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AgriTech Workshops
December 2025
The National Robotarium | HIE | SRUC

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This report documents the series of workshops and related work commissioned and funded by Highlands and Islands Enterprise (HIE).



Robotics & Automation Workshops

Consolidated Findings, Priorities, Focus Areas, and Solution Requirements

1. Executive Summary

This report summarises insights gathered from three Agri-Tech workshops delivered with crop & arable farmers, livestock farmers, and potato growers. It is being shared with all workshop attendees to close the feedback loop and reflect what was heard during the sessions.

The workshops were designed to understand farmers' self-identified operational priorities, rather than to promote specific technologies or solutions. Participants were asked to discuss challenges within their own businesses and to prioritise them based on what matters most to them.

Challenges were rated using a Red-Amber-Green (RAG) framework, reflecting each farmer's view of priority based on factors such as labour, cost, safety, compliance, productivity, and wellbeing.

- RED and AMBER ratings were used to identify focus areas where robotics, automation, AI, or improved data use could realistically offer support.
- GREEN ratings highlight areas that farmers did not consider a near-term priority, helping to avoid solution-led or technology-push approaches.

The main outcome of the workshops was that farmers did not reject automation. Instead, they consistently highlighted that while relevant technologies exist, many lack the time, access to capital, or confidence to determine which solutions are appropriate and viable for their farms.

This report does not provide solutions or recommend specific technologies. It provides a shared reference point capturing farmer priorities, agreed focus areas, and the conditions any future robotic, automated, or data-driven solution would need to meet to be considered relevant and valuable.

2. Methodology and RAG Framework

Three in-person workshops were held with: - Crop & arable farmers (Day 1) - Livestock farmers (Day 2) - Potato growers (Day 3)

Farmers identified challenges across their operations and rated each using a Red-Amber-Green framework.

The ratings represent each farmer's own prioritisation, not a collective assessment:

- RED – High priority: Issues considered most critical, with significant impact on day-to-day operations, cost, safety, compliance, or business viability.
- AMBER – Medium priority: Important challenges or inefficiencies that affect performance but are not currently business-critical.
- GREEN – Lower priority: Areas considered less pressing or currently manageable, where intervention is not a near-term priority.

Focus areas were selected by examining common RED and AMBER priorities across participants and identifying task-level opportunities where technology could realistically support farmers.

3. Day 1: Crop & Arable Farmers

3.1 Priority Areas Identified by Farmers

RED – High Priority

- Labour availability and reliance on skilled seasonal labour for rouging, grading, and monitoring
- Manual crop inspection and disease detection leading to late intervention and yield loss
- Paperwork, audits, and compliance reporting consuming disproportionate management time
- Rising input and energy costs combined with low margins

AMBER – Medium Priority

- Data collection exists (e.g. yield maps, spray records) but is fragmented and underused
- Labour and time-intensive soil sampling and crop monitoring

GREEN – Lower Priority

- Basic digital record-keeping tools already in place - Growing familiarity with existing precision agriculture systems

3.2 Focus Areas Taken Forward

Based on RED and AMBER priorities, the following task-level focus areas were selected:

- Vision-based crop monitoring and disease detection
- Silo and dryer emptying and cleaning
- Automated or semi-automated soil sampling
- Data workflows linking field data to compliance, audits, and decision-making

GREEN areas were not taken forward, as farmers did not view them as requiring immediate intervention.

3.3 What a Robotic or Automated Solution Must Have

To address these focus areas, farmers stated that any solution must:

- Target a **specific task**, not attempt whole-farm automation
- Operate reliably in **variable weather, lighting, and field conditions**
- Integrate with **existing machinery, datasets, and farm software**
- Reduce time spent on **manual inspection and paperwork**
- Be **affordable, scalable, and clearly cost-justified**
- Require **minimal specialist technical skills** to operate or maintain

4. Day 2: Livestock farmers

4.1 Priority Areas Identified by Farmers

RED – High Priority

- Labour retention, skills shortages, and reliance on hard-to-recruit staff
- Time pressure and poor work–life balance
- Cleaning, hygiene, and health & safety risks in sheds
- Equipment downtime, maintenance costs, and cleaning of machines

AMBER – Medium Priority

- Animal health monitoring – actions and records
- Animal health data spread across disconnected systems
- Continued reliance on manual observation and timely intervention
- Variable confidence in data-driven insights

GREEN – Lower Priority

- Established use of milking and feeding automation
- Basic sensor adoption where systems are already embedded

4.2 Focus Areas Taken Forward

- Animal health monitoring and early detection – stockman’s eye
- Robotic and automated cleaning systems
- Integration of livestock data into simple decision-support tools

GREEN areas were noted as relatively mature and were not prioritised for further exploration.

4.3 What a Robotic or Automated Solution Must Have

For livestock farmers, viable solutions must:

- Deliver **clear and immediate labour or time savings**
- Improve **health & safety**, particularly around cleaning tasks
- Be **robust and easy to maintain** in harsh farm environments
- Produce **simple, trusted outputs**, not complex analytics
- Allow **human oversight and control**, particularly for animal welfare

5. Day 3: Potato Growers

5.1 Priority Areas Identified by Farmers

RED – High Priority

- Labour and time-intensive roguing and grading with high dependency on skilled workers
- Quality control failures leading to rejection and financial loss
- Manual picking tables causing fatigue and inconsistent throughput
- Increasing audit and traceability burden
- Time spent and repetitive nature of Soil sampling
- In field aphid monitoring and the decision-making delay to implement corrective action

AMBER – Medium Priority

- Existing automation is often costly, bulky, or inflexible and data integration is a challenge
- Vision systems are available but not always trusted or easy to maintain
- Data is collected but rarely fed back into decisions

GREEN – Lower Priority

- Mechanisation of basic harvesting processes
- Familiarity with existing grading infrastructure

Analysis of the potato growers workshop discussions revealed three key thematic areas of challenge for potato growers. The first centres on **labour-intensive operations**, encompassing both routine and ad hoc activities such as rogueing, soil sampling, aphid monitoring, sorting table management, and store cleaning.

The second theme relates to **operational optimisation**, particularly the final incremental improvements that can enhance productivity. This challenge is predominantly data-focused, involving the capacity to capture, network, and share quality information that enables reliable, informed decision-making across machinery and teams.

The third area concerns **risk management**, including yield quality and value protection, workplace safety considerations including cold and dusty storage environments, lone working protocols, chemical handling procedures, machinery operation and maintenance, and weather-related vulnerabilities.

5.2 Focus Areas Taken Forward

- Picking and grading tables - Vision-based potato