biodiversity and contribute towards a climate-neutral sector by 2050



Ensuring the economic viability of growers is crucial to securing the future of the sector

Economic

As price takers, rising input costs place growers under greater economic pressure, with a number of growers either stopping production or reducing acreages. This further curtails entry by the next generation of growers



The value of a self-sufficient horticulture sector extends across financial, rural economy and carbon footprint terms

Social

A strong horticulture industry provides a healthy diet, helping to maintain a healthy society. From carbon sequestration to enhancing biodiversity, horticultural systems offer many synergies and co-benefits between environmental, economic and social sustainability






A sustainable food system (SFS) is profitable (economic sustainability), has broad-based benefits for society (social sustainability) and a positive or neutral impact on the natural environment (environmental sustainability).

Sources: DAFM Food Vision 2030, stakeholder consultations.

Context: Food Vision 2030

An ambition for horticulture, that is underpinned by environmental, economic and social sustainability, can help to grow the sector whilst supporting the key missions set out in Food Vision 2030.

2030 vision for Ireland’s agri-food sector: To be a world leader in sustainable food systems.

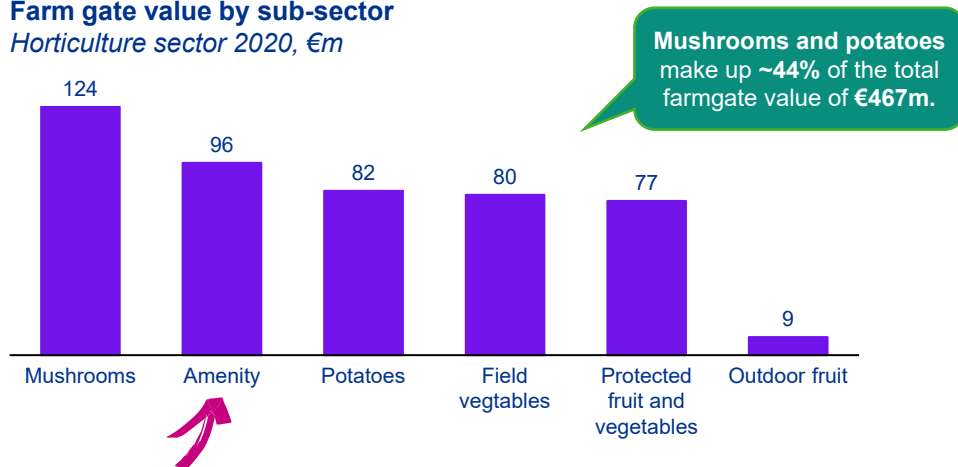
| | | |
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| <h2>Food Vision 2030</h2> | <ul style="list-style-type: none"> “Ireland will become a world leader in Sustainable Food Systems (SFS) over the next decade delivering benefits for the sector, for Irish society and the environment” | |
| <h3>The Strategy is built upon four high-level Missions:</h3> | <h3>Horticulture’s role:</h3> | |
| <p>Mission 1 A climate smart environmentally sustainable agri-food sector</p>  | <p>Horticulture can contribute to the Missions in the strategy by:</p> <ul style="list-style-type: none"> Helping to realise a climate-neutral sector by 2050 Contributing to carbon sequestration and enhancing biodiversity such as pollinators Providing synergies and co-benefits between environmental, economic and social sustainability Taking advantage of the growing demand for fruit and vegetables, whole-foods, ornamental plants and amenity infrastructure | |
| <p>Mission 2 Viable and resilient primary producers with a secure future</p>  | | |
| <p>Mission 3 Food which is safe, nutritious and appealing, trusted and valued at home and abroad</p>  | | |
| <p>Mission 4 An innovative, competitive and resilient agri-food sector, driven by technology and talent</p>  | | |
| <h3>Key areas to consider</h3> | | |
| <p>Environmental targets</p> | <p>Import substitution</p> | <p>R&D</p> |
| <p>Labour issues</p> | <p>Health benefits</p> |  |
| <p>Collaboration</p> | <p>Product innovation</p> | |

Sources: DAFM Food Vision 2030.

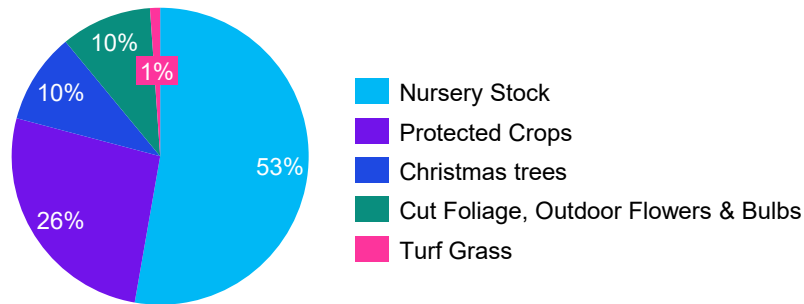
Market overview

The horticulture sector makes a strong contribution to gross agricultural output with a farm gate value of ~€467m (2020).

Farm gate value by sub-sector
Horticulture sector 2020, €m



Breakdown of amenity horticulture
Value share by product 2020, %



Sources: CSO, DAFM, Teagasc, Bord Bia (Kantar)

Notes: *Final estimates will be published in June 2022, **at wholesale prices.

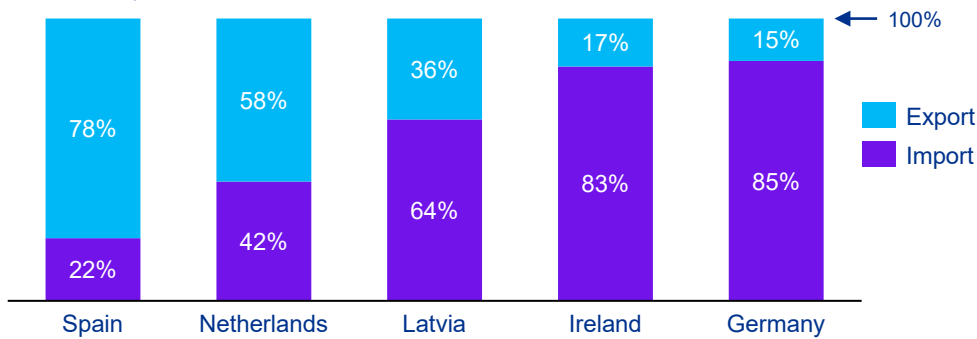
Key takeaways

- Based on CSO estimates*, Ireland's agricultural output (at basic prices) was ~€10bn in 2021 (~€8.9bn in 2020)
- Horticulture is the 4th largest sector within agriculture, with a farm gate value of ~€467m (2020). Edible horticulture accounts for €371m of this total
- Mushrooms and potatoes are the top value crops (44% of total) in horticulture overall, out of the seven categories measured
- In spite of a reduction in the number of growers over the past two decades, the level of output has remained broadly constant
- The majority of horticulture output is consumed domestically. Only mushrooms and amenity horticulture are significant exporters (~85% of Irish mushroom production is exported)
- The fresh produce retail market was valued at ~€1.7bn in 2021. Fruit accounted for €835m, vegetables for €630m and potatoes for €246m
- The food service market** for fresh produce was valued at ~€444m in 2019.
- The retail amenity (gardening) market at consumer level was worth ~€1.5bn in 2021

Market overview

The Irish trade deficit for horticulture signals a lost value opportunity.

Fruit and vegetable trade deficit of Ireland and comparative EU countries, 2020



Note: Percentages are based on the total value (in euros) of all fruit and veg (HS codes 07 and 08) handled within each country



~1,000 Growers



~250 Growers supply 85% of output



Branded retail chains

Branded retail chains sell more than 90% of fresh produce.

Key takeaways

- The majority of Ireland's fruit and vegetables are imported (~83%*), implying a significant trade deficit in the sector
- Ireland's reliance on imports for fruit and vegetables is linked to seasonality and some crops not being grown in Ireland
- There is a potential opportunity to displace some imports with increased domestic production while expanding the share of products outside of the current mass market volume drivers
- More than 90% of all Irish fresh produce retail is sold by branded retail chains
- Out of an estimated 1,000 growers in commercial operation, Teagasc estimates the top 250 growers and producers supply 85% of output
- The top 250 growers and producers directly sell to consolidators and Supermarket Central Distribution Centres (CDCs)

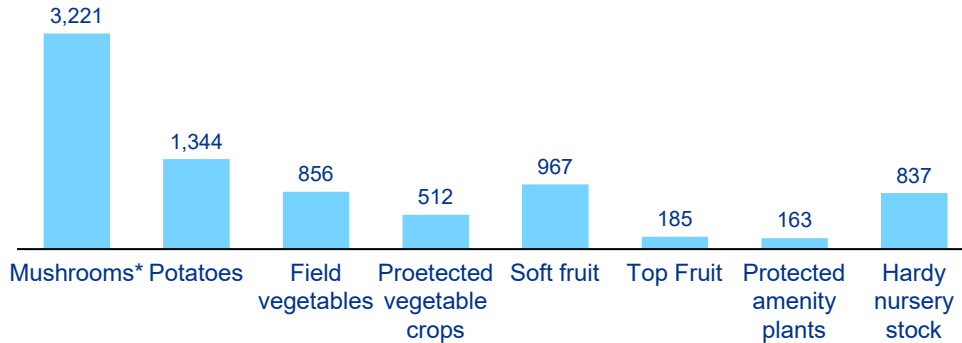
Sources: Teagasc, Eurostat

Note: *This is based on the flow of imports and exports, not imports as a percentage of domestic consumption.

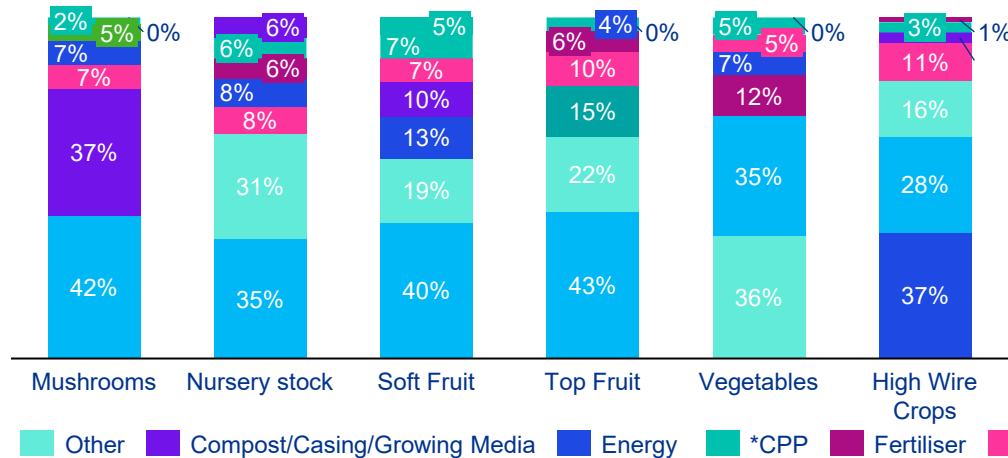
Market overview

While covering <2% of agricultural land, horticulture accounts for ~11% of total agri-food jobs (direct and downstream) – hence it is a vital component of rural economies.

Direct employment in Horticulture, (Estimates)



Breakdown of relative importance of inputs, 2022***



Key takeaways

- The Irish horticulture sector employs more than 7,000 people in primary production and a further 11,000 in downstream businesses
- In terms of farmed land, less than ~2% of the agriculture area in Ireland is devoted to horticulture production. Considering the sector's direct and downstream jobs, horticulture jobs account for ~11% of total agri-food sector employment**. The 11% share is, in part, driven by the required seasonal employment
- The mushroom sub-sector is the largest by employment, with a 35% share of direct horticulture jobs
- Labour is one of the largest components of production costs across most sub-sectors, ~40% of total input costs
- Employee turnover can be a persistent issue – the vacancy rate in the horticulture sector in 2018 was ~14% and anecdotally may have risen since with COVID and related travel disruption
- Labour supply constraints have caused upward pressure on wages, while rising costs for recruitment and training adds to the overall increase in labour input costs

Sources: DAFM, Teagasc.

Notes: *Mushroom employment figure based on Teagasc 2021 Irish Mushroom Industry Labour Survey, **Agri-food sector employment was 163,600 in 2020, ***12 months to March 2022.

Market overview

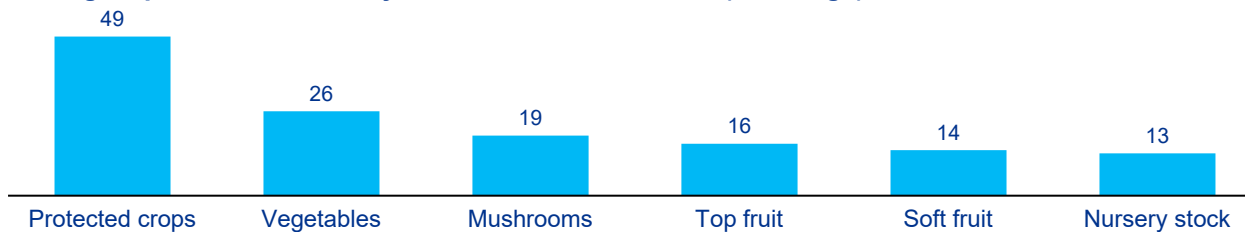
Year on year increase in horticulture input costs greatly outpaced national inflation, with rates up to 49% for some crops. Key cost drivers are fertiliser, energy and packaging.

Input cost inflation by sub-sector, 2022 (Q1)

| Sector | Labour | Packaging | Fertiliser | CPP | Energy | Compost | Other |
|-----------------|--------|-----------|------------|-----|--------|---------|-------|
| Mushrooms | 8% | 48% | 0% | 50% | 135% | 9% | 14% |
| Nursery stock | 7% | 35% | 120% | 6% | 135% | 27% | 10% |
| Soft fruit | 9% | 40% | 92% | 15% | 135% | 21% | 10% |
| Top fruit | 11% | 42% | 240% | 18% | 135% | 0% | 10% |
| Vegetables | 11% | 36% | 240% | 17% | 135% | 20% | 10% |
| Protected crops | 7% | 26% | 33% | 7% | 270%* | 23% | 10% |

Note: CPP = crop protection products, Energy includes electricity at +131% and diesel +141%, *includes natural gas and electricity.

Average input cost inflation by sub-sector, 2021 – 2022** (% change)



Sources: Teagasc.

Notes: **12 months to March 2022, ***weighted average.

Key takeaways

- Growers have seen significant increases in key input costs in the first quarter (Q1) of 2022
- The horticulture sector’s key inputs, across most sub-sectors, include energy, fertiliser, labour and packaging
- From March 2021 to March 2022, average*** input cost inflation ranged from 13% for nursery stock to 49% for protected crops
- The large increase in protected crop input cost inflation is due to a 270% increase in energy costs
- The pace of inflation in 2022 (Q1) poses a significant challenge for many horticultural enterprises. Achieving a margin over costs is becoming much more challenging

SWOT analysis: sector wide (1/2)

Collaboration, marketing and investment in R&D are key elements for developing the sector.

Strengths

S

- Existing expert grower base across all sectors
- High quality produce with high production standards and quality image underpinned by Bord Bia Sustainable Horticulture Assurance Scheme
- Growing consumer awareness of health benefits of consuming more fruits and vegetables, and wellbeing benefits of amenity horticulture
- High demand for trees and plants in our built environment
- Changing consumer preferences around plant-based diets domestically and in export markets
- Bloom established as a major promotional vehicle for Irish Horticulture
- Horticulture produces high value output using less than 2% of available agricultural land
- Sustainable water supply

Weaknesses

W

- Fragmented producer base and lack of scale versus international competitors; local cost of production likely to be higher
- Low margins and consequent lack of investment at the grower level
- Limited producer co-operation, short-term supply contracts with consolidators and supermarkets
- Underdeveloped Agricultural Knowledge and Innovation Systems (AKIS) for horticulture. Lack of new entrants, limited training and exposure for new entrants
- Growth is dependent on high levels of capital investment and high value crop production under glasshouses and protected structures
- Challenging labour supply market difficulties (attracting and retaining labour) and high labour costs
- Lack of RDI capacity in key areas, including production systems and labour-saving technologies. Lack of product innovation and diversification due to deficit of available market intelligence

Sources: Horticulture Industry Forum (HIF), stakeholder consultations, Teagasc.

SWOT analysis: sector wide (2/2)

Collaboration, marketing and investment in R&D are key elements for developing the sector.

Opportunities

- Exploit consumer health benefits / lifestyle trends, trend toward plant-based diets will boost consumption
- Import substitution of key fruits and vegetables, Improve identification of Irish produce through better branding
- Despite Brexit, increase of export potential to the UK and beyond for all sectors if supported by better structure and marketing
- Capacity for furthering sustainability, quality credentials and Ireland's green image to create new export markets
- Capitalise on environmental benefits that horticulture production can deliver
- Maximize the value-added opportunity from increased waste valorisation opportunities and increasing use efficiency in line with circular bioeconomy objectives
- Farm to Fork targets for pesticides together with Integrated Pest Management IPM adoption will reduce environmental loading
- Take advantage of Ireland's low pest and disease status to produce plants for export
- Learn from international best practice to adopt and expand proven sustainable food and plant production technologies and systems, e.g., Controlled environment agriculture (CEA). Also learn from on-going research and innovation (R&I) outcomes
- Expanding the organic sector
- Exploit Producer Organisation potential, adoption of automation and cost-reducing technologies to bolster competitiveness

Threats

- Supply disruptions to key inputs and rising input cost pressure (Geopolitical tensions: Ukraine crisis)
- Retailer power, consolidation of buying power and lack of alternative routes to market
- Ageing producer base, poor level of succession planning and lack of new entrants, partly due to poor returns from the industry
- Inadequate education and training to provide required skill base due to low demand
- Weakening of Sterling against Euro makes imported UK produce more competitive on the Irish market
- Consumers apathetic to the plight of Irish growers. Unaware of seasonal variations, price implications and sustainable products
- Failure to meet the challenge of securing viable, affordable and sustainable alternatives to peat in horticultural production
- Pest, crop disease and biosecurity risks, with reduced availability of crop protection products
- Failure to adopt new technologies that can enhance sustainability and productivity
- Challenging labour supply market difficulties (attracting and retaining labour) and high labour costs
- Internationally, plant breeding and plant innovation is a key driver of productivity growth. A relatively weak position as an importer of almost all seed, plant modules, young plants and the deficit of commercial micro-propagation capacity can constrain the sector's growth and innovation prospects

Sources: Horticulture Industry Forum (HIF), stakeholder consultations, Teagasc.

PESTLE analysis

○ Potential opportunities
 ▣ Potential threats

Political

- Stability of government and continued leadership support from DAFM
- Potential for / need for step-change in government attention and funding on / of horticulture is compellingly shown as part of the solution to reduce Irish agriculture's carbon footprint (37% of national footprint)
- Climate change measures will likely see farmer diversification into horticulture, brings both opportunity and threat and should be anticipated and managed
- Post-COVID fiscal pressures and potential for contracted Budgets for a number of years
- Changes to legislation or funding
- Geopolitical tensions: Ukraine crisis

Economic

- New market opportunities, including rising domestic willingness to spend on provenance/health, and export potential for value-added areas
- Volatility in exchange rates with key export markets impacting pricing and profitability of farmers
- Input supply disruptions and input cost pressure (geopolitical)

Social

- Consumer focus on sustainability and supporting local produce could drive a shift towards indigenous products and services
- Not attracting talent to obtain the relevant education
- Young talent not interested to pursue employment outside of urban centres

Sources: KPMG research.

Technological

- Next-generation technology to automate processes where possible
- Technologies replacing manual labour could affect quality of the finish produce that is currently being hand picked
- Cost of implementing new technologies

Legal & Regulatory

- R&D tax credits and other incentives for the sector and farmers
- Post-Brexit challenges faced by the sector in relation to the import and export of produce to and from the UK
- Changes to legislation in the EU and UK (regulatory divergence)

Environmental

- Focus on local Irish produce and food miles to the local sector's benefit
- Horticulture's potential as one of the few sectors that can go carbon negative, with associated branding benefits as well as additional revenue stream (voluntary carbon market)
- If climate change results in higher Irish temperatures without greater rainfall, coupled with higher CO2 levels, there is potential for an uplift in production
- Interim costs associated with net zero carbon emission targets
- Potential increase in cost of packaging as a result of zero plastic trend



Section 2

Cross-cutting factors

Cross-cutting factors: Overview

The sector's future will be influenced by the extent of policy interventions to address the sector's constraints while maximising opportunities for growth.

Cross-cutting factors
Underlying strategic themes

Five underlying strategic themes are used to consider opportunities for Irish horticulture.

01 Markets, specialisation and diversification
 What are the opportunities for market development, specialisation and diversification?

02 Sectoral insights
 What insights can be drawn from sectoral data and analysis?

Theme 1 Theme 2

This theme is discussed further in section three of the report.

Cross-cutting factors
Cross-cutting factors (1/3)

Several issues need to be addressed to support the sustainability of the horticulture sector.

We have identified a number of cross-cutting factors that represent both challenges and opportunities for the sector.

- Labour** - Growers/producers are reliant on temporary workers, supply of which is falling. Securing sufficient labour is a challenge. The sector is reliant on employment permits, attracting and retaining employees.
- Pricing** - Increases in input cost. Five branded chains control over retail market; growers are price-takers from imported goods.
- Margins** - Low margins make it difficult to invest in sustainability demands.
- Scale** - The Irish market is small, opportunities for major projects are limited. Limited scale opportunities for innovative or sustainable players.
- Research & Development (R&D)** - Support innovation and growth. R&D for R&D to support the sector. R&D for both technical sector research and source: Stakeholder consultations and workshops.

Cross-cutting factors
Actions for cross-cutting factors

| Context | Actions | Area of sustainability |
|---|--|---|
| <ul style="list-style-type: none"> Growers/producers are reliant on temporary workers, supply of which is falling. Securing sufficient labour is a challenge. The sector is reliant on employment permits, attracting and retaining employees is a significant challenge. Fall all workers have access to transport. Rising labour costs have an impact on growers' margins and sustainability. | <ul style="list-style-type: none"> Enhance efficiency of labour permits and address the need for a seasonal permit scheme to support labour requirement. Increase administrative resources to speed up the process. Evaluate temporary or alternative housing options to support growers in housing their temporary workers. Consider a permanent seasonal workers' scheme. Support R&D in developing transport solutions to connect workers with growers. Promote long-term career development through... | <ul style="list-style-type: none"> Labour Environment Social |

Cross-cutting factors
Key learnings from Dutch horticulture (1/2)

NL is a global leader in horticulture innovation, driven by sustainable technologies and government sector support which creates a precision farming environment.

| Innovations | Commentary | Key learning / actions for Ireland |
|---|---|--|
| NL has pioneered a sustainable precision farming model using glasshouses in NL. | NL has over 9,000ha of high-tech glasshouses. Horticulture crops are grown in climate-controlled conditions, facilitating precision harvesting with reduced use of water and fertiliser. At optimal growing conditions, each glasshouse can produce the same lettuce yield as 10 outdoor acres. All new glasshouses are required to be climate-neutral. Sustainable glasshouse technologies are stimulated by government subsidies such as "The glasshouse as a source of energy" programme using solar panels to create energy and innovative heat exchangers to save energy consumed, with the surplus being used for other purposes. | Embrace the glasshouse model. The use of glasshouses has transformed Dutch horticulture allowing the precision growth of produce with fewer resources and higher profitability. Require capital investment supported by government into skills, research and extension. Energy costs a lower cost. Adopt and promote sustainable glasshouse production. |
| Designated Dutch greenports drive collaboration in the horticulture industry in NL. | Greenports provide a "clustering" effect for Dutch horticulture. Greenports are clusters of intensive horticulture production and agri-business such as suppliers and logistics. The basic premise around this cluster design is to increase economies of scale and efficiency in transport and logistics. There are five designated "Greenports" in NL across vegetables, cut flowers and pot plant production. | Aim to grow the horticulture sector in clusters. Across sectors, the clustering effect is known to enhance knowledge exchange, product commercialisation, revenue and job growth. |
| Experimental "lighthouse farms" are being used to help growers to thrive in a circular economy in NL. | NL has recognised the growing importance of circular agriculture and is developing expertise in the area. Circular agriculture aims to keep residues of agricultural biomass and food processing and re-use them as renewable resources - this cuts waste, leads to less inputs and reduces the need for fertilisers. The Dutch Ministry of Agriculture recently launched a plan of action to support the transition to circular agriculture. NL has established experimental "lighthouse farms" to build their knowledge and prepare for the global shift to circular farming. | The shift to circular agriculture is approaching, now is the time to prepare. The Dutch approach to knowledge building through test farms will ensure they are prepared for the transition to circular farming. Develop circular bioeconomy opportunities to grow the horticulture sector. |

Source: KPMG NL, The Dutch Horticulture Industry, 2023; KPMG NL, Dutch Greenport International, 2023; KPMG NL, Horticulture Industry & Research, 2023; KPMG NL, Horticulture Industry & Research, 2023.

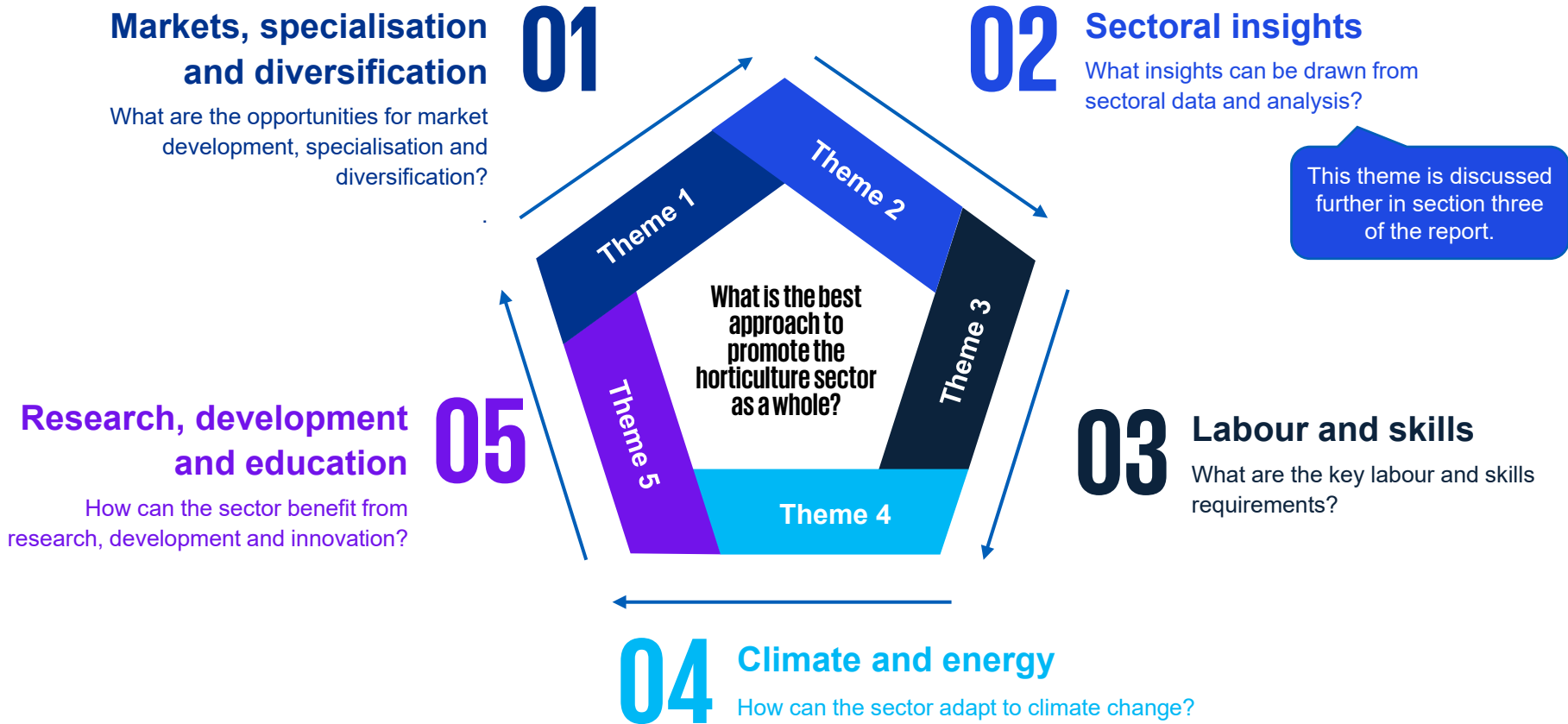
Overview

In this section we consider:

- 1. Strategic themes: Five strategic themes** underly the analysis of opportunities for Irish horticulture. These themes are analysed by considering **cross-cutting factors** that are relevant to the sector as a whole. Note that sectoral (sub-sector) insights are developed further in section three of this report
- 2. Cross-cutting factors:** While each sub-sector has its own constraints and opportunities, the horticulture sector's **cross-cutting challenges need to be addressed and opportunities developed** by directing policy interventions towards the necessary actions and enablers that can support the sector. **Actions are identified** to address the inherent challenges and opportunities that arise from the sector's cross-cutting factors
- 3. Key learnings from international case studies:** Horticulture in the **Netherlands and New Zealand** are considered as case studies and present several considerations for the Irish context. **Actions are identified** to adopt learnings from the international case studies

Underlying strategic themes

Five underlying strategic themes are used to consider opportunities for Irish horticulture.



These strategic themes are addressed through analysing the sector's cross-cutting factors

Cross-cutting factors (1/3)

Several issues need to be addressed to support the sustainability of the horticulture sector.

We have identified a number cross-cutting factors that represent both challenges and opportunities for the sector



Labour – Growers/producers are reliant on temporary workers, supply of which is falling. Securing sufficient labour is a challenge. The sector is reliant on employment permits, attracting and retaining employees is a significant challenge



Pricing – Increases in input costs are not matched by prices. Five branded chains control over 90% of the fresh produce retail market; growers are price takers. Downward price pressure from imported goods



Margins – Low margins make re-investment difficult in light of sustainability demands.



Scale – The Irish market is relatively small which limits investment opportunities for major projects. Expanding capacity is limited not only by the capital requirements but also by low demand due to scale. Limited scale opportunities are a barrier to entry for innovative or sustainable players



Research & Development (R&D) – R&D is a key enabler to support innovation and growth. Funding constraints curtail the role for R&D to support the sector. R&D is much needed in terms of both technical sector research and market intelligence



New Product Development (NPD) & innovation– Linked to the need for R&D, new product development and innovation can help to create new opportunities to grow the sector



Knowledge transfer – Horticulture needs to be integrated back into the broader Agriculture Knowledge and Innovation System (AKIS) to create an environment conducive to growth. Greater resourcing of horticulture advisory services are needed



Education and training – Education and training programs can be enhanced by considering the current needs of the sector. On the consumer side, consumer education, especially through school programmes and initiatives, can raise awareness and consumption of healthy products from the horticulture sector



Sustainability (including growing media) – The sector's sustainability credentials presents an opportunity to support growth. However, while the sector has a relatively low environmental footprint, finding alternatives to peat-based growing media is a significant challenge. There is a research challenge to find alternative growing media which are available, affordable and sustainable, while meeting the yield and quality parameters required. There is pressure to reduce chemical pesticide use which requires a full sector shift given current dependence in the growing process. The sector needs access to essential pest control products that still meet sustainability requirements

Develop “Horti-metrics” as a common measure to understand and communicate the sector’s environmental impact.

Sources: Stakeholder consultations and workshop.

Cross-cutting factors (2/3)

Several issues need to be addressed to support the sustainability of the horticulture sector.

We have identified a number cross-cutting factors that represent both challenges and opportunities for the sector



Succession planning – Ageing producer base, low level of succession planning and lack of new entrants. There is a need to attract new entrants, so reducing the average owner age from 57 to mid-40s



Insight & intelligence – There is a lack of sector and farm management data. Implementing mechanisms to collect, analyse and disseminate sector and farm management data can help to inform the policy makers and growers to support strategic decision making. Better data and further research can help to inform the sector of strategic market opportunities



Inventory of soil & site suitability – Linked to R&D and sector intelligence, an inventory of soil and site suitability can support the identification and targeting of product opportunities



Promotion – The sector can be promoted (create awareness) by leveraging the sector's health, wellbeing and environmental credentials. In addition, local produce can be promoted during the Irish growing season. These levers can help to increase consumption of local produce, thereby gaining a greater share of the home market and reducing the trade deficit.



Brexit – Horticulture exports to the United Kingdom (UK) now face additional barriers due to the increased administrative burden created by Brexit



Organic production – Organic production presents a market opportunity, however, the balance between higher costs and producer prices are a key factor



Energy – Energy is an important input costs across sub-sectors, especially for soft fruit, protected crops and nursery stock. Rising energy costs tied with low margins place producers under increased pressure. Alternative energy sources for own generation can help to alleviate this pressure but funding support would be needed to invest



Collaboration – Producers can benefit from greater collaboration to increase their bargaining power and to help grow their business. Producer organisations (POs) are a key example, however, other forms of collaboration such as knowledge sharing can be equally important for growers that are not part of a PO structure. Producers and retailer collaboration: can help to better meet the needs of consumers, support the viability of the Irish grower base, develop the domestic market to benefit both growers and retailers.



Plastic and packaging – Consumers want packaging that is convenient and saves them time. Equally, increasing environmental concerns necessitate a move to more sustainable packaging. However, the increased cost of sustainable packaging is not necessarily matched by higher producer prices



Food waste – There is limited information about the extent of food waste in the primary production sector in Ireland. Reducing food waste on the farm level will have positive social, economic and environment impacts, as well as support sustainability of growers

Sources: Stakeholder consultations and workshop.

Cross-cutting factors (3/3)

Several issues need to be addressed to support the sustainability of the horticulture sector.

We have identified a number cross-cutting factors that represent both challenges and opportunities for the sector



Understanding the sector's overall impact – A cost-benefit analysis (CBA) of the sector can inform policy makers on the relative importance of the sector, to guide the level of resources and funding support provided to the sector



Circular bioeconomy – The circular bioeconomy presents market opportunities to grow the horticulture sector and support sustainability objectives



Sustainable nutrition – Sustainable nutrition builds on the concept of a sustainable food system (SFS) by adding a health / nutrition dimension to the environmental, economic and social sustainability dimensions. The horticulture sector is ideally placed to support sustainable nutrition



Innovation and value-added products – Investing in innovation and the development of value-added products can unlock latent opportunities for the sector. For example, plant-based ingredients and plant protein processing businesses







Smart / precision agriculture – The adoption of smart / precision agriculture can help to increase efficiency and boost competitiveness. For example, technologies and practices such as vertical farming, hydroponics and Internet of Things (IoT) applications



Sources: Stakeholder consultations and workshop.





Actions for cross-cutting factors

Labour

| Context  | Actions  | Area of sustainability |
|--|---|--|
| <ul style="list-style-type: none"> • Growers/producers are reliant on temporary workers, supply of which is falling. Securing sufficient labour is a challenge • The sector is reliant on employment permits, attracting and retaining employees is a significant challenge • Not all workers have access to transport • Rising labour costs have an impact on growers' margins and sustainability | <ul style="list-style-type: none"> • Enhance efficiency of labour permits and address the need for a seasonal permit scheme to support labour requirement. Increase administrative resources to speed up the process. Evaluate temporary or alternative housing options to support growers in housing their temporary workers • Consider a permanent seasonal workers' scheme • Support / develop transport solutions to connect workers with growers • Promote long-term career development through networking, training and formal education opportunities to encourage life-long jobs and reduce short-term recruitment needs • Longer-term solution: the State through entities like Enterprise Ireland and Teagasc should prioritise support for rapid mechanisation – including grants and/or pay-per-use schemes for existing technology available internationally, and through indigenous R&D on future horticulture mechanisation |   |






Actions for cross-cutting factors

Collaboration to address pricing, margins and scale (1/2)






| Context  | Actions  | Area of sustainability |
|---|---|---|
| <ul style="list-style-type: none"> • Grower and retail collaboration can help to address the challenges of pricing, margins and scale • Collaboration: Producers can benefit from greater collaboration to increase their bargaining power and to help grow their business. Producer organisations (POs) is a key example, however, other forms of collaboration such as knowledge sharing can be equally important for growers that are not part of a PO structure. Producer, retailer and facilitator collaboration: can help to better meet the needs of consumers, support the viability of the Irish grower base, develop the domestic market to benefit both growers and retailers • Pricing – Increases in input costs are not matched by increases in output price. Five branded chains control over 90% of the fresh produce retail market; growers are price takers. Downward price pressure from imported goods • Margins – Low margins make re-investment difficult in light of sustainability demands • Scale – The Irish market is relatively small which limits investment opportunities for major projects. Expanding capacity is limited not only by the capital requirements but also by low demand due to scale. Limited scale opportunities are a barrier to entry for innovative or sustainable players | <p>Grower collaboration: Collaboration can include knowledge sharing and transfer:</p> <p>Increase grower participation in POs:</p> <ul style="list-style-type: none"> • Change growers’ perceptions about POs: it is not about giving up control but about creating mutual value • Highlight PO success stories and key success factors, roadshow this with key growers to get early momentum • Provide training and mentoring support to help growers to participate <p>Other forms of grower collaboration:</p> <ul style="list-style-type: none"> • Develop local working groups to facilitate knowledge sharing. Other sub-sectors could follow the example of the apple development group, to drive development and growth in their sub-sectors • Encourage collaboration with research organisations and other sectors. For example, bio-refineries that could assist in adding value to waste streams <p>Improve communication:</p> <ul style="list-style-type: none"> • Retailers should be aware of the production range that is available locally and growers need to know market trends to adapt the supply |   |

Actions for cross-cutting factors

Collaboration to address pricing, margins and scale (2/2)

| Context  | Actions  | Area of sustainability |
|---|--|---|
| <ul style="list-style-type: none"> • Grower and retail collaboration can help to address the challenges of pricing, margins and scale | <p>Collaboration with retailers and facilitators:</p> <ul style="list-style-type: none"> • Producers and retailer collaboration can help to better meet the needs of consumers, support the viability of the Irish grower base, develop the domestic market to benefit both growers and retailers • Develop trust, transparency and co-operation • Initiate an approach on collaborative dialogue between actors in the supply chain that ensures sustainable and fair pricing that ensures security of domestic supply and viability of growers • Identify international best practise for retailers to champion domestic supply • Develop viable and sustainable business supply models with Irish growers <p>Develop a retail charter:</p> <ul style="list-style-type: none"> • Retail sector to support Irish growers and their produce through dedicated marketing campaigns during the domestic production season • Win-Win: Supporting local growers through a charter can help the retail sector to showcase its commitment to the sector, highlighting its corporate social responsibility (CSR) and sustainability credentials. Growers can benefit through increased output and sales |    |

Actions for cross-cutting factors

| Research and development (R&D) | | |
|--|--|---|
| Context  | Actions  | Area of sustainability |
| <ul style="list-style-type: none"> • R&D is a key enabler to support innovation and growth. Funding constraints curtail the role for R&D to support the sector. R&D is much needed in terms of technical, scientific and market research • R&D expenditure is likely unfeasible in a low margin market and for smaller players without public support. It is impracticable to suggest all individual players undertake their own R&D as access to finance is a key challenge • R&D enables the sector to innovate and leverage supply chain efficiency, technological progress and sustainability as an opportunity as opposed to just a defensive play. There are environmental and financial gains (e.g. higher margins in the long run) to be achieved, but likely requires high capital and a operational expenditure at the outset | <ul style="list-style-type: none"> • Establish a working group to develop a detailed research needs analysis for the sector which can then inform research calls, projects and opportunities conducted by organisations such as DAFM, Teagasc, Bord Bia and EI • Support the horticulture sector to access research and innovation funding, from both domestic and European sources <p>Local example to consider:</p> <ul style="list-style-type: none"> • The COFORD council provides advice and information to support the forestry sector. Teagasc could provide additional support to horticulture if the required funding and human resources can be provided • The Competitive Forestry Research for Development (CoFoRD) Programme provides funding for research aimed at enhancing the competitiveness of the Irish forestry sector. Enterprise Ireland also provides grants for the development of timber related products |    |

International example to consider: Hort Innovation Australia manages a fund for R&D investment in the horticulture sector. **Statutory levies** are collected from growers and combined with public funding and voluntary levies. The organisation allocates funds in line with its individual investment plans developed to meet the R&D needs of each sub-sector. The Sustainable Food and Fibre Futures project provides grants to horticulture growers and research groups for the development of a new product or process, feasibility studies or applied research.

Actions for cross-cutting factors






Sustainability

 Environmental

 Economic






 Social

New Product Development (NPD) & innovation

| Context  | Actions  | Area of sustainability |
|--|---|---|
| <ul style="list-style-type: none"> • New Product Development (NPD) & innovation – Linked to the need for R&D, new product development and innovation can help to create new opportunities to grow the sector | <ul style="list-style-type: none"> • Secure funding to support NPD: Engage with Enterprise Ireland and the Department of Trade, Enterprise and Industry (DETE) • Develop innovation pathways for new product development (NDP) and bio-based products • Develop market insight and secure sufficient resources to conduct research • Develop different product formats - Research the size of the prize based on end use, review the competition for these opportunities and conduct feasibility studies • Follow international best practice: identify, monitor and learn from global trends | <ul style="list-style-type: none">    |

Actions for cross-cutting factors






Knowledge transfer

| Context  | Actions  | Area of sustainability |
|--|---|---|
| <ul style="list-style-type: none"> Knowledge transfer: Horticulture needs to be integrated back into the broader Agriculture Knowledge and Innovation System (AKIS) to create an environment conducive to growth. Greater resourcing of horticulture advisory services is needed <div data-bbox="223 642 752 839" style="background-color: #0056b3; color: white; padding: 10px; border-radius: 15px; margin-top: 20px;"> <p>Growers should be made aware of their legal protection from prohibited trading practices in the Unfair Trading Practices (UTP) Regulations**.</p> </div> | <ul style="list-style-type: none"> Develop a roadmap for integrating horticulture back into the broader Agriculture Knowledge and Innovation System (AKIS)* Increase resourcing of horticulture advisory services Create accelerated training programmes for market access and knowledge acquisition Develop a knowledge transfer programme to meet the current deficit through continuous professional development (CPD) Facilitate the role of growers as new knowledge creators Follow international best practice and identify modern production techniques | <div style="display: flex; flex-direction: column; align-items: center; justify-content: center;">    </div> |






Note: *As part of Ireland's CAP Strategic Plan, a national AKIS Consultative Group is to be established by DAFM. The group will include a representative for horticulture. This could support the integration of horticulture into the broader AKIS system. **See [General Scheme of the Agricultural and Food Supply Chain Bill 2022](#)

Actions for cross-cutting factors

Education and training, succession planning






| Context  | Actions  | Area of sustainability |
|---|--|---|
| <ul style="list-style-type: none"> • Education and training programs can be enhanced by considering the current needs of the sector. On the consumer side, consumer education, especially through school programmes and initiatives, can raise awareness and consumption of healthy products from the horticulture sector • Succession planning: Ageing producer base, low level of succession planning and lack of new entrants. There is a need to attract new entrants, so reducing the average owner age from 57 to mid-40s | <ul style="list-style-type: none"> • Horticulture as an education pathway requires greater investment, increased promotion as a career option and a continued focus on the role of horticulture growers/producers. Horticulture careers must be promoted from the post primary level • Attract new entrants by creating awareness about horticulture and the opportunities in the sector, provide support such as bursaries and mentoring programmes • Develop and modernise the horticulture training and education offering • Augment the curriculum in horticulture to reflect the latest plant production methodologies (where necessary) • Develop a graduate training programme (for example an MSc in horticulture) linked to European colleges / institutions. Identify sources of funding, short-list candidate universities, set-up placement programmes • Provide the required resources to ensure a permanent dedicated staff compliment to support horticulture industry training and development needs • To attract new entrants, link retailers with growers to provide long-term contracts which are profitable each year for the grower, following the example of the poultry industry • Provide relevant education to consumers and the trade sector |    |

Actions for cross-cutting factors






| Sustainability (incl. growing media) | | |
|--|--|---|
| Context  | Actions  | Area of sustainability |
| <ul style="list-style-type: none"> The sector’s sustainability credentials presents an opportunity to support growth. However, while the sector has a relatively lower environmental footprint, finding alternatives to peat-based growing media is a significant challenge There is a research challenge to find alternative growing media which are available, affordable and sustainable, while meeting the yield and quality parameters required There is pressure to reduce chemical pesticide use which requires a full sector shift given current dependence in some production systems and the growing process. The sector needs access to essential pest control products that still meet sustainability requirements | <ul style="list-style-type: none"> Develop “Horti-metrics” as a common measure to understand and communicate the sector’s environmental impact Follow best practice for sustainable production Provide education to consumers and the trade sector on sustainable food choices, production systems and other relevant environmental implications Growing media in the short-term: Engage stakeholders to develop mechanisms to sustainably use domestic peat supplies in the short-term, especially in the context of current geopolitical events Growing media in the medium to long-term: Conduct research and provide research funding for knowledge creation and dissemination. Adopt a multi-disciplinary approach to resource the research challenge Fill the knowledge gap on Integrated Pest Management (IPM) | <ul style="list-style-type: none">    |


Actions for cross-cutting factors

Insight & intelligence

| Context  | Actions  | Area of sustainability |
|--|--|---|
| <ul style="list-style-type: none"> • Insight & intelligence – There is a lack of sector and farm management data. Implementing mechanisms to collect, analyse and disseminate sector and farm management data can help to inform the policy makers and growers to support strategic decision making. Better data and further research can help to inform the sector of strategic market opportunities. Horticulture is not currently part of the National Farm Survey (NFS). This is due to the diverse and fragmented nature of the industry. The relatively small number of growers makes growers more hesitant to share information that could be seen as financially sensitive • Inventory of soil & site suitability – Linked to R&D and sector intelligence, an inventory of soil and site suitability can support the identification and targeting of product opportunities | <ul style="list-style-type: none"> • Develop a horticulture survey administered by DAFM, where data is not publicly published but used for evidence-based policy making that supports the sector to meet its full potential • Establish and evaluate the labour requirements for each sub-sector. This should include data points on labour use efficiency and the availability of suitably skilled labour • Promote postgraduate student research in the area of sector data and provide funding via existing research funding mechanisms, including horticulture sector data as a key theme in calls for research funding applications • Allocate human resources and funding to support the development of an Inventory of soil and site suitability • Develop a network of market intelligence, conduct feasibility studies and develop detailed cost analysis • Establish a research programme to compile farm management data and to develop this into strategic insights for growers |    |





Actions for cross-cutting factors

| Promotion (including import substitution) | | |
|---|---|---|
| Context  | Actions  | Area of sustainability |
| <ul style="list-style-type: none"> Promotion – The sector can be promoted (create awareness) by leveraging the sector’s health, wellbeing and environmental credentials. In addition, these levers can help to increase consumption of local produce as part of import substitution for the sector to gain a greater share of the home market | <ul style="list-style-type: none"> Develop and implement levers that can support import substitution Promote Irish grown produce in terms of the associated environmental benefits (low food miles and Horti-metrics) and the fresh / nutrition-based benefits Develop controlled environment agriculture (CEA) growing methods as well as integrated pest management (IPM) for unprotected crops Develop recognition of Irish produce, dedicated branding and lower food miles travelled through identifiable packaging (<i>also see packaging theme</i>) Use “Horti-metrics” to communicate the sector’s environmental impact |    |






 Programs that can support consumer education on the health and wellbeing benefits of food and amenity horticulture can support the sector whilst making a positive contribution to society (environmental, economic and social sustainability). School level education programmes, such as Food Dudes, are a good example. These programmes cultivate a liking for fruit and vegetables at an early age.

Actions for cross-cutting factors

Brexit

| Context  | Actions  | Area of sustainability |
|--|--|---|
| <ul style="list-style-type: none"> • Brexit: Horticulture exports to the United Kingdom (UK) now face additional barriers due to the increased administrative burden created by Brexit • In future there are likely to be increased Sanitary and Phytosanitary (SPS) checks at the border which may present additional delays | <ul style="list-style-type: none"> • Continually monitor developments, identify impacts and communicate findings to the sector to ensure preparedness for challenges as they emerge • Develop support services to help growers navigate the increased administrative requirements • Harness positive attitude to Irish produce in UK local market, in particular promoting Irish Plant-Health Status |   |

Energy

| Context  | Actions  | Area of sustainability |
|---|--|--|
| <ul style="list-style-type: none"> • Energy: Energy is an important input cost across sub-sectors, especially for soft fruit, protected crops, potatoes (cold storage) and nursery stock. Rising energy costs tied with low margins place producers under increased pressure. Alternative energy sources for own generation can help to alleviate this pressure but funding support would be needed to invest | <ul style="list-style-type: none"> • Support the sector with mechanisms and programmes to monitor energy needs and identify where, when and how energy efficiencies can be adopted on farms • Renewable energy adoption: Facilitate knowledge transfer and funding support |    |

Actions for cross-cutting factors

Sustainability

 Environmental

 Economic

 Social

Organic production






| Context  | Actions  | Area of sustainability |
|---|--|---|
| <ul style="list-style-type: none"> Organic production presents a market opportunity, however, the balance between higher costs and producer prices are a key factor | <ul style="list-style-type: none"> Develop market intelligence to highlight market opportunities Provide support for growers to enter the organic sector, especially during the formative years of the business Create awareness and facilitate uptake of support available through the Organic Farming Scheme Provide practical training in essential skills and provide capacity for advisors focused on organic horticulture (Note: Organic Growers of Ireland apprenticeship scheme is a good example of training in the sector) |    |



Opportunity for small-scale growers: Economically viable full-time farm income can be achievable on a small holding. There is also an opportunity for co-operation and specialisation amongst organic growers.






Actions for cross-cutting factors

Plastic and packaging, food waste






| Context  | Actions  | Area of sustainability |
|--|--|---|
| <ul style="list-style-type: none"> • Plastic and packaging: Consumers want packaging that is convenient and saves them time. Equally, increasing environmental concerns necessitate a move to more sustainable packaging. However, the increased cost of sustainable packaging is not necessarily matched by higher producer prices • Food waste: There is limited information about the extent of food waste in the primary production sector in Ireland. Reducing food waste on the farm level will have positive social, economic and environment impacts, as well as support sustainability of growers | <ul style="list-style-type: none"> • Packaging innovation: Learn from and adopt international best practice (including national research and innovation), monitor global packaging trends and identify solutions that minimise food waste, reduce plastic waste and achieve circularity in food systems. Consider developing alternative supply chains to utilise off spec produce and produce which cannot be sold through retailers • Pilot alternative packaging initiatives to build information on what works in Ireland • Provide education on the value of in-season produce across the retail and food services sectors to reduce the need for packaging • Develop recognition of Irish produce and lower food miles travelled through identifiable packaging and sustainability labelling (<i>also see promotion theme</i>) • Develop initiatives that support the reduction of food waste while supporting food schemes that benefit society |    |

Actions for cross-cutting factors

Understanding the sector's overall impact - cost-benefit analysis (CBA)












| Context  | Actions  | Area of sustainability |
|---|---|---|
| <ul style="list-style-type: none"> A cost-benefit analysis (CBA) of the sector can inform policy makers on the relative importance of the sector, to guide the level of resources and funding support provided to the sector | <ul style="list-style-type: none"> Conduct a CBA of the Irish horticulture sector to inform the sector's strategy development process. This should allow for sub-sector variation in cost-benefit ratio and accompanying conclusions about which mix within horticulture to focus investment. Consider sector funding in the context of the CBA results |    |

Innovation and value-added products (1/2)












| Context  | Actions  | Area of sustainability |
|---|--|--|
| <ul style="list-style-type: none"> The growing global market for plant-based ingredients is an opportunity for horticulture and plant protein processing businesses. For example, extracts for food ingredient concentrates and isolates, food colourants and medicinal ingredients Growing world population: need for additional sources of plant-based ingredients, that limit our impact on the environment Reducing food waste: develop the bio-based industry by incorporating traditional "waste" produce, for example produce with blemishes into the production of value-added products | <ul style="list-style-type: none"> Support the development of new sources and types of ingredients (through secondary and tertiary product development) Develop opportunities for growers to participate in the value chain: provide knowledge sharing and advisory service for growers, support co-operation between economic actors, which combine horticultural produce with innovative or traditional technologies and produce new food and bio-based products or market applications Supportive policy environment: create alignment between agri-food, waste, industrial, health, environment & climate, research and development frameworks |    |

Sources: DAFM.

Actions for cross-cutting factors

| Innovation and value-added products (2/2) | | |
|---|--|--|
| Context  | Actions  | Area of sustainability |
| <ul style="list-style-type: none"> Opportunities for innovation led enterprises, for example, in developing plant varieties with unique ingredient potential | <ul style="list-style-type: none"> Learn from local success stories to adopt best practice and establish a “start-up incubator” to support growers in developing new innovation led enterprises. Develop mechanisms to support these businesses in retaining the IP and licensing for their plant technology For example: An Irish horticulture business used innovation to develop unique plant varieties, high in nutritional and functional values |    |
| <ul style="list-style-type: none"> Consider and evaluate other market opportunities in areas such as medicinal and aromatic plants (MAPs) MAPs can be used for health benefits, in food or cosmetics. Individual parts of the plant can be used (roots, stems, leaves. etc.), or they can be processed to form essential oils, extracts, etc. Note that this is subject to a regulatory framework being in place | <ul style="list-style-type: none"> Evaluate medicinal and aromatic plants to establish a clear growth ambition Create an Irish MAP operational group and define an explicit ambition for the sector Stimulate sector growth with direct investments Actively pursue an Irish MAP research strategy Identify skills and capabilities required to deliver on ambition and train potential growers |    |
| <ul style="list-style-type: none"> Consider and evaluate other market opportunities in areas such as Biophilic design Biophilic design is a design concept to increase occupant connectivity to the natural environment by increasing direct sensorial contact with plants, water features, natural air-flow, sounds and scents Biophilic design is still a niche sector in Ireland; encouraging its growth will directly increase the value of amenity horticulture | <ul style="list-style-type: none"> Identify biophilic architecture/consultancy firms in Ireland and partner to enhance overall awareness of the concept Perform market research to identify most popular and profitable office amenity plant products –communicate this information to horticulture stakeholders Undertake an exercise to identify potential clients e.g. large multinational offices, retail outlets which sell office equipment and facilitate introductions to suitable horticulture growers. Develop targeted messaging promoting the positive benefits of incorporating greenery into the office |    |




Actions for cross-cutting factors

| Circular bioeconomy, smart / precision agriculture & sustainable nutrition | | |
|---|---|--|
| Context  | Actions  | Area of sustainability |
| <ul style="list-style-type: none"> The circular bioeconomy presents market opportunities to grow the horticulture sector and support sustainability objectives | <ul style="list-style-type: none"> Identify the key bioeconomy opportunities for the horticulture sector Establish a working group to focus on exploring and developing these opportunities Engage with existing forums such as the Irish Bioeconomy Forum Align with key existing policies, for example, the national policy statement on the bioeconomy |    |
| <ul style="list-style-type: none"> Smart / precision agriculture: Increase efficiency and boost competitiveness through the adoption of smart / precision agriculture. Consider technologies and practices such as vertical farming, hydroponics and Internet of Things (IoT) applications | <ul style="list-style-type: none"> Identify the key precision agriculture technologies and practices that could benefit Irish growers and learn from best practice Provide resourcing of horticulture advisory services to support growers in the adoption of these technologies and practices Provide funding support to aid growers in the adoption of technologies and practices |    |
| <ul style="list-style-type: none"> Sustainable nutrition: Sustainable nutrition builds on the concept of a sustainable food system (SFS) by adding a health / nutrition dimension to the environmental, economic and social sustainability dimensions. The horticulture sector is ideally placed to support sustainable nutrition | <ul style="list-style-type: none"> Focus consumer messaging on horticulture as a holistic component of a sustainable food system that is good for consumers, society and the environment Develop the sector's story and a toolkit to communicate the story |    |

Sources: DAFM, KHNI.

Key learnings from Dutch horticulture (1/2)



NL is a global leader in horticulture innovation, driven by sustainable technologies and government sector support which creates a precision farming environment.

| Innovations | Commentary | Key learning / actions for Ireland |
|---|---|--|
|  <p>NL has pioneered a sustainable, precision farming model using glasshouses ⁽¹⁻²⁾</p> | <p>NL has over 9,000ha of high-tech glasshouses</p> <ul style="list-style-type: none"> Horticulture crops are grown in climate controlled conditions, facilitating precision harvesting with reduced use of water and fertiliser At optimal growing conditions, each glasshouse acre can produce the same lettuce yield as 10 outdoor acres All new glasshouses are required to be climate-neutral Sustainable glasshouse technologies are stimulated by government subsidies such as “The glasshouse as a source of energy” programme using solar panels to create energy and innovative heat exchangers to save energy consumed, with the surplus being used for other purposes | <ul style="list-style-type: none"> Embrace the glasshouse model. The use of glasshouses has transformed Dutch horticulture allowing the precision growth of produce with fewer resources and higher profitability <p><i>Requires capital investment supported by investment into skills, research and innovation. Energy costs is a further constraint.</i></p> <ul style="list-style-type: none"> Adopt and promote sustainable glasshouse production |
|  <p>Designated Dutch greenports drive collaboration in the horticulture industry⁽³⁾</p> | <p>Greenports provide a “clustering” effect for Dutch horticulture</p> <ul style="list-style-type: none"> Greenports are clusters of intensive horticulture production and agri-businesses such as suppliers and logistics The basic premise around this cluster design is to increase economies of scale and efficiency in transport and logistics There are five designated “Greenports” in NL across vegetables, cut flowers and pot plant production | <ul style="list-style-type: none"> Aim to grow the horticulture sector in clusters. Across sectors, the clustering effect is known to enhance knowledge exchange, product commercialisation, revenue and job growth |
|  <p>Experimental “lighthouse farms” are teaching NL how to thrive in a circular economy⁽⁴⁾</p> | <p>NL has recognised the growing importance of circular agriculture and is developing expertise in the area</p> <ul style="list-style-type: none"> Circular agriculture aims to keep residuals of agricultural biomass and food processing and re-use them as renewable resources – this cuts waste, leads to less imports and reduces the need for fertilisers The Dutch Ministry of Agriculture recently launched a plan of action to support the transition to circular agriculture NL has established experimental “lighthouse farms” to build their knowledge and prepare for the global shift to circular farming | <ul style="list-style-type: none"> The shift to circular agriculture is approaching; now is the time to prepare. The Dutch approach to knowledge building through test farms will ensure they are prepared for the transition to circular farming. Develop circular bioeconomy opportunities to grow the horticulture sector |

Sources: (1) Naturerising.ie - the Dutch horticulture industry, (2) hortidaily.com; (3) Dutch Greenport International; (4) Wageningen university & research – circular agriculture.

Key learnings from Dutch horticulture (2/2)

A thriving research ecosystem and access to funding helps drive key innovations in Dutch horticulture.



| Trend | Commentary | Key learning / action for Ireland |
|---|---|--|
|  <p>The University and research ecosystem enables innovation⁽¹⁾</p> | <p>Foodvalley is a knowledge-intensive agri-food ecosystem</p> <ul style="list-style-type: none"> Foodvalley is a cluster of agricultural start-ups and experimental farms, with Wageningen University & Research (WUR) at its centre Five of the top global agri-food companies possess R&D facilities there This ecosystem drives technical innovations in the agricultural industry, such as robot fruit pickers, water and waste recycling and glasshouses which produce more energy than they consume WUR has a number of active research streams split across food production of the future, nutrition & health, green transitions, nature conservation & ecology and rural/urban environments | <ul style="list-style-type: none"> Stimulate the research ecosystem. The adoption of precision farming techniques in NL is driven by the deliberate creation of an agri-innovation district in Food Valley. This approach is seen across sectors and could be applied to Irish horticulture Research stakeholders to consider if a new institution is required or whether an existing college in Ireland can use similar quantum over time, with knowledge transfer from NL e.g. secondments |
|  <p>The NL government offers a number of funding options to drive innovation both locally and globally⁽²⁻⁴⁾</p> | <p>The public sector remains the primary source of funding for agri-R&D - example sources of funding include:</p> <ul style="list-style-type: none"> Agricultural innovation subsidy scheme – up to €35,000 per year for 3 years to perform research in the agricultural sector SME Innovation Stimulus for Regional and Top Sectors (MIT) – up to €200,000 for projects which stimulate innovation in SMEs <p>Tax incentives – NL offers three key tax incentives:</p> <ul style="list-style-type: none"> WBSO: This incentive reduces wage tax and social security contributions for employees engaged in R&D activities R&D allowance (RDA): The RDA is a super deduction of 160% of qualifying expenses directly attributable to qualified research activities Innovation box: Qualifying income attributable to innovations is taxed at a 5% rate <p>At a global level, the Dutch government recently demonstrated their commitment to strengthening sustainable agriculture by acting as an anchor investor in the Rabobank backed AGRI3 fund. This fund aims to direct \$1bn of public and private capital into sustainable, de-forestation free agriculture.</p> | <ul style="list-style-type: none"> Offer a variety of funding options to encourage development and adoption of innovative technologies. A dedicated fund such as the AGRI3 fund allows growers to access finances needed to continue or expand their operations |

Sources: (1) Foodvalley.nl; (2) debreed.nl; (3) business.gov.nl; (4) agri3.com.

Notes: CA - Common agricultural policy.

Key learnings from New Zealand horticulture (1/2)



Market trends shaping the New Zealand horticulture research.

| Innovations | Commentary | Key learning / action for Ireland |
|---|---|---|
|  <p>Labour shortages addressed through the use of Robotics</p> | <ul style="list-style-type: none"> • New Zealand saw a 75% reduction in the number of backpackers available to work in the country due to Covid • In response, Robotics Plus have come up with automated solutions such as an apple packer which packs at twice the speed • Robotics Plus have also developed 'unmanned ground vehicles', with a view to combatting the labour shortage through the automation of horticultural tasks | <p>Labour shortage is one of the key challenges faced by the Irish horticulture sector. There is a growing trend of using robots to pick apples and other fruits, however, a purchase or lease of the robot requires significant funds that smaller growers are not able to allocate at the moment. Through entities like Enterprise Ireland and Teagasc, prioritise support for rapid mechanisation.</p> |
|  <p>Technological solutions to routine tasks</p> | <ul style="list-style-type: none"> • New Zealand's R&D organisation, PlantTech, conducted research with Kiwifruit manufacturer Zespri to improve their crop estimation techniques • PlantTech's solution involves using computer vision to examine the fruit while it is still on the vine, using AI models and trigonometry to accurately predict the size of the fruit without compromising a sample | <p>Consistency of supply is one of the key concerns, according to Irish retailers. Similar technology could support crop estimation and management in Ireland. Develop domestic solutions for estimating production and growing practices that can enhance the consistency of supply.</p> |

Sources: RoboticsPlus, PlantTech research – November 2020.

Key learnings from New Zealand horticulture (2/2)

Investment in research and development helps to boost sector development.

| Trend | Commentary | Key learning / action for Ireland |
|--|--|--|
|  <p>Research and Development organisation leading the way with AI technology</p> | <ul style="list-style-type: none"> PlantTech engages in various research projects examining the impact of the use of Artificial Intelligence (AI) to address challenges such as environmental sustainability and climate change PlantTech have also entered a strategic partnership with New Zealand eScience Infrastructure with a view to develop new AI technology, with their focus starting in the agri-tech sector PlantTech's current research strategy focuses on maximising the use of proximal sensing and remote sensing in horticulture practices | <p>Government support for research on innovation and finding solutions to horticultural challenges could boost development of the sector.</p> <p>Enhance support mechanism for research and innovation, integrate horticulture back into the broader Agriculture Knowledge and Innovation System (AKIS).</p> |
|  <p>New Zealand's government is focused on horticulture through the establishment of the Sustainable Food & Fibre Futures fund</p> | <ul style="list-style-type: none"> SFF Futures can provide support at any level on a co-investment basis. From small grassroots community projects to large-scale industry development, we can help bring your ideas to life The fund is available for feasibility studies, research or the development of a product or service The overall goal of the project is focused on crop protection practices through the use of biopesticides and biological controls to protect crops and create a more sustainable and desirable source of food About NZ\$40m (€24m) is available each year. Funding is available in several ways, depending on the length and complexity of your project. A small grant may be enough to cover the costs of a short-term project. With larger, longer-term programmes, we could provide multi-year funding | <p>Establish a working group to develop a detailed research needs analysis for the sector which can then inform research calls, projects and opportunities conducted by organisations such as DAFM, Teagasc, Bord Bia and EI.</p> <p>Support the horticulture sector to access research and innovation funding, from both domestic and European sources.</p> |

Sources: Statista Global Consumer Survey as of May 2021, 2,091 Austrian consumers surveyed.

Section 3

Sub-sector analysis

Sub-sector analysis: Overview

The sub-sector analysis covers three areas:

1) Sub-sector snapshots provide an overview of key statistics and sector dynamics.



2) SWOT analysis identifies key strengths, weaknesses, opportunities, and threats across sub-sectors.



3) A strategic ambition is identified for each sub-sector, along with priority areas for change and the associated actions that are required.



Sub-sector analysis: snapshot

Sub-sector overview: Mushrooms

Key statistics

- ~34 growers producing on 40 farms in Ireland
- ~3,221 people employed*
- ~85% of produce is exported to the UK
- ~€124m farm gate value

Overview

- Growers:** There was a decline in the number of growers and production units over the past decade – small farms ceased while larger units expanded to remain sustainable
- Input costs:** labour, compost casing / growing media, packaging and energy are some of the most important inputs for the sector. Inputs costs for energy, packaging and labour experienced a significant increase between 2020 and 2021
- Labour:** With reliance on work permits and visas for migrant workers, labour supply constraints are a weakness for the sector. Some growers have experienced delays up to 8 months for crops to be processed
- Growing media:** dependence on peat also supply constraints pose a threat to the sector
- Market access:** a small number of growers the Irish market, while more than 85% of produce is exported

Exports

- Mushroom exports* were valued at €151.2M in 2021 (up with 31% over 2020)**
- Pre-packed (closed cup) mushrooms are the largest sector, with ~50% share of total value
- There is a rising importance for vitamin E mushrooms (only available from Irish & UK producers) – it is still a small market but growing, positioning Irish suppliers as premium

Number of mushroom growers in Ireland, 2016-2020

| | |
|------|----|
| 2016 | 48 |
| 2017 | 45 |
| 2018 | 34 |
| 2019 | 34 |
| 2020 | 34 |

↓ -3% (2018-2020) **Grower consolidation**

Labour accounts for 42% of the total cost of production. Compost and casing account for 37.1%

Sub-sector analysis: SWOT

SWOT analysis: Amenity

Leverage growing awareness and interest in the environment to build the amenity market.

Strengths

- Expert grower base and strong gardening / plants market following Covid-19. Growing consumer awareness of the health and environmental benefits of amenity horticulture
- The disease-free status of Irish stock, and the proximity to the UK market. Able to exploit opportunities in UK market – strategy for growth needs to focus both on domestic and export front (Brexit: challenge)
- Market can expand as new and innovative plant materials are identified – many are market-ready sectors with opportunities for value-add

Weaknesses

- Established domestic market but growth is becoming more dependent on successful export strategy
- Labour shortages (challenges to attract and retain labour) and rising labour costs impacting cost of production
- Low level of R&D, with continued investments in R&D required for market differentiation
- Education and skills deficit in plant growing
- Sector not sufficiently integrated in AKIS

Sub-sector analysis: ambition and actions

Strategic ambition: Potatoes (1/3)

An ambition underpinned by environmental, economic and social sustainability.

| Sub-sector needs | |
|--|--|
| Priority area: Identify value-added opportunities | Actions to be taken |
| Develop innovation pathways for new food and drink products, including bio-based materials | <ul style="list-style-type: none"> Develop market insight and resources to support the research Consider international developments For bio-based materials: the potato sector should be embedded in the circular economy |
| Identify different product format opportunities | <ul style="list-style-type: none"> Determine the size of the prize considering end use, competitors, feasibility and the options in the frozen market |
| Promote locally grown produce | <ul style="list-style-type: none"> Continue to support and build a strong communication and promotional platform, based around the local sustainable supply and nutritional benefits messaging |
| Develop packaging innovation | <ul style="list-style-type: none"> Learn from best practice Monitor global trends Identify solutions that minimize waste |
| Priority area: Maximise marketable yield (inside farm gate) | Actions to be taken |
| Grower adoption of best practice and technology | <ul style="list-style-type: none"> Invest in R&D and consider international best practice Education and knowledge transfer on best practice |

Source: Stakeholder consultations and workshop.

Note: In addition to the main sub-sectors, a strategic ambition and priority areas are identified for glasshouse crops and salad crops. However, a separate SWOT analysis is included.

Sub-sector overview: Mushrooms

Key statistics



~34 growers producing on 40 farms in Ireland



~3,221 people employed*



~85% of produce is exported to the UK



~€124m farm gate value

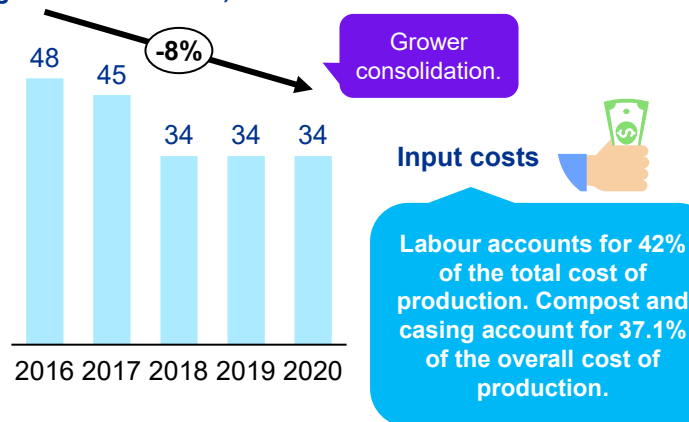
Overview

- **Growers:** There was a decline in the number of growers and production units over the past decade – small farms ceased while larger units expanded to remain sustainable
- **Input costs:** labour, compost casing / growing media, packaging and energy are some of the most important inputs for the sector. Inputs costs for energy, packaging and labour experienced a significant increase between 2020 and 2021
- **Labour:** With reliance on work permits and visas for migrant workers, labour supply constraints are a weakness for the sector. Some growers have experienced delays up to 6 months for documents to be processed
- **Growing media:** dependence on peat along with supply constraints pose a threat to the sector
- **Market access:** a small number of growers supply the Irish market, while more than 85% of produce is exported

Exports

- **Mushroom exports**** were valued at €151m in 2021 (up with 31% over 2020)***
- **Pre-packed (closed cup) mushrooms** are the largest sector, with ~50% share of total mushrooms
- There is a **rising importance** for **vitamin D mushrooms** (only available from Irish & UK producers) – it is still a small market but growing well, positioning Irish suppliers as premium suppliers

Number of mushroom growers in Ireland, 2016-2020



Challenges for growers

- **Access to capital:** Capital investment is needed, with an average cost of ~€200K per mushroom tunnel
- **Access to labour:** skilled labour is needed for harvesting
- **Market access:** growers need to have a relationship with a consolidator who has market access, or market their own product (this can be more challenging)
- **Skills:** growers need technical growing knowledge and HR skills for managing the labour force
- **Certification:** a requirement to meet quality assurance (QA) requirements
- **Exchange rate:** Fluctuations in the Sterling exchange rate will have an impact on a grower's farm gate price for exported produce

Sources: DAFM, Teagasc, Bord Bia, KPMG consultations. Note: *Total direct employment, **Mushroom exports include processing, for example, pre-packed mushrooms, ***This also included product which was imported into RoI and re-exported (domestic production growth was modest in 2021).

SWOT analysis: Mushrooms

Opportunities to add value via innovation and product development for mushrooms.

Strengths

S

- Biggest direct employer across horticulture sectors
- Strong PO (Producer Organisation) representation
- ~85% mushrooms produced in ROI are exported to the UK market
- Proximity to the UK market means large-scale investments at the grower level can be justified (e.g. adoption of technology that facilitates cost effective production)
- Produce grown to quality assurance standards
- Highly specialised and expert grower base
- Lean technologies and processes have been utilised to increase competitiveness and boost productivity and yield

Weaknesses

W

- Further investment in sectoral research, development and innovations is required
- Reliance on UK market given scale of domestic market. Additional costs associated with movement of products across the border post Brexit
- Labour recruitment and retention (especially among pickers), together with rising labour costs
- Labour's reliance on work permits and visas: overall ~6 months delay in the documents processing
- Imbalance of power between retailers and suppliers

Opportunities

O

- A growing convenience and food service market
- Potential to add value through innovation and product development
- Leverage consumer awareness of health benefits and changing lifestyle and food trends
- Continue to work on optimising supply chain
- Mushrooms are key to the Circular economy and are a sustainable food product
- Carbon footprint of mushrooms and mushroom production is low
- Exotic market and exotic production. Support and training for smaller sites needed
- Collaboration with other sub-sectors

Threats

T

- Retailer power / retailer consolidation putting downward pressure on prices
- Price / lack of profitability due to comparative pricing
- Foreign exchange volatility
- Impact of Brexit / Covid on labour availability
- Increased emphasis on local sourcing / UK production
- Loss of industry expertise. Some growers may shift to other activities - vertical farming etc. -opportunity but - skills and infrastructure could be lost for the mushroom sector itself
- The sub-sector is dependent on peat. Medium term will still need domestic peat - or risk of supply and cost pressures. Research for alternatives will take time, it is likely that a combination of peat and alternative products will be needed, as long as there is no alternative no 100% alternative to peat
- Polish and other EU mushrooms suppliers
- Input cost inflation - energy and fuel

Sources: Bord Bia, Teagasc, stakeholder consultations.

Strategic ambition: Mushrooms (1/3)

An ambition underpinned by environmental, economic and social sustainability.

| | | |
|--|--|--|
| <h2 style="margin: 0;">Strategic ambition: Mushrooms</h2> | | <ul style="list-style-type: none"> ▪ To become the most sustainable global leader in primary and value-added mushroom products, driven by increasing demand for plant-based solutions |
| <h3 style="margin: 0;">Sub-sector needs</h3> | | |
| <h4 style="margin: 0;">Priority area: Environmental footprint</h4> | | <h4 style="margin: 0;">Actions to be taken</h4> |
| <p>Understand the environmental impact of mushroom production</p> | | <ul style="list-style-type: none"> • Develop “Horti-metrics” as a common measure to understand and communicate the sector’s environmental impact • Benchmark against international competitors and best practice examples |
| <p>Improve and reduce the sector’s environmental footprint</p> | | <ul style="list-style-type: none"> • Invest in research and knowledge transfer to optimise the sector’s environmental footprint |
| <p>Understand consumer sentiment toward the sector’s environmental impact</p> | | <ul style="list-style-type: none"> • Conduct consumer research to generate insight • Refine communication with consumers accordingly • Similarly communicate to the broader trade sector |
| <p>Find alternatives to peat production systems</p> | | <p>Conduct research and provide research funding for:</p> <ul style="list-style-type: none"> • Knowledge creation and dissemination • Adopt a multi-disciplinary approach to resource the research challenge |
| <h4 style="margin: 0;">Priority area: Production system evolution and RDI*</h4> | | <h4 style="margin: 0;">Actions to be taken</h4> |
| <p>Increase labour use efficiency</p> | | <ul style="list-style-type: none"> • Provide training in lean management, agronomy best practice and labour retention strategies • Invest in R&D, for example, labour-saving technology • Develop and implement an enhanced permit system and provide support for access to accommodation |

Sources: Stakeholder consultations and workshop.

Notes: *RDI: Research, Development and Innovation

Strategic ambition: Mushrooms (2/3)

An ambition underpinned by environmental, economic and social sustainability.

| <h2 style="margin: 0;">Strategic ambition: Mushrooms</h2> | | <ul style="list-style-type: none"> ▪ To become the most sustainable global leader in primary and value-added mushroom products, driven by increasing demand for plant-based solutions |
|---|--|--|
| Sub-sector needs | | |
| Priority area: Production system evolution and RDI* activities (cont.) | Actions to be taken | |
| Review and monitor labour needs | <ul style="list-style-type: none"> • Establish and maintain a bi-annual labour survey. Allocate the required funding and resources | |
| Adapt existing technologies into the Irish system | <ul style="list-style-type: none"> • Allocate resources and support for R&D • Facilitate international collaboration • Develop the required competencies by investing in local skills | |
| Create bespoke systems for the Irish marketplace | <ul style="list-style-type: none"> • Invest in R&D to develop bespoke systems that can enhance labour efficiency whilst lowering the overall labour requirement • Facilitate international collaboration to develop and foster domestic competencies | |
| Increase compost use efficiency | <ul style="list-style-type: none"> • Invest in R&D activities that support a focus on increasing efficiency for growers | |
| Foster innovation across the total production system by challenging existing assumption on how mushrooms are grown | <ul style="list-style-type: none"> • Focus R&D on developing the next evolution for the mushroom sector, a “Mushroom sector 3.0” | |
| Packaging innovation | <ul style="list-style-type: none"> • Learn from and adopt international best practice • Monitor global packaging trends • Identify solutions that minimise food waste | |

Sources: Stakeholder consultations and workshop.

Notes: *RDI: Research, Development and Innovation

Strategic ambition: Mushrooms (3/3)

An ambition underpinned by environmental, economic and social sustainability.

| | |
|--------------------------------------|--|
| Strategic ambition: Mushrooms | <ul style="list-style-type: none"> To become the most sustainable global leader in primary and value-added mushroom products, driven by increasing demand for plant-based solutions |
|--------------------------------------|--|

| Sub-sector needs | |
|--|---|
| Priority area: Production system evolution and RDI* activities (cont.) | Actions to be taken |
| New food product development, based on health and nutrition benefits | <ul style="list-style-type: none"> Develop consumer trend insight Develop bespoke approach based on the local context while learning from international best practice |
| Develop an innovation pathway for the sector in terms of new food products and bio-based materials | <ul style="list-style-type: none"> New food products: develop market insight and invest in the required research capacity Bio-based materials: Embed the mushroom sector in the circular economy and circular economy practices |
| Increase product shelf-life | <ul style="list-style-type: none"> Invest in R&D to enhance product shelf-life Develop bespoke approach based on the local context while learning from international best practice |
| New product development (NPD), including exotic mushrooms | <ul style="list-style-type: none"> Follow international best practice, consider key learnings from the Dutch and Chinese sector experience |



Sources: Stakeholder consultations and workshop.
 Notes: *RDI: Research, Development and Innovation.

Sub-sector overview: Amenity

Key statistics



~180 nurseries in Ireland



~1,000 people employed**



Exports of €20 million in 2021



~€96m – farm gate value

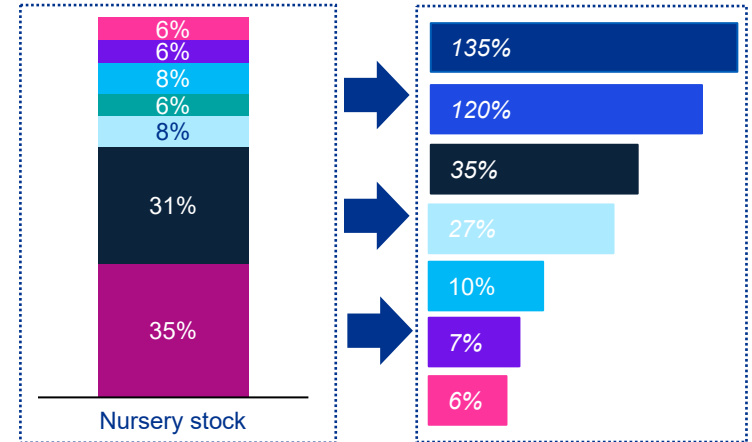
Overview

- **Amenity crop output** is valued at ~€96m (farm gate value) comprising of nursery crops, protected amenity crops, Christmas trees, outdoor flowers / foliage and turf grass
- **The 20 biggest nurseries** account for ~70% of the market
- **Succession** is one of the key issues, with not enough young people getting involved in the amenity sub-sector
- **Growing media:** dependence on peat along with supply constraints pose a threat to the sector

Exports and domestic market

- **Potential** to exploit import substitution and export channels
- **Amenity horticulture exports** were valued at ~€20m in 2021, consisting of: **Nursery stock:** €8m, **foliage:** €6m, **Christmas trees:** €3.6m, **bulbs and flowers:** €2.1m
- **Advantages:** disease-free status of Irish stock, proximity to the UK market. Due to Brexit, the UK faces labour supply challenges
- **Increased interest in gardening** has led to a shortage of plants in Europe, and along with a buoyant Irish market, Irish plant retailers have had to turn to Irish suppliers for additional supply

Breakdown of input costs, 2022* Input cost inflation 2022*



Note: Illustrative, not to scale.

- Fertiliser
- Growing media***
- Energy
- Crop protection products
- Packaging
- Other
- Labour

Delivery costs are normally included with commercial orders. Increases in delivery charges after prices have been set can hamper the supplier's margin.

"A reasonable target for locally grown product in plants and flowers is 50% of stems bought annually in ROI, this can be achieved over a 15-year time frame if the investment is in place and the infrastructure encouraged."

Retail chain

Sources: DAFM, Teagasc, Bord Bia, KPMG consultations.

Notes: *12 months to March 2022, **Total direct employment, protected amenity plants: 163, hardy nursery stock: 837, ***Compost/Casing/Growing Media.

SWOT analysis: Amenity

Leverage growing awareness and interest in the environment to build the amenity market.

Strengths

S

- Expert grower base and strong gardening / plants market following Covid-19. Growing consumer awareness of the health and environmental benefits of amenity horticulture
- The disease-free status of Irish stock, and the proximity to the UK market. Able to exploit opportunities in UK market – strategy for growth needs to focus both on domestic and export front (Brexit: challenge)
- Market can expand as new and innovative plant materials are identified – many are market-led sectors with opportunities for value-add

Opportunities

O

- Capacity for significant import substitution for plant material for the amenity sector
- Develop integrated supply chain involving breeder, agent, young plant producer, plant finisher, retail/landscaper and end user
- Significant growth opportunity for cut flower production (import value currently ~€50m) with potential opportunities for peony, sunflowers, hardy foliage and berries etc. in protected zones
- Growing interest in gardening and green spaces, particularly in urban areas. Greater awareness of climate change, the environment and importance of biodiversity – consumers want to have a “flag” to stand behind and clear guidance on how they can help the environment through their purchases
- The ‘Proven Winners’ plant brand has brought together easy-to-grow plants for customers – a similar concept in Ireland could provide a strong branding opportunity for Irish grown plants
- Physical and mental health benefits of green spaces is a marketing opportunity that can be leveraged

Sources: Bord Bia, Teagasc, stakeholder consultations.

Weaknesses

W

- Established domestic market but growth is becoming more dependent on successful export strategy
- Labour shortages (challenges to attract and retain labour) and rising labour costs impacting cost of production
- Low level of R&D, with continued investments in R&D required for market differentiation
- Education and skills deficit in plant growing
- Sector not sufficiently integrated in AKIS

Threats

T

- Regular supply of fixed volumes required for a number of these segments (e.g. cut foliage), with consistent quality at fixed price
- Labour shortages and related labour issues
- Aging grower profile and a lack of succession planning
- High-tech growing systems required to scale and propagate new plants (Access to funds and lack of investment)
- Failure to meet the challenge of securing viable, affordable and sustainable alternatives to peat used in production
- Any deterioration in trading terms, particularly post-Brexit and/or in future trade deals

Strategic ambition: Amenity (1/4)

An ambition underpinned by environmental, economic and social sustainability.

| Strategic ambition: Amenity | |
|--|--|
| <ul style="list-style-type: none"> Make Irish grown plants the first choice of buyers at home and abroad, driven by Ireland’s high plant-health status and sustainability credentials | |
| Sub-sector needs | |
| Priority area: Identification of export and B2B market opportunities | Actions to be taken |
| Identify opportunities for exporting existing products | <ul style="list-style-type: none"> Engage with existing key exporters Identify additional research that is required to inform growers of export opportunities Engage with export markets and develop networks for market intelligence |
| Identify and build networks with key purchasers of Irish products at both retail and commercial scale | <ul style="list-style-type: none"> Identify who they are Understand their needs and wants Develop a network with the Irish supply base Facilitate engagement |
| Import substitution | <ul style="list-style-type: none"> Develop a network of market intelligence to inform import substitution efforts Increase the domestic share of plants we grow and import Conduct commercial feasibility studies |
| Enable the sector to build capacity and enhance capabilities | <ul style="list-style-type: none"> Invest in R&D and knowledge transfer Develop training and education offering Secure the required funding |

Sources: Stakeholder consultations and workshop.

Strategic ambition: Amenity (2/4)

An ambition underpinned by environmental, economic and social sustainability.

| Strategic ambition: Amenity | | <ul style="list-style-type: none"> ▪ Make Irish grown plants the first choice of buyers at home and abroad, driven by Ireland’s high plant-health status and sustainability credentials |
|--|--|--|
| Sub-sector needs | | |
| Priority area: Develop Horti-metrics | Actions to be taken | |
| Measure the environmental footprint of amenity production | <ul style="list-style-type: none"> • Develop an environmental balancing statement across crop models • Benchmark against international best practice • Conduct a LCA (lifecycle assessment of environmental impacts) | |
| Improve and reduce environmental footprint | <ul style="list-style-type: none"> • Invest in research and knowledge transfer • Reduce the use of plastics, conduct R&D to inform this • Fill the knowledge gap on Integrated Pest Management (IPM) • Follow best practice for sustainable production • Provide relevant education to consumers and the trade sector | |
| Drive the purchase of Irish grown plants | <ul style="list-style-type: none"> • Identify the key messages to use for promoting Irish grown plants, based on the benefits for consumers and B2B buyers • Develop a toolkit to communicate the story and benefits that can help to add a premium for plants of Irish origin | |
| Find alternatives to peat production systems | <p>Conduct research and provide research funding for:</p> <ul style="list-style-type: none"> • Knowledge creation and dissemination • Adopt a multi-disciplinary approach to resource the research challenge | |

Sources: Stakeholder consultations and workshop.

Strategic ambition: Amenity (3/4)

An ambition underpinned by environmental, economic and social sustainability.

| Strategic ambition: Amenity | |
|--|---|
| <ul style="list-style-type: none"> Make Irish grown plants the first choice of buyers at home and abroad, driven by Ireland's high plant-health status and sustainability credentials | |
| Sub-sector needs | |
| Priority area: Lack of specialist plant production and commercial feasibility knowledge | Actions to be taken |
| Develop education and plant production methodologies | <ul style="list-style-type: none"> Augment the curriculum in horticulture to reflect these methodologies Include modern / commercial production techniques |
| Identify the skills deficit in plant production | <ul style="list-style-type: none"> Develop a knowledge transfer programme to meet the current deficit through continuous professional development (CPD) |
| Develop a masters programme linked to European colleges / institutions | <ul style="list-style-type: none"> Identify sources of funding Short-list candidate universities Set-up placement programmes |
| Integrate horticulture into AKIS and develop the required policies | <ul style="list-style-type: none"> DAFM team to spearhead this initiative Review the current structure and understand the path to integration |
| Innovation and new knowledge creation | <ul style="list-style-type: none"> Invest in applied R&D Adopt international best practice Leverage grower collaboration and knowledge sharing Facilitate the role of growers as new knowledge creators |

Sources: Stakeholder consultations and workshop.

Strategic ambition: Amenity (4/4)

An ambition underpinned by environmental, economic and social sustainability.

| Strategic ambition: Amenity | |
|--|---|
| <ul style="list-style-type: none"> Make Irish grown plants the first choice of buyers at home and abroad, driven by Ireland’s high plant-health status and sustainability credentials | |
| Sub-sector needs | |
| Priority area: Policy alignment | Actions to be taken |
| <p>Make horticulture part of policy conversations across DAFM and other departments such as transport, environment and education</p> | <ul style="list-style-type: none"> Spearhead by DAFM Share information on key policy timelines |
| <p>Support sector’s understanding of policy development</p> | <ul style="list-style-type: none"> Communication and understanding of policy developments and changes, and call out opportunities |
| <p>Local authority and town council education at the government department and local level</p> | <ul style="list-style-type: none"> Communicate benefits of using Irish grown trees and plants Encourage the uptake of Irish grown trees and plants Support Green Cities Initiative |
| Priority area: Health and wellbeing | |
| <p>Identify the health and wellbeing credentials of amenity horticulture</p> | <ul style="list-style-type: none"> Invest in R&D on the physical, mental, environmental and societal benefits. Communicate this to consumers and B2B buyers |
| <p>Communication of health and wellbeing credentials to consumers</p> | <ul style="list-style-type: none"> Develop the sector’s key messages and a toolkit to communicate them |
| <p>Capture the economic value of wellbeing benefits</p> | <ul style="list-style-type: none"> Conduct a CBA to better understand this value |
| <p>Commercial greening</p> | <ul style="list-style-type: none"> Build the sector story and educate the B2B audience, planners, landscapers and architects Conduct a CBA to better understand this value |

Sources: Stakeholder consultations and workshop.

Sub-sector overview: Potatoes

Key statistics



~700 potato growers in Ireland with about 300 larger commercial farms



~1,344 people employed*



~19% of potatoes consumed in Ireland in 2019 were imported



~€82m – farm gate value

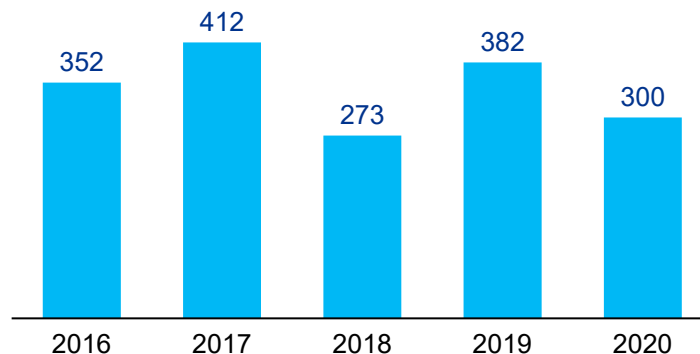
Overview

- The main markets include: retail (washed potatoes in bags), pre-prepared, fresh chips, salad potatoes, processing (mash, chips, etc). There are **no potatoes processed into frozen chips in Ireland**
- Weather conditions can have a significant impact on potato growers, affecting **consistency and stability of supply**
- **There has been consolidation in the sector in recent years** with existing growers building scale and investing to modernise and improve efficiencies of operations
- The potato sector is still a **significant employer** but **mechanisation** has helped the sector to save on labour costs relative to other sectors

Exports / Imports

- **Import:** The UK is a key source of imports to Ireland, just under 100,000 tonnes of potatoes were imported from the UK in 2019. Note a large portion of these imports are for the fresh chipping market and early season potatoes
- Considering all sectors (fresh, frozen, processed, crisped) that figure rises to ~185,000 tonnes (raw equivalent)
- Reliance on the UK for seed potatoes pose a threat to the security of supply for seed potatoes

Potato production in Ireland (thousand tonnes), 2016-2020



Potatoes are produced for various categories: early potatoes, main crop potatoes, seed potatoes, potatoes for crisps and salad potatoes.



Investments in storage capacity and capability for ambient storage could support the overall growth and stability of the sector.

“Fresh chipping market presents an opportunity – Irish growers supply 10% of this at the moment. There is currently a knowledge gap in this area – need to learn from the UK”
Potato farmer

Sources: CSO, DAFM, Teagasc, Bord Bia, KPMG consultations, Trade Map.

Notes: *Total direct employment.

SWOT analysis: Potatoes (1/2)

Collaboration, marketing and investment in R&D are key elements for developing the sector.

Strengths

S

- Consumer recognition of Irish varieties (Rooster, etc.). High household penetration, intrinsically healthy and nutritious 'staple food': low in macronutrients (fat/calories) and a source of many micronutrients (e.g. dietary fibre, potassium)
- Good value for money/affordability. Wide distribution in retail and foodservice
- Non-allergenic food, gluten-free. Seasonal and variety recognition. Part of a sustainable diet. Key component of the Irish Food Based Dietary Guidelines
- Local grower diversification into niche but growing markets. Highly specialist growers who can consistently produce high yields within market specification
- High quality seed used; indigenous seed breeding programme has a focus on breeding for a local market (among others)
- Approximately 50% of growers have access to irrigation (helps to secure high value markets)
- Identified as a country with a high seed production status; land base largely PCN free

Weaknesses

W

- Potatoes perceived as old-fashioned, less convenient and dull with younger shoppers, associated with 'my mother's cooking, not mine'. Can be perceived as being less healthy. Mature/declining market, seen as a commodity. Consumer switching to more 'modern carbohydrates', which can be seen as having a more exciting image
- Potatoes used as a loss leader by major retailers. Concentration of purchasing power by leading retailers (control 80% of retail market), weak bargaining power of growers, lack of co-ordinated sales by growers
- Few exports of seed potatoes
- Wet climate increases planting/harvesting difficulties and increases disease/pest control costs. This is now exacerbated with the loss of key plant protection products (PPPs)
- Grower costs have increased significantly in 2022 due to high fertiliser prices, diesel and energy costs for storage and processing
- Reduced advisory service activity at farm level, limited agronomic research in Ireland (mostly around blight control). Lack of research into increasing the value of potatoes into higher food products and valorising waste streams across the supply chain
- Lack of irrigation on 50% of farms (often needed to consistently access premium markets)

Sources: Bord Bia, Teagasc, KPMG consultations..

SWOT analysis: Potatoes (2/2)

Collaboration, marketing and investment in R&D are key elements for developing the sector.

Opportunities

- Health and sustainability are drivers of consumer behaviour. Government spending on health promotion activity. A plant-based food in a world looking to switch towards plant-based diets
- Celebrity chefs and influencers driving interest in more varied and interesting meal solutions
- Growing interest in freshness, local and in-season attributes. A shift from processed to natural unprocessed foods
- Grower diversification from ware potato production into other markets can help to increase the sectors output value without a detrimental effect on cropping area
- Opportunity to increase supply of seed to the domestic sector and then develop seed exports
- Replace / reduce imports across segments including salad/baby potatoes and peeling/processing, by increasing Irish production and strongly promoting its Irish origin. For chipping potatoes, increase Irish production of suitable varieties (Markies, Maris Piper)
- Potential to develop a higher end consumer product. For example, potato milk
- Promoting research into value-added products and valorising waste streams across the supply chain

Threats

- To be 'perceived' as a basic non-convenient traditional food. Falling consumption, older consumption profile
- Increasing availability of easy prepared, time saving alternatives. Increased attraction of meal kits and ready prepared, convenience meals. Branded competition in pasta and rice, with big marketing and promotional budgets
- Rising input costs: fertiliser, diesel and energy costs for storage and processing. Access to suitable land becoming more difficult
- An increase in the market withdrawal of critical plant protection products for potatoes
- Imposition of additional requirements by the retail sector, for example, excluding the use of certain plant protection products which are critical for good agronomy
- High production costs with relatively low premium for salad potatoes. Suitability of varieties for salad potatoes in Irish conditions are less well known
- Seed potatoes: The high ware prices in Ireland make it difficult for seed potato production to be competitive. A lack of grower knowledge for specific seed production. Supply chain and inspection capacity will be needed for expansion of the seed sector. Poor alternative markets for rejected seed / over-sizes, valorisation of these needs to be investigated

Sources: Bord Bia, Teagasc, KPMG consultations.

Strategic ambition: Potatoes (1/3)

An ambition underpinned by environmental, economic and social sustainability.

| | |
|---|--|
| Strategic ambition: Potatoes | <ul style="list-style-type: none"> To sustainably grow the potato sector by increasing the penetration of Irish potatoes in key channels, adding value through new product development, and building new routes to market enabled by a sustainable supply of quality seed |
| Sub-sector needs | |
| Priority area: Identify value-added opportunities | Actions to be taken |
| Develop innovation pathways for new food and drink products, including bio-based materials | <ul style="list-style-type: none"> Develop market insight and resources to support the research Consider international developments For bio-based materials: the potato sector should be embedded in the circular economy |
| Identify different product format opportunities | <ul style="list-style-type: none"> Determine the size of the prize considering end use, competitors, feasibility and the options in the frozen market |
| Promote locally grown produce | <ul style="list-style-type: none"> Continue to support and build a strong communication and promotional platform, based around the local sustainable supply and nutritional benefits messaging |
| Develop packaging innovation | <ul style="list-style-type: none"> Learn from best practice Monitor global trends Identify solutions that minimize waste |
| Priority area: Maximise marketable yield (inside farm gate) | Actions to be taken |
| Grower adoption of best practice and technology | <ul style="list-style-type: none"> Invest in R&D and consider international best practice Education and knowledge transfer on best practice |

Sources: Stakeholder consultations and workshop.

Strategic ambition: Potatoes (2/3)

An ambition underpinned by environmental, economic and social sustainability.

| Strategic ambition: Potatoes | |
|--|---|
| <ul style="list-style-type: none"> To sustainably grow the potato sector by increasing the penetration of Irish potatoes in key channels, adding value through new product development, and building new routes to market enabled by a sustainable supply of quality seed | |
| Sub-sector needs | |
| Priority area: Maximise marketable yield (inside farm gate) (cont.) | Actions to be taken |
| Improve storage and reduce waste during storage | <ul style="list-style-type: none"> R&D into how different varieties behave when stored |
| Adoption of IPM* practices and disease control strategies | <ul style="list-style-type: none"> Invest in R&D to support the adoption of best practice for IPM and disease control. Facilitate knowledge transfer of research to the sector |
| Variety development for import substitution | <ul style="list-style-type: none"> Invest in R&D for varieties that can support import substitution and meet consumer preferences |
| Renewable energy adoption | <ul style="list-style-type: none"> Facilitate knowledge transfer and funding support |
| Priority area: Reduce and replace imports | Actions to be taken |
| Prioritise chipping potatoes for import substitution | <ul style="list-style-type: none"> Develop a model business case for market entry, including market intelligence and support for growers |
| Increase storage capacity (on farms and / or centrally) | <ul style="list-style-type: none"> Explore financial supports |

Sources: Stakeholder consultations and workshop.

Notes: IPM: Integrated Pest Management

Strategic ambition: Potatoes (3/3)

An ambition underpinned by environmental, economic and social sustainability.

| <h2 style="margin: 0;">Strategic ambition: Potatoes</h2> | | <ul style="list-style-type: none"> ▪ To sustainably grow the potato sector by increasing the penetration of Irish potatoes in key channels, adding value through new product development, and building new routes to market enabled by a sustainable supply of quality seed |
|---|--|--|
| Sub-sector needs | | |
| Priority area: Reduce and replace imports (cont.) | Actions to be taken | |
| Trade education (B2B trade) | <ul style="list-style-type: none"> • Promote local chipping potatoes to trade sector, of equal value to import alternatives • Tie trade sector back to growers | |
| Consumer education | <ul style="list-style-type: none"> • To support and build a strong communication platform based around the local sustainable supply message • Promote different ways of cooking to appeal to younger markets | |
| Reduce and replace imports | <ul style="list-style-type: none"> • Capitalise on pilot growing completed to date • Identify the size of the prize by channel • Develop market segmentation insight | |
| Priority area: Develop the Irish seed potato sector (use experts) | Actions to be taken | |
| Establish the opportunity | <ul style="list-style-type: none"> • Consider: land availability, cost of production, incentives and business case models • Understand the market structure | |
| Supports to develop capacity in the sector | <ul style="list-style-type: none"> • Explore funding options to help seed potato sector invest in specialist facilities and equipment • Invest in education of growers | |

Sources: Stakeholder consultations and workshop.

Notes: IPM: Integrated Pest Management.

Sub-sector overview: Field vegetables

Key statistics



~200 growers in Ireland



~856 people employed**



Rising input costs and low margins are key constraints



€80m – farm gate value (~17% of total horticulture value)

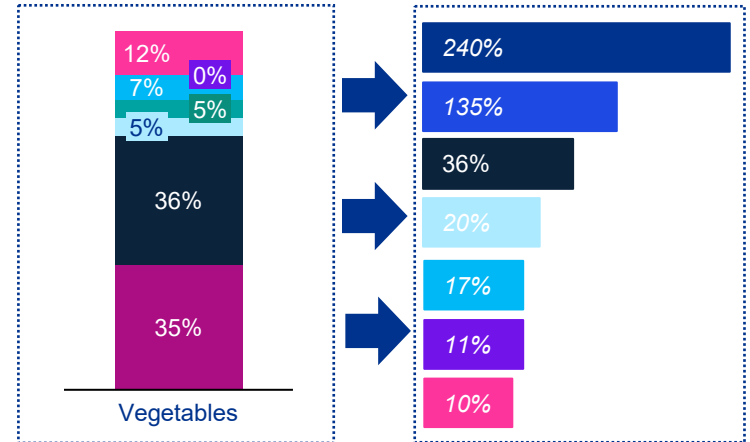
Overview

- The **largest 50 growers** (~25% of total) account for 75% of the total field vegetable production area
- For **retail vegetables**, carrots, broccoli and onions are among the top best selling produce areas in Irish retail, they are also key imported product lines
- Labour:** With reliance on work permits and visas for migrant workers, labour supply constraints are a weakness for the sector
- Rising input costs:** rising input costs are a threat to the viability of the sector, with **labour being the single biggest input cost**
- Low margins** make re-investment difficult. Margins are a particular constraint for vegetable growers, forcing growers to exit the business and, therefore, reducing the local supply range
- Succession** is one of the key issues, with not enough young people getting involved in the sector

With rising input costs, a number of growers plan to either stop production or reduce their acreage:

"..overall there will be a reduction in the line of 25% with certain crops reduced by as much as 50%."
- Consultation with a grower

Breakdown of input costs, 2022* Input cost inflation 2022*



Note: Illustrative, not to scale.

- Fertiliser
- Growing media***
- Energy
- Crop protection products
- Packaging
- Other
- Labour

Adoption of labour-saving technology and machinery critical to the sector staying competitive.

Pressure to reduce chemical pesticide use will necessitate the adoption crop management and production protocols incorporating Integrated Pest Management (IPM) strategies.

Sources: DAFM, Teagasc, KPMG consultations.

Notes: *12 months to March 2022, **Total direct employment, ***Compost/Casing/Growing Media.

SWOT analysis: Field vegetables

Support the sector based on principles of fair trade, sustainability and innovation.

Strengths

S

- The top best selling conventional field vegetables are carrot, onion, broccoli, and celery, with organic sales strong where Irish supply is available (e.g. organic carrots have very strong sales)
- Potential to develop Irish supply of best selling field vegetable lines to support import substitution
- Ireland is 60% self-sufficient* in terms of vegetable supply

Weaknesses

W

- Fragmented production base with ~200 growers across Dublin, Meath, Wexford and Cork – largest 50 growers account for 75% of total field vegetable production in terms of area
- Increasing costs of production (costs increased by ~12% between 2020 and 2021) and labour intensive methods in place (labour costs represent ~40% of production costs)
- Labour supply constraints

Opportunities

O

- Potential to substitute some imports of vegetables (e.g. onions, broccoli, celery, cauliflower, cabbage, courgette) with local supply
- Develop additional varieties / domestic supply to meet local demand
- Build producer confidence through PO support (increase participation)
- Adoption of best Integrated Pest Management (IPM) practices to build on high quality produce image and meet customer demands
- Leverage increasing health conscious consumer trends to strengthen brand positioning
- Improve quality and supply of a range of varieties over maximum season: use of Controlled Environment Agriculture (CEA)

Threats

T

- Increased competition from imported vegetables
- Rising input costs are a threat to the viability of the sector
- A lack of investment in automation. Adoption of new labour-saving technology and machinery is critical to the sector staying competitive
- Low margins make re-investment difficult, threatening the longer-term viability of the sector
- A lack of succession as not enough young people get involved in the sector
- A concentrated market of branded retail chains selling produce, with the largest 50 growers (~25% of total) accounting for 75% of the total field vegetable production area

Sources: Bord Bia, HIF, Teagasc, KPMG consultations.

Notes: However, a significant amount is imported out of season.

Strategic ambition: Field vegetables (1/3)

An ambition underpinned by environmental, economic and social sustainability.

| Strategic ambition: Field vegetables | |
|---|---|
| Sub-sector needs | |
| Priority area: Supply chain engagement | Actions to be taken |
| Develop a factual basis for retailer and consolidator engagement | <ul style="list-style-type: none"> • Halt the decline and rebuild a viable sector based on principles of fair trade, sustainability and innovation to protect local production by Irish farming families • Conduct a supply chain analysis • Understand the share of retail price across product lines and what does the primary producer receive • Identify and define key engagement platforms across the supply chain, encouraging constructive engagement by the main parties and to ensure alignment of messaging and inputs |
| Develop a fair trade mechanism | <ul style="list-style-type: none"> • Define and develop a fair trade concept for the horticulture sector • Ensure alignment with UTP Regulations (national context) and UTP Directive (EU context) • Incorporate a broader sustainability charter and promote to retailers and consumers |
| Drive consumer demand for fair trade | <ul style="list-style-type: none"> • Improve consumer and retail perceptions of the fair trade concept, focussing on the Ireland context • Based on market insights to support and build a strong communication platform for retailers and consumers based around local sustainable supply with positive environmental and health benefits credentials |

Sources: Stakeholder consultations and workshop.

Strategic ambition: Field vegetables (2/3)

An ambition underpinned by environmental, economic and social sustainability.

| Strategic ambition: Field vegetables | |
|---|--|
| <ul style="list-style-type: none"> ▪ Halt the decline and rebuild a viable sector based on principles of fair trade, sustainability and innovation to protect local production by Irish farming families | |
| Sub-sector needs | |
| Priority area: Financial feasibility (costs and returns) | Actions to be taken |
| Identify current variable costs | <ul style="list-style-type: none"> • Identify the state of play in the horticulture sector • Establish a dashboard for horticulture input costs, track this over time, support knowledge transfer and advisory services, develop sustainable agronomy support services (Teagasc) |
| Enable more one-to-one advisory with growers | <ul style="list-style-type: none"> • Develop research programmes and support greater resourcing for advisory services on vegetable production |
| Priority area: Policy change | Actions to be taken |
| Establish possible options to sustain the sector | <ul style="list-style-type: none"> • DAFM horticulture team to spearhead |
| Establish what policy changes are needed and engage with the food regulation office | <ul style="list-style-type: none"> • IFA to spearhead engagement with key stakeholders and policy makers |
| Develop POs to increase collaboration among growers | <ul style="list-style-type: none"> • Maximise the opportunities under CAP to support POs |
| Priority area: Route to market | Actions to be taken |
| Increase domestic market share in the food services sector | <ul style="list-style-type: none"> • Develop insight to understand the sector's needs, the supply chain players and network |
| Develop alternative routes to market | <ul style="list-style-type: none"> • Assess and analyse opportunities for alternative routes to market |

Sources: Stakeholder consultations and workshop.

Strategic ambition: Field vegetables (3/3)

An ambition underpinned by environmental, economic and social sustainability.

| Strategic ambition: Field vegetables | |
|---|---|
| <ul style="list-style-type: none"> ▪ Halt the decline and rebuild a viable sector based on principles of fair trade, sustainability and innovation to protect local production by Irish farming families | |
| Sub-sector needs | |
| Priority area: Innovation and New Product Development (NPD) | Actions to be taken |
| Frozen products opportunity | <ul style="list-style-type: none"> • Develop insights to understand the potential market opportunity in this category and the feasibility of supplying it in both the retail and food service sector • Where viable opportunity identified scope out plan to activate |
| Chilled products opportunity | <ul style="list-style-type: none"> • Develop insights to understand the potential market opportunity in this category and the feasibility of supplying it in both the retail and food service sector • Where viable opportunity identified scope out plan to activate |
| Secure funding | <ul style="list-style-type: none"> • Engage with Enterprise Ireland and the Department of Trade, Enterprise and Industry (DETE) |
| Farm level innovation | <ul style="list-style-type: none"> • Facilitate adoption of labour-saving technologies • Evolve production systems to take account of IPM practices |
| Propagation / Plant material | <ul style="list-style-type: none"> • Adopt best practice and build capacity |

Sources: Stakeholder consultations and workshop.

Sub-sector overview: Soft fruit (a)

Key statistics



~57 growers in Ireland



~967 people employed**



~8,000 tonnes of fresh strawberries are produced per annum

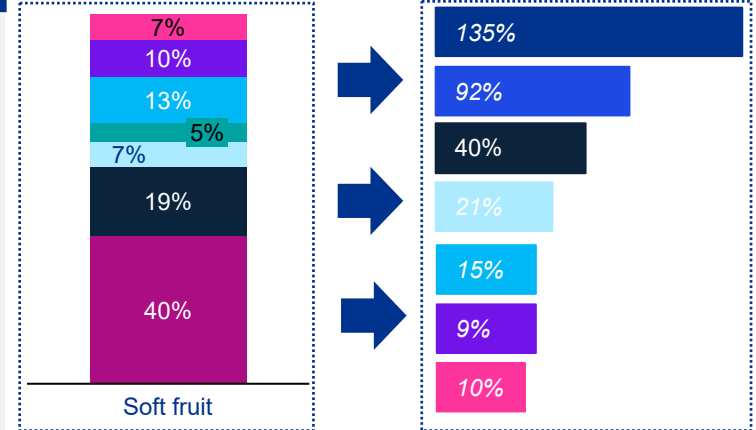


Farm gate value of soft fruit ~€51m^(b)

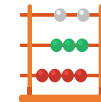
Overview

- **Strawberry production:** Strawberries are the main soft fruit crop grown in Ireland (~€47m per annum). Most strawberries are now grown under cover, using either tunnels or glasshouses. Modern production methods include tabletop systems
- **Strawberry market:** The majority of strawberries are sold on the Irish market, supplied to retailers and wholesalers. Other important outlets include local shops, farmers' markets and roadside sales
- **Raspberry production:** Valued at ~€4m per annum. The majority of Irish raspberries are grown under protective cropping, mostly in Spanish tunnels. The majority of growers plant longcane raspberry canes, purchased from specialist plant propagators
- **Raspberry market:** The majority of fresh raspberries are sold on the Irish market, supplied to retailers and wholesalers. Other important outlets include local shops, farmers' markets and roadside sales
- **Labour:** With reliance on work permits and visas for migrant workers, labour supply constraints are a weakness for the sector
- **Other opportunities:** Potential to develop blueberry and cherry crops to exploit import substitution opportunities in the domestic market

Breakdown of input costs, 2022* Input cost inflation, 2022*



- Fertiliser
- Growing media***
- Energy
- Crop protection products
- Packaging
- Other
- Labour



In terms of relative importance, labour is the biggest production cost. However, the cost of electricity and fertiliser have increased significantly, by 135% and 92% respectively

Sources: IFA, Teagasc, KPMG consultations.

Notes: (a) Includes protected fruit, (b) ~€43m for protected fruit, *12 months to March 2022, **total direct employment, ***Compost/Casing/Growing Media

SWOT analysis: Soft fruit (a)

Identify import substitution opportunities in the domestic market, and export opportunities for select crops (e.g. strawberries).

Strengths

S

- Soft fruit industry valued at ~€51m with strawberries representing ~90% of harvest at 8,000 tonnes each year, worth an estimated €47m (annual growth of about 10%). The industry employs more than 900 people
- Consolidation in recent years has enabled some growers to build scale and invest in modernising and improving efficiency of operations
- Growth in value of output, particularly from strawberries (potential for long season growth and yield maximisation)
- Investment in valuable variants (e.g. Malling Centenary strawberries have a high percentage of Grade 1 fruit)

Weaknesses

W

- Ongoing challenges with rising input costs and labour supply constraints, further exacerbated by extended season (7-8 months)
- Labour represents ~40% of production costs, however plant material cost (i.e. importing of strawberry plants) is also a significant cost for glasshouse production
- Lack of specialised Irish plant propagators

Opportunities

O

- Potential to develop raspberry, blueberry and cherry crops to exploit import substitution opportunities in the domestic market
- For example, 99% of blueberries are imported (some grown in UK including Wales and Scotland) – estimated total retail value of the market is €65m
- Extending the growing season with early crops of strawberries or raspberries

Threats

T

- Highly competitive marketplace; cost of production higher in Ireland compared to other markets
- Pricing for organic fruit could be difficult to achieve, especially for smaller suppliers
- Growing media: dependence on peat along with supply constraints pose a threat to the sector

Sources: Bord Bia, Teagasc, stakeholder consultations.

Notes: (a) Includes protected fruit

Strategic ambition: Soft fruit – strawberries (1/2)

An ambition underpinned by environmental, economic and social sustainability.

| Strategic ambition: Strawberries | |
|--|--|
| <ul style="list-style-type: none"> To profitably and sustainably grow and promote Irish strawberries, by modernising production systems that maximise in-season output* | |
| Sub-sector needs | |
| Priority area: Select varieties and growing programs suitable for Irish producers | Actions to be taken |
| Develop a framework for smart variety screening and planting programmes | <ul style="list-style-type: none"> Conduct a sensory evaluation including propagation and supply chain engagement for strawberry varieties. Identify production protocols which optimise the programme of varieties available across a longer season of production while maximising agronomic performance |
| Research, advisory and training | <ul style="list-style-type: none"> Invest in the appropriate R&D on strawberry and other potential soft fruit including blueberry, raspberry and blackberries Invest in developing appropriate competencies in soft fruit research and advisory Follow international best practice and identify modern production techniques, including for all soft fruit Support knowledge transfer Develop knowledge networks Develop horticulture college education offering |
| Priority area: Maximise grower margins | Actions to be taken |
| Achieve efficiency gains at the farm level | <ul style="list-style-type: none"> Adoption of lean principles Adopt and promote more glasshouse production |

Sources: Stakeholder consultations and workshop.

Notes: *Opportunities for raspberries, blackberries and blueberries need to be explored.

Strategic ambition: Soft fruit – strawberries (2/2)

An ambition underpinned by environmental, economic and social sustainability.

| Strategic ambition: Strawberries | | <ul style="list-style-type: none"> To profitably and sustainably grow and promote Irish strawberries, by modernising production systems that maximise in-season output* |
|--|--|--|
| Sub-sector needs | | |
| Priority area: Maximise grower margins (cont.) | Priority area: Maximise grower margins | |
| Safeguard growers return at the retail level | <ul style="list-style-type: none"> Understand costs for all pack sizes Develop promotion around the local value proposition | |
| Innovation and NPD | <ul style="list-style-type: none"> Invest in R&D to identify and develop innovation pathways | |
| Priority area: Promote and drive consumer demand | Actions to be taken | |
| Education on the value of in-season strawberries across the retail and food services sectors | <ul style="list-style-type: none"> Based on market insights, to support and build a strong communication platform for buyers and consumers based around the local sustainable supply with positive environmental and health benefit credentials Use marketing tools to drive awareness | |
| Priority area: Growing media | Actions to be taken | |
| Find alternatives for growing media | <ul style="list-style-type: none"> Invest in R&D in terms of availability, functionality and affordability | |



Sources: Stakeholder consultations and workshop.
 Notes: *Opportunities for raspberries, blackberries and blueberries need to be explored.

Sub-sector overview: Apples

Key statistics



~50 commercial apple growers in Ireland



90% of all fresh apple retail is through the supermarket multiples



Ireland only supplies ~5% of the local eating (dessert) apple market



~€8m – farm gate value

Overview

- Ireland only supplies ~5% of the eating (dessert) apple market (in contrast with the UK where local apples account for 30-35% of the apples supplied to the UK retail channel)
- The Irish climate is **not optimal, but suitable** for growing apples in certain geographical locations
- The seasonality of Irish apples makes **stable supply challenging**, where retailers turn to imports
- **Consistency of taste, quality and visual appeal** is a challenge but can be achieved through concerted research for suitable varieties and appropriate market promotion

Exports / Imports

- **Exports of apple products (cider)** can be rewarding with possibility to direct apples into ciders
- **Imports:** as of 2019, approximately a third of imported fresh apples and pears arrive from France, with the UK and the Netherlands taking the second and the third places (18.7% and 10.7% respectively). Analysis could investigate opportunities to substitute imported concentrates with Irish apple juice
- The **environmental message** (low food miles) has been a major factor in creating consumer demand for Irish apples in the past few seasons

“As input costs are rising rapidly, a further increase in prices of the order of 30% will be needed over the next 3 or 4 seasons.”

Managing Director, Large Producer & Distributor

Three types of apples produced commercially in Ireland

% of total apple production area (2017)



Eating / Dessert



Culinary / cooking



Cider

Bramley cooking apples are key part of local production, being supplied throughout the year. Availability of eating apples is a bigger challenge



Apples are a top-selling fruit, with a domestic market of ~€131m. The current ~5% market share presents a clear opportunity for import substitution.

With investment in innovation R&D, opportunities for new food products, animal feeds and cosmetics could be developed.

Processing market: eating, culinary and cider apples are juiced for the production of cider and apple juice that are supplied to the retail and food service sectors in Ireland and abroad.

Sources: DAFM, Teagasc, Bord Bia, KPMG consultations, OEC.

SWOT analysis: Apples

Opportunities to strengthen Irish brand positioning of apple sector and focus on developing premium category.

Strengths

S

- Produce grown to quality assurance standards
- Quality fresh produce and top-selling fruit for home market, although Irish growers only supply ~5% of the dessert apple market
- Key volume segment in retail and foodservice, indicating good opportunity for Irish producers if they can deliver a consistently good product
- Highly specialised and expert grower base; good engagement between many growers

Weaknesses

W

- Challenges to developing strong Irish proposition for apples with consistency of product
- Seasonality of production and sub-optimal location of orchards to develop varieties popular in marketplace
- Limited investment in sectoral research, development and innovation to improve retail value – lack of investment also at the grower level and there are challenges with grower profitability and orchard age profile, as well as business succession
- Tendency for retail consumers to undervalue apples due to discounting and packaging

Opportunities

O

- Potential for PO participation and representation
- Improve competitiveness and profitability via lean technologies and processes
- Add value through innovation and product development, and develop stronger Irish brand proportion for apples with greater commercial training for the industry (e.g. placements in top global orchards in NZ, US, continental Europe)
- Potential to displace imported supply of apples and pears whilst improving availability of organic apples that seek a premium
- Reduce single-use packaging for Irish apples. Agri environment schemes could reward apple growing
- Gain competitive advantage from consumers' positive sentiment towards local produce. Considering food miles, potential increased prices for imported products could give local produce a price advantage
- Opportunities for strong investment in sector to position Irish apples in premium category to boost profitability

Threats

T

- Retailer power impacting profitability of growers
- Below cost selling and/or low re-investment at the grower level places constraints on investment in orchards and equipment
- Competition from lower priced imports (regions with a lower cost base), while local growers face rising input costs
- Loss of industry expertise due to ageing profile of growers
- Unstable climate for most popular apple variants
- Loss of Plant Protection Products (PPPs) with EU regulations leading to removal of certain products from the market that may not have close substitutes

Sources: Bord Bia, Teagasc, KPMG consultations.

Strategic ambition: Apples (1/3)

An ambition underpinned by environmental, economic and social sustainability.

| | |
|--|---|
| <h2 style="margin: 0;">Strategic ambition: Apples</h2> | <ul style="list-style-type: none"> ▪ To profitably increase the volume share of fresh Irish eating apples to 25% in ten years, while maximising the opportunities for cooking and cider apples through the development of value-added products |
|--|---|

| Sub-sector needs | |
|--|---|
| Priority area: Develop an overarching research programme prioritising selected varieties and growing systems suitable to the Irish growing environment | Actions to be taken |
| Develop a framework for smart variety screening and planting systems | <ul style="list-style-type: none"> • Conduct a sensory evaluation including propagation and supply chain engagement • Assess varieties with potential market acceptance and agronomic characteristics for Irish conditions |
| Research advisory and training requirements | <ul style="list-style-type: none"> • Invest in the appropriate R&D, including variety trialling and testing • Follow international best practice • Support knowledge transfer • Develop knowledge networks • Develop horticulture college education offering |
| Invest in agronomic intelligence | <ul style="list-style-type: none"> • Conduct feasibility studies • Develop detailed cost analysis |
| Priority area: Develop more orchards and attract more growers | Actions to be taken |
| Develop a business case for expansion and / or market entry | <ul style="list-style-type: none"> • Conduct a CBA for the sector • Conduct feasibility studies • Communicate the available funding to growers • Make potential prioritised funding available |

Sources: Stakeholder consultations and workshop.

Strategic ambition: Apples (2/3)

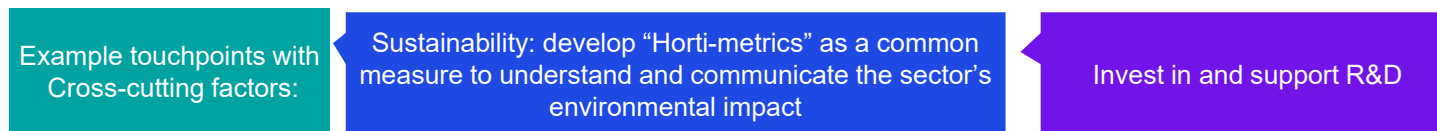
An ambition underpinned by environmental, economic and social sustainability.

| Strategic ambition: Apples | <ul style="list-style-type: none"> To profitably increase the volume share of fresh Irish eating apples to 25% in ten years, while maximising the opportunities for cooking and cider apples through the development of value-added products |
|--|--|
| Sub-sector needs | |
| Priority area: Develop more orchards and attract more growers (cont.) | Actions to be taken |
| Fill the knowledge deficit | <ul style="list-style-type: none"> Develop education and training programs Learn from international best practice Explore different business models |
| Finance package availability | <ul style="list-style-type: none"> Align supports, grants and other supports, for example, accelerated capital allowances, seed capital scheme or equivalent Alignment of policies |
| Development of POs | <ul style="list-style-type: none"> Encourage growers to join POs Create accelerated training programmes for market access and knowledge acquisition |
| Priority area: Develop value-added, NPD and waste valorisation opportunities | Actions to be taken |
| Develop innovation pathways for new product development (NDP) and bio-based products | <ul style="list-style-type: none"> Develop market insight and secure sufficient resources to conduct research |
| Increase penetration of traditional Irish craft cider in the Irish market (alcohol and non-alcoholic) | <ul style="list-style-type: none"> Incentivise craft cider by lowering the customs and excise barrier Set standards that specify Irish apple usage by volume in Irish branded products Engage with distributors and identify the size of the market price for non-alcoholic cider |

Strategic ambition: Apples (3/3)

An ambition underpinned by environmental, economic and social sustainability.

| | | |
|---|--|---|
| <h2 style="margin: 0;">Strategic ambition: Apples</h2> | | <ul style="list-style-type: none"> ▪ To profitably increase the volume share of fresh Irish eating apples to 25% in ten years, while maximising the opportunities for cooking and cider apples through the development of value-added products |
| Sub-sector needs | | |
| Priority area: Develop value-added, NPD and waste valorisation opportunities (cont.) | Actions to be taken | |
| Develop different product formats, for example, apple flour for baked goods | <ul style="list-style-type: none"> • Research the size of the prize based on end use • Review the competition for these opportunities • Conduct feasibility studies | |
| Grow the sale of locally made juice | <ul style="list-style-type: none"> • Package and promote the locally produced product story | |



Sources: Stakeholder consultations and workshop.

Strategic ambition: Glasshouse crops (1/2)

An ambition underpinned by environmental, economic and social sustainability.

| Strategic ambition: Glasshouse crops | <ul style="list-style-type: none"> To stabilise and enable the building of capability in the protected crops sector, adding value through premiumisation and increasing the domestic market share underpinned by sustainability and innovation |
|--|---|
| Sub-sector needs | |
| Priority area: Expand volumes from existing producers to grow more | Actions to be taken |
| Make the sector more appealing | <ul style="list-style-type: none"> Create incentives through increased funding for the sector |
| Premiumisation in retail | <ul style="list-style-type: none"> NPD and innovation programmes for value-added products Develop market segmentation Increase promotion of the benefits of Irish grown crops. Establish the value around an 'Irish Tomato' and expand that to other crops such as cucumbers and salad leaves etc. |
| Innovation and R&D | <ul style="list-style-type: none"> Identify alternative uses to find alternative buyers and routes to market Consider trends in crop types in the Netherlands and the rest of Europe Evaluate international trends in snack pack offerings and varieties across the salad crop market |
| Priority area: Horti-metrics and LCA | Actions to be taken |
| Establish Horti-metrics | <ul style="list-style-type: none"> Develop "Horti-metrics" as a common measure to understand and communicate the sector's environmental impact, conduct an LCA Develop research competency in overall sustainability of CEA* |

Sources: Stakeholder consultations and workshop.

Note: *CEA: Controlled Environment Agriculture

Strategic ambition: Glasshouse crops (2/2)

An ambition underpinned by environmental, economic and social sustainability.

| | |
|---|---|
| <h2>Strategic ambition: Glasshouse crops</h2> | <ul style="list-style-type: none"> To stabilise and enable the building of capability in the protected crops sector, adding value through premiumisation and increasing the domestic market share based on sustainability and innovation |
| <p>Priority area: Horti-metrics and CLA (cont.)</p> | <p>Actions to be taken</p> |
| <p>Use findings to improve sustainability credentials</p> | <ul style="list-style-type: none"> Communication and knowledge transfer Inform growers of funding support available to improve their sustainability Establish the merits of producing more food under this system |
| <p>Explore ways to improve the sector’s Horti-metrics</p> | <ul style="list-style-type: none"> Look at existing innovation and international best practice |
| <p>Priority area: Energy</p> | <p>Actions to be taken</p> |
| <p>Develop the business case for carbon credits</p> | <ul style="list-style-type: none"> Discuss the R&D findings with key departments and government agencies, such as the Department of Finance |
| <p>Identify alternative renewable energy sources</p> | <ul style="list-style-type: none"> Assess the merits of emerging technologies Identify the potential best solutions for the sector Provide funding support |
| <p>Priority area: Promote and drive consumer demand</p> | <p>Actions to be taken</p> |
| <p>Education on the value of in-season produce across the retail and food services sectors</p> | <ul style="list-style-type: none"> Based on market insights, support and build a strong communication platform for buyers and consumers based around the local sustainable supply with positive environmental and health benefit credentials Use marketing tools to drive awareness |

Sources: Stakeholder consultations and workshop.

Strategic ambition: Salad crops (1/2)

An ambition underpinned by environmental, economic and social sustainability.

| <h2 style="margin: 0;">Strategic ambition: Salad crops</h2> | | <ul style="list-style-type: none"> ▪ To profitably increase salad crop production through modernising production systems that can maximise output while enhancing the sector’ environmental sustainability |
|---|--|---|
| Sub-sector needs | | |
| Priority area: Modernise production systems to be more sustainable | Actions to be taken | |
| Automate growing and harvesting | <ul style="list-style-type: none"> • Invest in R&D, with a greater emphasis on food safety and irrigation water quality • Identify the optimal technologies for local conditions • Knowledge transfer: communicate options to growers • Provide funding to drive investment | |
| Develop the business case | <ul style="list-style-type: none"> • Undertake a market analysis • Establish market appetite for changes to production systems | |
| Priority area: Select varieties and growing programs suitable for Irish producers | Actions to be taken | |
| Develop a framework for smart variety screening and planting programmes | <ul style="list-style-type: none"> • Facilitate a trial site in Ireland and invite seed companies to submit varieties. Provide additional resources through which Teagasc could facilitate such a trial site | |
| Research, advisory and training | <ul style="list-style-type: none"> • There is currently no research or advisory capacity and limited expertise to describe in detail what the market opportunity in the glasshouse and salad crops sector could be and what the strategy should be. More detailed work needs to be conducted to assess the opportunity for CEA from both a market and technical perspective | |

Sources: Stakeholder consultations and workshop.

Strategic ambition: Salad crops (2/2)

An ambition underpinned by environmental, economic and social sustainability.

| Strategic ambition: Salad crops | <ul style="list-style-type: none"> To profitably increase salad crop production through modernising production systems that can maximise output while enhancing the sector’ environmental sustainability |
|---|---|
| Sub-sector needs | |
| Priority area: Select varieties and growing programs suitable for Irish producers (cont.) | Actions to be taken |
| Research, advisory and training (cont.) | <ul style="list-style-type: none"> Invest in the appropriate R&D Follow international best practice Support knowledge transfer, develop knowledge networks Develop horticulture college education offering |
| Priority area: Promote and drive consumer demand | Actions to be taken |
| Education on the value of in-season produce across the retail and food services sectors | <ul style="list-style-type: none"> Based on market insights, support and build a strong communication platform for buyers and consumers based around the local sustainable supply with positive environmental and health benefit credentials Use marketing tools to drive awareness |
| Education and consumer awareness on the benefits of local produce | <ul style="list-style-type: none"> Emphasise the carbon footprint of locally produced crops versus the importation of a crop that is 90% water. Conduct LCA on Irish produced salad crops with complimentary marketing approach. |
| Collaboration with retailers and facilitators | <ul style="list-style-type: none"> Develop grower’s collaboration with retailers and facilitators to help better meet the needs of consumers Develop viable and sustainable business supply models with Irish growers |

Sources: Stakeholder consultations and workshop.

Section 4

Conclusion

Conclusion

In line with Food Vision 2030, the vision for the horticulture sector can focus on sustainability in terms of environmental, economic, and social sustainability.

This report provided an overview of the current context for the horticulture industry, the state of play in each of the seven sub-sectors, lessons from international case studies and highlighted the actions that can help to address challenges and develop opportunities for the sector.

Note that since the inception of this report, geopolitical events in Ukraine have created additional uncertainties whilst exacerbating key constraints for the sector. The findings of this report must be considered in conjunction with the heightened uncertainty and associated impacts of current geopolitical developments.

In line with Food Vision 2030, the vision for the horticulture sector can focus on sustainability in terms of environmental, economic, and social sustainability, to strengthen the future viability of Irish horticulture. Such a strategic ambition could be to grow a more profitable value-added sector driven by sustainability and innovation. Whilst each sub-sector presents its own challenges and opportunities, there are key cross-cutting factors that are applicable to the overall sector. The report identified several actions to address these cross-cutting factors, for example:

- **Labour supply:** enhance the efficiency of labour permits and address the need for a seasonal permit scheme, while longer-term solutions, such as mechanisation and robotics, are being developed and implemented
- **Collaboration:** Increase grower participation in EU funded producer organisations, develop local working groups to facilitate knowledge sharing, and develop industry collaboration with retailers and facilitators (including around the benefits of producer organisations). Encourage collaboration with research organisations and other sectors
- **Research and development (R&D):** Establish a working group to develop a detailed research needs analysis for the sector which can then inform research calls, projects and opportunities conducted by organisations such as DAFM, Teagasc, Bord Bia and EI. Support the horticulture sector to access research and innovation funding, from both domestic and European sources
- **New Product Development (NPD) and innovation:** Secure funding to support NPD, develop innovation pathways, market insight and different product formats, while following international best practice
- **Knowledge transfer:** Develop a roadmap for integrating horticulture back into the broader Agriculture Knowledge and Innovation System (AKIS), increase resourcing of horticulture advisory services, create accelerated training programmes, augment the existing knowledge transfer programme, facilitate the role of growers as new knowledge creators, and follow international best practice
- **Education and training:** Develop and modernise the horticulture training and education offering, augment the curriculum in horticulture to reflect the latest plant production methodologies, develop a masters programme linked to European colleges / institutions, provide relevant education to consumers and the trade sector, and attract new entrants by creating awareness about horticulture and the opportunities in the sector

Conclusion

Policy action and collaboration between the sector's key players is crucial to achieving a thriving, viable and growing sector.

- **Sustainability:** Develop "Horti-metrics" as a common measure to understand and communicate the sector's environmental impact for example, fruit and vegetables have the smallest area of land use per kg of food produced. Leverage this data for the betterment of the horticulture sector. Provide education on the value of in-season produce across the retail and food services sectors. Develop controlled-environment agriculture (CEA) growing methods as well as integrated pest management (IPM) for unprotected crops
- **Insight and Intelligence:** Develop data and intelligence on the sector to inform evidence-led policy making and marketing initiatives that support the sector to achieve its full potential
- **Promotion (create awareness):** Develop and implement the levers that can support import substitution. Promote Irish grown produce in terms of the associated environmental benefits (low food miles and "Horti-metrics") and the fresh / nutrition-based benefits through identifiable packaging. Highlighting "fresh, local and in-season"
- **Brexit:** Continually monitor developments, identify impacts, and communicate findings to the sector to ensure preparedness for challenges as they emerge. Develop support services to help growers navigate the increased administrative requirements. Harness positive attitude to Irish produce in UK local market, in particular promoting Irish Plant Health Status
- **Packaging and food waste:** Learn from and adopt international best practice, monitor global packaging trends, and identify solutions that minimise food waste. Ensure industry initiatives are communicated to the consumer

In conjunction to addressing the cross-cutting factors, **sector specific actions** need to be taken to ensure the sub-sector can reach their potential. The report used **three illustrative scenarios** to articulate the sector's strategic ambition. The scenarios show the **different outcomes (growth, staying stable, decline)** that could occur, considering the level of policy action and collaboration between **the sector's key players**. Scenario 1 (growth) presented the most preferred outcome, where all the identified actions are implemented, and all key players collaborate. If nothing is done, the best case scenario would be similar to scenario 2 (stable). However, it would likely result in a worse case outcome as illustrated by scenario 3 (decline).

There is **no single solution** that can ensure the successful development of the Irish horticulture sector. The most direct way to achieve the sector's ambition will come from giving existing growers and businesses the confidence to expand and diversify profitable enterprises.

Success requires that a range of actions for both the **sub-sectors and overall cross-cutting factors** are implemented, focusing on **policy action and collaboration between the sector's key players**. In particular, **collaboration between the sector's key players** will be crucial to **implement the actions identified** in this report, as part of the horticulture sector strategy that will be developed by DAFM.

Appendices:

Appendix A –

**Supporting analysis:
Case studies (Netherlands
& New Zealand)**

Case study summary (Netherlands – NL)

The Netherlands is a global leader in horticulture innovation.

Market Overview



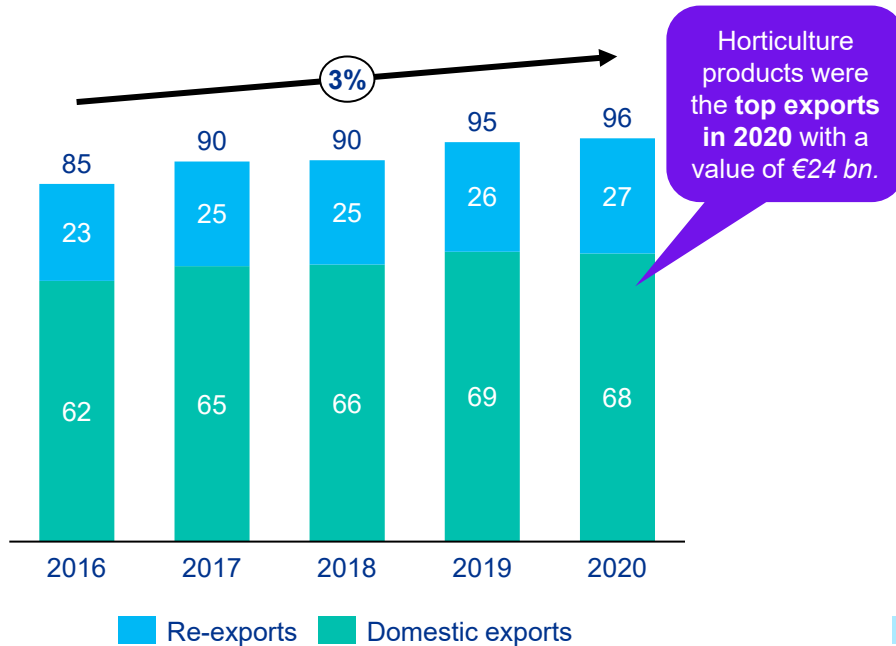
- In 1961, approximately half of the Netherlands was land which had been reclaimed from the sea. The high value of land lead to intense production of agriculture and horticulture, relying heavily on the use of fertilisers, pesticides and energy to yield high volumes. Since 2000, policy has shifted with a focus on more sustainable methods of production. The Netherlands is now a world leader in sustainable production, promoting entrepreneurial opportunities in circular agriculture and collaboration between farmers to share best practice
- The Netherlands (NL) horticulture sector is focused on the production of **fruit, vegetables and flower bulbs**
- Horticulture is regionally concentrated, with many open field fruit and vegetable farms located in the southern provinces while the North is a hub for flower bulbs production
- NL is the world's **2nd largest exporter of agricultural products** after the United States and is a top five global exporter in all main horticulture sub-sectors (**#1** for trees & plants; **#3** for vegetables and **#4** for fruit)
- The NL horticulture market (**€10.6bn, 2020**) is valued at ~23 times that of Ireland's (**€0.5bn, 2019**) despite NL cultivating only ~29% more land using horticulture
- The Dutch agriculture export profile is made up of both domestic exports and “re-exported” produce, which is produce imported into NL and modified/processed for further export
- Horticulture products were the top Dutch export in 2020 (**€24bn**), with trees and plants the largest sub-sector (**€10bn**)
- **Germany** is the largest importer of Dutch horticulture products, with a value of ~ **€8bn** in 2020, representing **~33% of total NL horticulture exports**
- Horticulture farms account for a quarter of the total number of Dutch farms, but occupy only a fraction (**~6%**) of the total agricultural land
- The Dutch **horticulture sector is significantly more profitable than dairy or arable farming**; cut flowers lead the way, being **~133 times** more profitable per hectare than dairy
- NL is a global leader in horticulture innovation, driven by a thriving research ecosystem, sustainable technologies and government sector support which has created a precision farming mindset
- The Dutch glasshouse industry is a global example of precision farming and sustainable techniques – Dutch glasshouse tomato yields are the highest in the world, at **~50 kg/m²**, higher than other global producers such as the US (**~9 kg/m²**), Spain (**~8.6 kg/m²**) and Morocco (**~8 kg/m²**)

Dutch horticulture exports

The NL export profile encompasses both domestic and re-exported produce – horticulture products are the top Dutch export, with trees and plants the largest sub-sector.

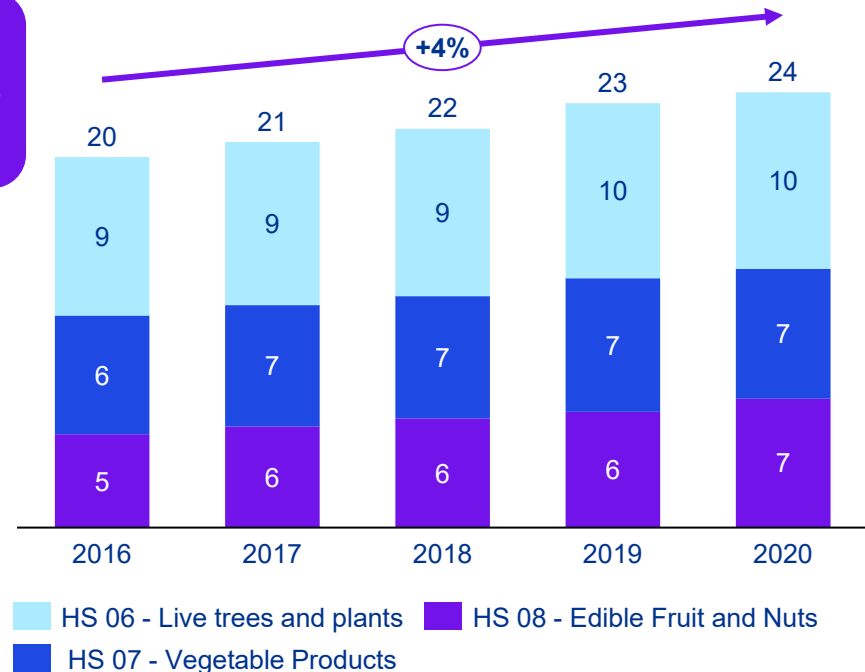
Total value of agricultural exports in NL

Domestic & re-export value, in €bn, CAGR 2016-20⁽¹⁾



NL export value by horticulture sub-sector

Sub-sector export value, in €bn, CAGR 2016-20⁽²⁾



Insight

- While domestic agriculture exports create the majority of value for NL, a growing re-export market bolsters the overall value
- Horticulture products are the top export from NL (25% of total export value, 2020); trees and plants are the largest sub-sector
- Despite the Covid-19 pandemic, the agricultural export value grew by 1% in 2020 relative to the previous year

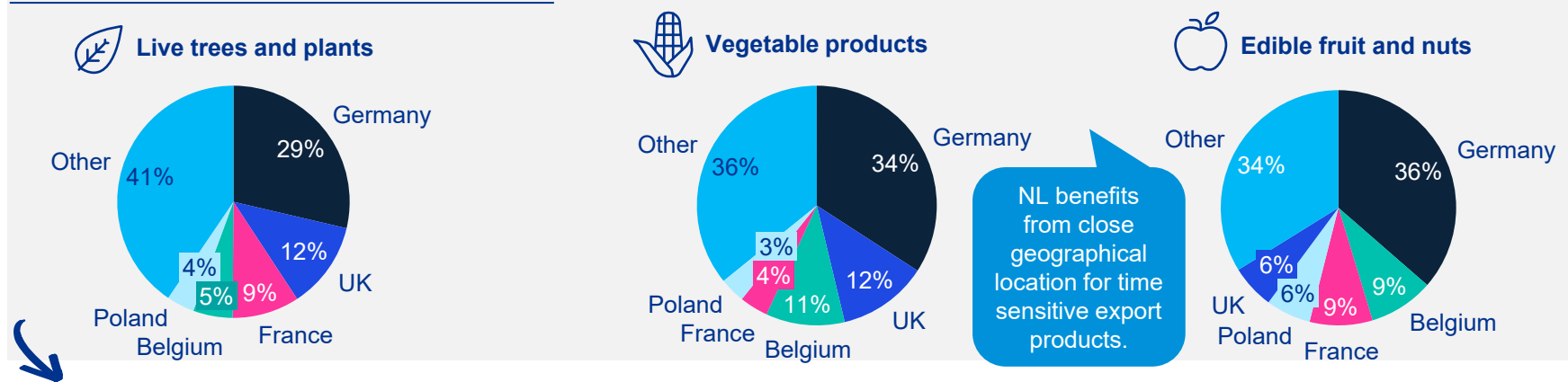
Sources: (1) cbs.nl; (2) trademap.org.

Notes: Total agricultural exports includes both agriculture and horticulture products; horticulture products refers to vegetables, fruits and nuts & live trees or plants; re-exports are products imported to NL and subsequently exported with or without further processing; HS refers to Harmonized System codes which is standardised numerical method of classifying traded products; the growth in total net agricultural export value was driven primarily by rising export values.

Export value by country

The Dutch are global export leaders across all three horticulture sub-sectors; trade is mainly with neighbouring markets, dominated by trade with Germany.

Top 5 importing countries by sub-sector
% of total NL exports by export value, 2020⁽¹⁾



Top 5 importing countries
Value of imports from NL horticulture, €bn, 2020⁽¹⁾



Key takeaways

- Dutch horticulture products were exported to up to **180 countries** in 2020
- Germany is the largest importer of Dutch horticulture products, with a value of ~ **€8bn** in 2020, representing ~**33%** of total NL horticulture exports
- The majority of Dutch trade is with neighbouring markets (within **1300 km**)
- While the Netherlands have a dominant larger neighbour for export potential (similar to UK for Ireland), they have meaningfully diversified beyond that market

NL is in the top 5 exporters for all three horticulture sub-sectors; trade is mainly with neighbouring European countries.

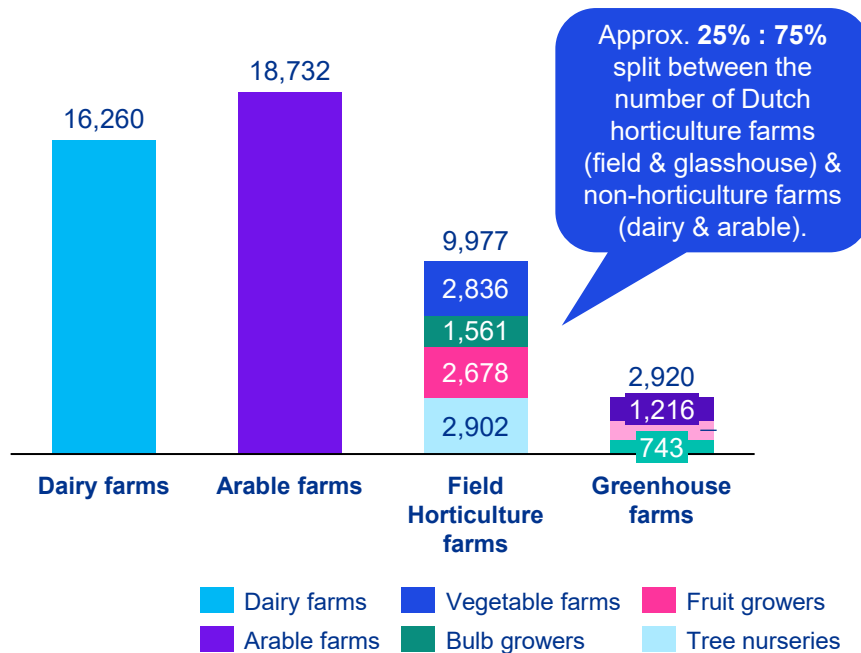
Sources: (1) trademap.org.

Notes: Total horticulture imports refers to the sum of imports for live trees and plants, vegetable products and edible fruit and nuts.

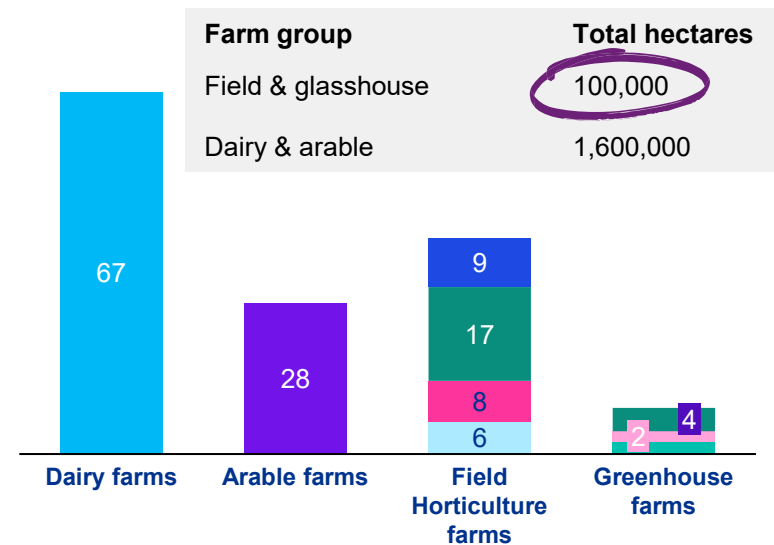
Overview of Dutch farm sizes

Horticulture farms account for a quarter of the total number of Dutch farms, but occupy only a fraction (~6%) of the total agricultural land.

Number of farms per farm type, 2019 ^(1,2)



Average farm size per farm type, hectares, 2019 ^(1,2)



Insight

- The horticulture export value (€24bn in 2020) is achieved using only 6% of the total agricultural land in NL, which highlights the efficiencies of the Dutch horticulture sector. This is a result of a number of factors, including significant capital expenditure involved

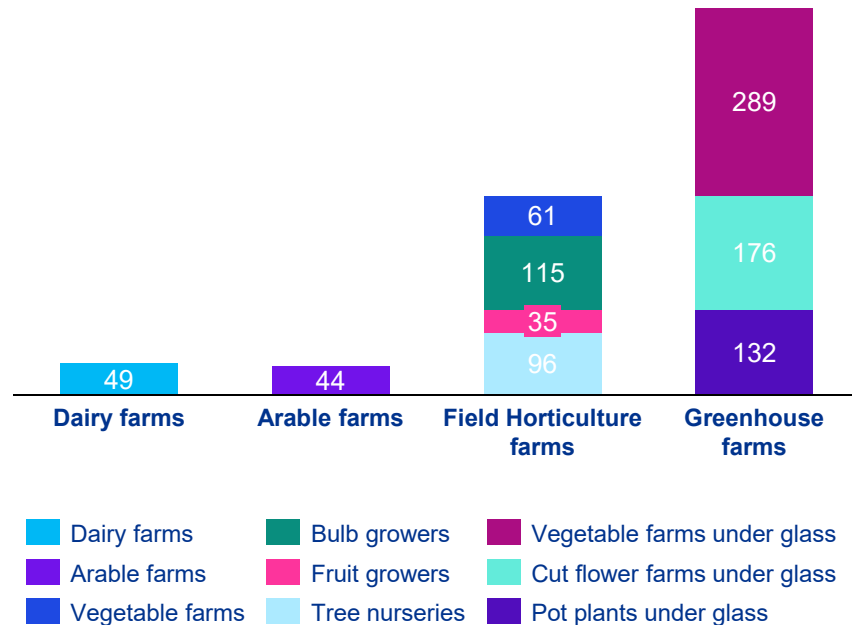
Sources: (1) Wageningen university & research – agro & food portal; (2) Dutch dairy in figures 2020 report.
Notes: Average size of dairy farms in NL is calculated using the surface area per km² and the total number of dairy farms.

Overview of Dutch horticulture farm income

The Dutch horticulture sector is significantly more profitable than dairy or arable farming; cut flowers lead the way and are ~133 times more profitable than dairy.

Average farm income

Avg. income per unpaid annual work unit, in €1000s, 2019⁽¹⁾



Estimated farm profitability per hectare

In €1000s, 2019⁽¹⁾

| Farm type | Profitability per ha, €1000s, 2019 |
|--------------------------|------------------------------------|
| Dairy | 0.7 |
| Arable | 1.6 |
| Vegetable (field) | 6.8 |
| Bulb (field) | 6.6 |
| Fruit (field) | 4.6 |
| Tree nurseries (field) | 16.0 |
| Vegetable (glasshouse) | 66.4 |
| Cut flowers (glasshouse) | 93.5 |
| Pot plants (glasshouse) | 56.0 |

Insight

- Per hectare, horticulture sub-sectors (both field and glasshouse) are more profitable compared to dairy and arable farming
- On average, green house cut flower producers earn approx. €176,000 after expenses, which is ~133 times more profitable per hectare than dairy – this is partly attributable to the efficiency of Dutch glasshouses

Sources: (1) Wageningen university & research – agro & food portal
Notes: ha – hectares

Sustainability within Dutch horticulture

By embracing sustainable farming practices, the Netherlands has become the 2nd largest exporter of food globally, despite its small landmass.



“Twice as much food using half as many resources”

- NL is the one of the largest global food exporters, second only to the USA, which has a landmass 270 times its size
- In the early 2000s, Dutch farmers made a commitment to move to sustainable agriculture practices and produce twice as much food using less resources
- Since then, many farms have reduced dependency on water for key crops by ~90% and eliminated the use of pesticides in glasshouses
- The Dutch successfully grow and export a variety of horticulture products sustainably including bananas*, onions and **tomatoes**



Three key steps to Dutch sustainability success

1. Build a research ecosystem

- Wageningen University & Research, located in Foodvalley functions as an incubator for innovative horticulture techniques and technologies

2. Embrace a sustainability mindset

- Dutch farmers have adopted the mentality of “do more, with less” e.g. hydroponics are utilised to significantly increase yield while reducing water usage

3. Adopt state-of-the-art technology

- Dutch farmers further maximise yields using precision farming e.g. use of drones and driverless tractors which allow monitoring of individual plants

Potato farms in NL can yield 20 tonnes/acre, while the global average is 9 tonnes/acre.



Sustainable Dutch tomatoes

- Tomatoes are the second most grown vegetable in NL, with approx. **900,000 tonnes** produced **annually**
- The export value of Dutch tomatoes was ~ **€1.7bn** in 2019
- Duijvestijn Tomatoes is a sustainable tomato producer in NL: it can produce **100 million tomatoes** per year using only **14 hectares**



Sustainable approaches utilised

- 1 Geothermal energy is used to heat glasshouses
- 2 CO₂ from a nearby oil refinery is re-used in glasshouses
- 3 Bespoke glasshouses are designed to maximise sunlight capture
- 4 A hydroponics system is utilised to minimise water & tomatoes are grown in small bags of rockwool substrate, providing nutrients and moisture
- 5 Bio-based packaging is utilised

Using sustainable practices, the Dutch tomato yield is the highest in the world, at **~50 kg/m²**, higher than the US (**~9 kg/m²**), Spain (**~8.6 kg/m²**) and Morocco (**~8 kg/m²**).

Sources: Statista; Duijvestijn Tomatoes; National geographic, Endure Network, cbi.eu.

Notes: *Netherlands is trialling new cultivation methods for growing bananas in greenhouses. It also re-exports bananas from specially designed port facilities.

Sources: International case study

Sources used for this case study are listed below.



- Breukers, A., Hietbrink, O., Ruijs, M.N.A. (2008). The power of Dutch greenhouse vegetable horticulture: an analysis of the private sector and its institutional framework
- CBS – Statistics Netherlands
- Dutch Greenport International
- Dutch Horticulture. Facts and Figures
- Endure Network (2021). Going bananas in the Netherlands
- Karnataka, Kerala and Tamil Nadu (2019). Opportunities for Dutch Companies Across Horticultural Value Chains
- Koen van Gelder (2021). Number of greenhouse horticulture farms in the Netherlands 2007-2020
- National Geographic (2017). This Tiny Country Feeds the World
- Nature Rising (2022). The Dutch Horticulture Industry
- OECD (2015). Innovation, Agricultural Productivity and Sustainability in the Netherlands
- Slater B. (2020). Dutch horticulture industry leads the world
- Viviano F. (2017). This Tiny Country Feeds the World: The Netherlands has become an agricultural giant by showing what the future of farming could look like
- Wageningen University & Research. Circular agri--food system
- Wageningen University & Research (2021). Food Economic Report 2020 of the Netherlands
- ZuivelNL (2021). Dutch Dairy in Figures 2020

Case study summary (New Zealand – NZ)

Investment in new varieties, growing techniques, and harvest and post-harvest practices helped to grow New Zealand’s horticulture sector.

Market Overview



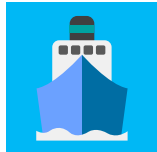
- In 2020, the New Zealand horticulture sector reached a new high, with total produce estimated to exceed **NZ\$10bn (€6bn)** for the first time. Horticulture exports increased by **7%**, earning more than **NZ\$6.4bn (€3.9bn)**, more than **11%** of New Zealand’s merchandise exports. Top product categories exported were kiwifruit, apples, onions, potatoes and avocados. With the exception of wine and some frozen produce to complement seasonal production, New Zealand does not import the same goods it exports
- With the notable addition of Zespri’s new red cultivar, which made its debut in Singapore and Japan, the kiwifruit business by itself generated record sales at over **NZ\$2.5bn (~€1.5bn)**
- New Zealand produce reached 128 countries in 2020, and its top five markets were Continental Europe, Japan, US, Australia and China
- One of the vital components of New Zealand’s share of the global marketplace is their reputation for **high quality and safe food**, combined with **excellent growing systems and novel products**
- While there is a strong focus on exports, the domestic market has a number of challenges similar to those experienced by Irish growers, for example, the relative lack of branding. Tourists who have bought into the clean and green image and have travelled to New Zealand, often struggle to source a New Zealand food experience and this is now an area of focus to develop – for both domestic consumers and the (domestic and international) tourist trail
- New Zealand growers are **early adopters of science and technology** to match changes in consumer demands. There has been considerable investment in all aspects of production and some of their packhouses are driving efficiencies and improving quality with cutting edge technology and innovative working practices
- The importance of **emerging technologies**, such as data analytics tools, is clearly understood: for example, New Zealand agri-tech companies are working on monitoring and predicting weather events, so growers can have more certainty around how and when to harvest their produce

Sources: Horticulture New Zealand, Fresh Facts – New Zealand Horticulture

New Zealand horticulture exports

New Zealand exports more than 80% of all the fruit it produces, however, only 36% of all vegetables produced are exported.

New Zealand's horticulture sector is mainly driven by exports and sustainability is becoming a bigger challenge. Food miles and the sector's higher carbon footprint is driving considerations to outsource production capacity through investing in agriculture in countries closer to key markets, for example, Spain.



- New Zealand's horticulture produce was exported to a total of 128 countries in 2020
- 65% of kiwifruit (the largest export) went to countries in Asia
- Exports to five markets – Continental Europe, Australia, the USA, China and Japan – accounted for 68% of the total exports

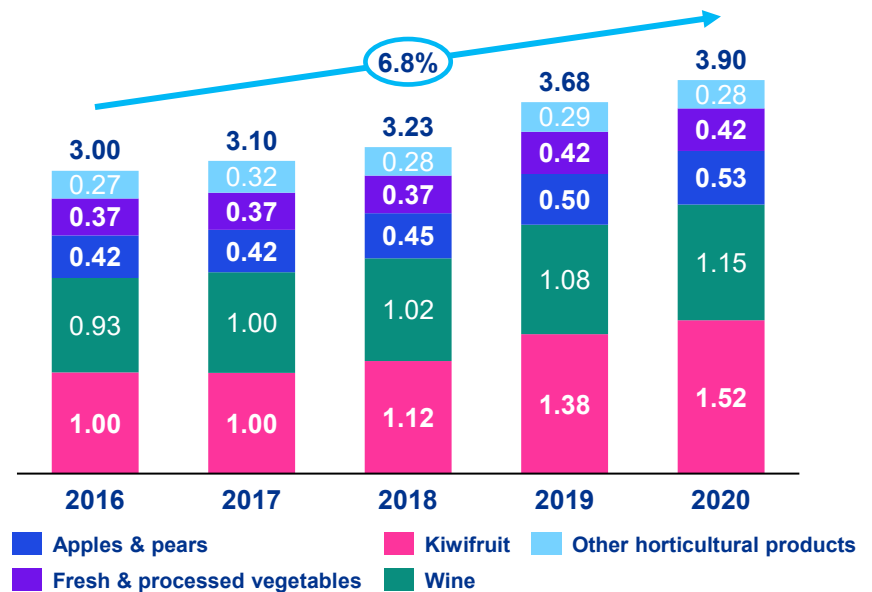


New Zealand's inherent food miles dilemma highlights the strategic advantage for Irish produce to supply the domestic (and UK) market.

Insight

- 72% of New Zealand's fruit sector is made up of kiwifruit and apples, without these fruits, the fruit sector is comparable to the much-smaller vegetable sector
- Investment in new varieties, growing techniques, and harvest and post-harvest practices have helped to support the sector's growth

New Zealand export value by horticulture sub-sectors
Sub-sector export value, in €bn, CAGR 2016-20



Sources: Trade Map, Horticulture New Zealand, figure.nz

New Zealand horticulture: labour and co-operatives

New Zealand promotes a range of initiatives to attract workers to careers in horticulture. Co-operatives are active across the country.



New Zealand labour market initiatives

Labour needs in the horticulture industry fluctuate seasonally, with specialised labour required in regions across the country. Covid-19 border restrictions prevented the usual influx of backpackers and a shortage in specialised skills could threaten the longevity of the industry. Some initiatives to counter these challenges are:

- **Recognised Seasonal Employment** program supported 14,400 workers in 2020 for employment from neighbouring Pacific countries
- Since 2007, the **Young Grower Award** provides contestants with professional development and networking opportunities, alongside competitions to test their skills, with the winners awarded monetary prizes
- Individual firms encourage a wide range of workers to embrace a career in horticulture through:
 - **Flexible hours** for parents and students
 - Encouragement for **disadvantaged groups** to apply, such as people with convictions or disabilities
 - Provision of **transport and accommodation**
 - **Training** in associated skills, such as driving license and to boost skills shortages, such as winter pruning
- Government classified horticulture as **essential workers** during Covid-19, boosting workers morale and allowing key tasks to be completed

Sources: nz.coop, hort.nz, Zespri.com, Evans and Meade (2006), RSE Survey 2020, LinkedIn.



Co-operatives in NZ Horticulture

- New Zealand's top 30 co-operatives' total gross revenue represents approximately 20% of the country's GDP. Co-operatives operate in multiple sectors but primarily in the agriculture and food sectors
- Co-operative dominance varies by market, driven by the product's characteristics. Kiwifruit homogeneity and shared export marketing initiatives enhance the likelihood of a successful co-operative. Previous research estimated kiwi co-operatives had a market share of 30%, compared to 8% for the more heterogeneous apples



Zespri is New Zealand's second largest co-operative (based on revenue) in the agri-food industry, behind Fronterra (dairy). Whilst not legally defined as a co-operative it operates under the same principles. It is the largest marketer of kiwifruit, working with growers and post-harvest operators to distribute supply. The organisation includes 2,700 growers in NZ, employs 550 people worldwide and is led by 8 board members.

"The 2019/20 season showed that with any challenge, the number one priority is to support your people." - Zespri

Export volume by country

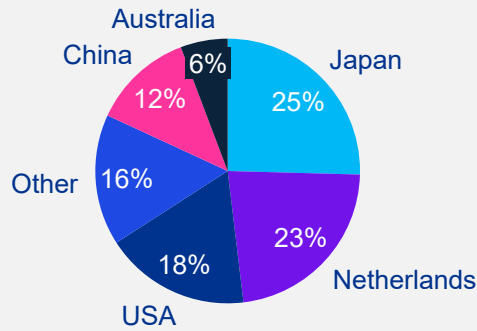
New Zealand predominantly exports to USA, Australia, Ecuador and Asia.

Top 5 importing countries 2020

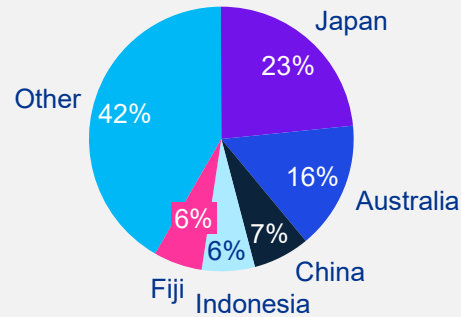
% value of total NZ exports for sub-sector⁽¹⁾



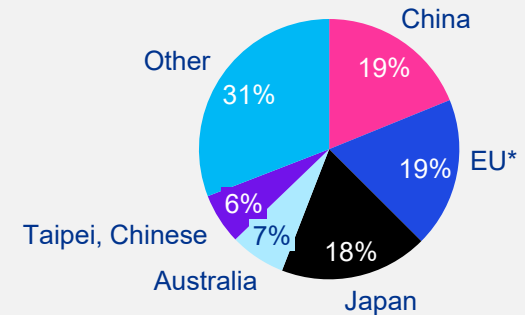
Live trees and plants



Vegetable products

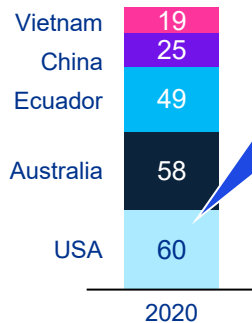


Edible fruit and nuts



Top 5 importing countries, 2020

Value of NZ total horticulture imports, €m⁽¹⁾



USA is the largest horticulture trading partner for NZ.



Key takeaways

- New Zealand horticulture was exported to 128 countries in total in 2020
- Exports to five markets – Continental Europe, Australia, the USA, China and Japan – accounted for NZ\$4.5bn (€2.7bn) and 68% of the total exports
- High-level of export partners diversification: New Zealand has established connections with different countries on most continents, creating strong market presence

NZ is in the top five global exporters for all three horticulture sub-sectors.

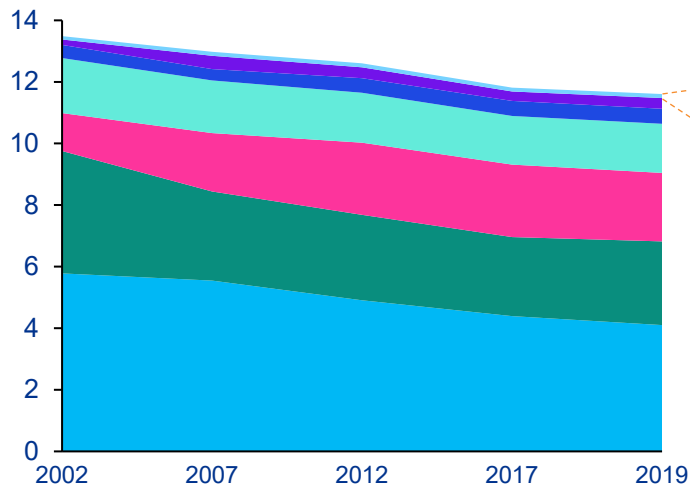
Sources: (1) Trade Map.

Notes: Total horticulture imports refers to the sum of imports for live trees and plants, vegetable products and edible fruit and nuts. *EU (not specified elsewhere).

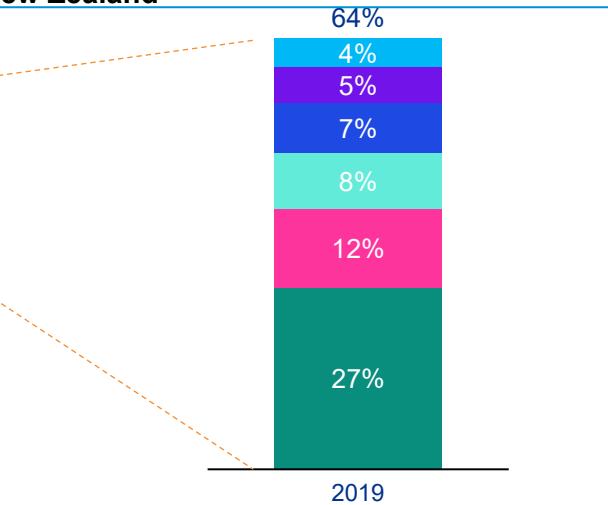
Overview of New Zealand farm sizes

Horticulture represents the smallest land use of any sector in New Zealand.

New Zealand sectoral land usage (2002-2019)⁽¹⁾



Top 6 horticultural land usage sectors in New Zealand⁽¹⁾



Insight

- Horticulture farms account for 11% of the total number of farms in New Zealand; wineries, kiwifruit and potatoes farms are the most common type of horticulture farm
- The horticulture export value (>€6bn in 2020) is achieved using only 11% of the total agricultural land, which highlights the efficiencies of the horticulture sector

Sources: (1) Stats NZ; Fresh Facts

Sources: International case studies

Sources used for the case studies are listed below.



- Beehive (2020). Government backing horticulture to succeed
- Co-operative Business NZ & PWC (2021). The New Zealand Co-operative Economy 2021
- Cradock-Henry A. N., Flood S., Buelow F., Blackett P., Wreford A. (2019). daptation knowledge for New Zealand’s primary industries: Known, not known and needed
- Deloitte (2018). New Zealand’s food story: The Pukekohe hub. Prepared for Horticulture New Zealand
- Evans & Meade (2006). The Role and Significance of Co-operatives in New Zealand Agriculture: A Comparative Institutional Analysis
- Fresh Facts – New Zealand Horticulture
- Horticulture New Zealand (2022). A Lighter Touch
- Horticulture New Zealand (2021). Growing Together. Annual Report: 2020/21
- Horticulture New Zealand (2020). Horticulture Post-COVID Recovery Strategy
- Horticulture New Zealand (2021). The Orchardist, Volume 94
- New Zealand Institute for Plant and Food Research
- NZKGI (2020). Recognised Seasonal Worker Survey
- PlantTech research – November 2020
- RoboticsPlus (2018). Press-release: Robotics Plus signs global deal for robotic apple packers
- Statista (2021). Global Customer Survey May 2021
- Zespri International, Company profile

Appendices:

Appendix B –

**Supporting analysis:
Organic sector**

Sub-sector overview: Organic sector

Key statistics



~360 organic growers



~568 ha of land allocated to horticultural organic farming



~70% of organic fruit and vegetable are imported

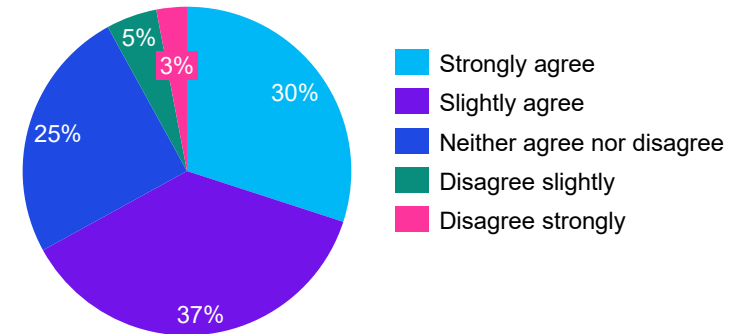


~€189m organic retail sales in 2020

Overview

- The **Irish organic food sector is still relatively small**, with only ~360 growers
- Bord Bia has estimated that approximately **70%** of organic fruits and vegetables consumed in the State are imported
- A survey carried out by Bord Bia in 2020, confirmed that **over 50% of respondents would prefer to buy locally produced Irish food over organic food**, with only 8% disagreeing with this statement completely. This shows a clear demand for local fresh produce, and the added potential for domestic organic produce
- While the importation of some horticulture products is necessary, the high percentages attributable to certain organic vegetables, which are bought regularly, indicate that **import substitution is possible** e.g. carrots, tomatoes, potatoes, onions, broccoli, mushrooms
- **Scale and consistency of supply remain the main limiting factors** to expand the availability of Irish grown organic vegetables
- For horticulture producers, there are four main routes to market, namely **box schemes, farmers markets, on farm shops** and **the retail sector**

Breakdown of responses to a survey statement: “I would choose locally produced Irish food over organic food”



Source: Bord Bia survey

“Get the larger scale, growers to operate as one by **forming a producer group.**”

MOPS study recommendation*

“Irish organic growers should be encouraged to **explore developing value-added products** e.g. farm to fork soups and ready meals and **see food ingredients as a 3rd route to market** for their products alongside retail and foodservice.”

MOPS study recommendation*

Sources: Bord Bia, DAFM, Kantar.

Notes: DAFM, EC, (2021). Maximising Organic Production Systems European Innovation Partnership (MOPS EIP) Project 2018-2021. Final report.

SWOT analysis: Organic sector

Utilise Ireland’s clean green image to market organic products.

Strengths

S

- Horticulture products are the most prominent food choice for the organic consumer
- Economically viable full-time farm income achievable on a small holding
- Organic Growers of Ireland apprenticeship scheme works well
- Polytunnels in Ireland enable production of an extensive range of crops across seasons
- Quality and taste of local Irish produced organic produce is considered very high
- Support through the Organic Farming Scheme

Weaknesses

W

- Lack of clear commercial market for new entrants
- Unclear routes to market and lack of market intelligence for primary producers
- High skill level and interest required
- Broad location of small operator supply base versus other countries, resulting in higher costs to get produce to wholesale or non-local retail/consumer markets
- Maintaining continuity of supply throughout the year to meet retail demand
- Higher costs and more labour intensive
- Low levels of income in the formative years of the business

Opportunities

O

- Growing demand for organic products
- Increasing awareness of environmental and health issues at consumer level
- Import substitution
- Health benefits and lifestyle trends
- Opportunity for local employment in rural areas
- Opportunity to earn viable income off a relatively small land area
- Opportunity for co-operation and specialisation amongst growers

Threats

T

- Blurring of identity of organic products versus other brands, for example, ethical and environmentally friendly
- Increasing standards in conventional farming: “closing the gap” with organic
- Risk of crop failure
- Lack of clear market routes and education
- Lack of land availability
- Lack of critical expertise from the industry in terms of advisors

Sources: DAFM.

Appendices:

**Appendix C –
Sources**

Sources: Sector figures (1/5)

Sources used in this report are listed below.

Sources for key figures

| Figure description | Figure value | Source |
|---|----------------------------|--|
| Agricultural output (at basic prices) | ~€10bn | CSO statistical release (2021), Output, Input and Income in Agriculture |
| Horticulture sector value (2020) | €467m | DAFM estimates (2021 RfT) |
| Farm gate value by sub-sector (2020) | N/A (multiple figures) | DAFM estimates (2021 RfT) |
| Fresh produce retail market value (2021) | €1.7bn | Bord Bia (Kantar) data |
| Retail value of fruit in the Irish market (2021) | €835m | Bord Bia (Kantar) data |
| Retail value of vegetables in the Irish market (2021) | €630m | Bord Bia (Kantar) data |
| Retail value of potatoes in the Irish market (2020) | €246m | Bord Bia (Kantar) data |
| Fresh Produce Food Service Market (2019) | €444m* | Bord Bia |
| Retail amenity (gardening) market (2021) | ~€1.5bn | Bord Bia |
| Horticulture trade deficit | N/A (multiple figures) | Eurostat data. Percentages are based on the total value (in euros) of all fruit and veg (HS codes 07 and 08) handled within each country |
| % of Irish fresh produce sold by branded retail chains | >90% | Callaghan, D. (2021). Horticulture: Sector characterisation and potential market opportunities. Teagasc |
| Number of people employed in primary production (horticulture sector) | >7,000 (11,000 downstream) | |
| % of agriculture area devoted to horticulture | <2%** | |

Notes: *At wholesale prices, **the figure is closer to 2% when including potato production.

Sources: Sector figures (2/5)

Sources used in this report are listed below.

Sources for key figures

| Figure description | Figure value | Source |
|--|--------------------------------|---|
| Breakdown of inputs costs | N/A (multiple figures) | Teagasc, (2022). Horticulture Input Costs 2022 – Impact Assessment. Teagasc Horticulture Development Department |
| Average cost increases by sub-sector | N/A (multiple figures) | |
| Input cost inflation by sub-sector | N/A (multiple figures) | |
| Labour as component of production costs | ~40% | |
| Mushroom sub-sector share of horticulture jobs | 35% | Teagasc, (2021). Horticulture Input Costs 2021 – Impact Assessment. Teagasc Horticulture Development Department |
| Number of growers | 1,000 and reference to top 250 | |
| Agri-food sector employment (2020) | 163,600 | DAFM, (2021). Annual review and outlook for agriculture, food and the marine 2021. |
| Vacancy rate in the horticulture sector | 14% | Teagasc, (2019). Labour in Horticulture – Planning for Labour |
| Number of mushroom growers and farms | 34 and 40 respectively | Teagasc, (2020). Mushroom production factsheet |
| Number of mushroom growers (2016-2020) | N/A (multiple figures) | Teagasc mushroom sector overview (Teagasc website) |
| Mushrooms: direct employment | 3,221 people | Teagasc, (2021). Irish Mushroom Industry Labour Survey |
| Mushrooms: % of produce exported to the UK | 85% | Teagasc, (2021). Irish Mushroom Industry Labour Survey |
| Share of labour and compost casing in input cost | N/A (multiple figures) | Teagasc, (2021). Horticulture Input Costs 2021 – Impact Assessment. Teagasc Horticulture Development Department |

Sources: Sector figures (3/5)

Sources used in this report are listed below.

Sources for key figures

| Figure description | Figure value | Source |
|---|------------------------|---|
| Mushrooms: farm gate value | €124m | DAFM estimates (2021 RfT) |
| Mushrooms: exports (2021) | €151m | Bord Bia, (2022). Export performance and prospects report, 2021 – 2022 |
| Pre-packed (closed cup) mushrooms' share of total mushrooms | 50% | |
| Mushrooms: capital investment required (average) | €200k | Teagasc, (2020). Mushroom production factsheet |
| Additional transportation costs post-Brexit | ~€300 extra per load | Consultations with stakeholders |
| Amenity: number of nurseries in Ireland | 180 | Teagasc, (2020). Production of Nursery Stock and Ornamental Plants, |
| Amenity: total direct employment | ~1000 | Callaghan, D. (2021). Horticulture: Sector characterisation and potential market opportunities. Teagasc |
| Amenity: export value and breakdown | N/A (multiple figures) | Bord Bia, (2022). Export performance and prospects report, 2021 – 2022 |
| Amenity: farm gate value | €96m | DAFM estimates (2021 RfT) |
| Amenity: input costs | N/A (multiple figures) | Teagasc, (2021). Horticulture Input Costs 2021 – Impact Assessment. Teagasc Horticulture Development Department |
| Apples: number of commercial growers in Ireland | 50 | Bord Bia, (2017). National Apple Orchard Census |
| Apples: % of eating (dessert) apples market supplied by Ireland | 5% | Bord Bia, (2021). Apple Category Development |
| Apples: farm gate value | €8m | DAFM estimates (2021 RfT) |

Sources: Sector figures (4/5)

Sources used in this report are listed below.

Sources for key figures

| Figure description | Figure value | Source |
|--|------------------------|---|
| Apples: domestic market value | €131m | Teagasc, (2020). Commercial Apple Production (Fact Sheet) |
| Apples: Source of imports (2019) | N/A (multiple figures) | Observatory of Economic Complexity (OEC) data |
| Potatoes: number of growers in Ireland | 700 | Bourke, L. (2021). The Potato Sector: Mechanised, Professional and Taking on New Market Opportunities. Bord Bia |
| Potatoes: direct employment | 1,344 | Horticulture: Sector characterisation and potential market opportunities, Teagasc (2021) |
| Potatoes: % of market imported | 19% | |
| Potatoes: farm gate value | €82m | DAFM estimates (2021 RfT) |
| Potato production in Ireland, 2016-2020 | N/A (multiple figures) | CSO data |
| Potatoes: import figures (2019) | N/A (multiple figures) | Trade Map (ITC) data |
| Field vegetables: number of growers in Ireland | 200 | Teagasc, (2020). Field Vegetable Production (Fact sheet) |
| Field vegetables: direct employment | 856 | Callaghan, D. (2021). Horticulture: Sector characterisation and potential market opportunities. Teagasc |
| Field vegetables: Farm gate value | €80m | DAFM estimates (2021 RfT) |
| Field vegetables: input costs | N/A (multiple figures) | Teagasc, (2021). Horticulture Input Costs 2021 – Impact Assessment. Teagasc Horticulture Development Department |

Sources: Sector figures (5/5)

Sources used in this report are listed below.

| Sources for key figures | | |
|---|------------------------|---|
| Figure description | Figure value | Source |
| Soft fruit: number of growers in Ireland | 57 | IFA president Tim Cullinan quoted in the media |
| Soft fruit: direct employment | 967 | Callaghan, D. (2021). Horticulture: Sector characterisation and potential market opportunities. Teagasc |
| Soft fruit: strawberries annual output (tonnes) | 8,000 | Teagasc, (2020). Fresh Strawberry Production (Fact Sheet) |
| Soft fruit: breakdown of input costs | N/A (multiple figures) | Teagasc, (2021). Horticulture Input Costs 2021 – Impact Assessment. Teagasc Horticulture Development Department |
| Organic sector: number of growers | 360 | DAFM data |
| Organic sector: land | 568ha | DAFM data |
| Organic sector: % of produce imported | 70% | DAFM, (2019). Review of organic food sector and strategy for its development |
| Organic sector: retail sales | €189m | DAFM data |

Sources: General

Sources used in this report are listed below.

- Bord Bia, (2017). National Apple Orchard Census 2017
- Bord Bia (2020). Attitudes towards Organic Food
- Bord Bia, (2020). Fresh Produce Report, July 2020
- Bord Bia, (2020). Assessing the Growth Opportunities for Irish Horticulture
- Bord Bia (2021). The Evolving Organic Market – Ireland and overseas
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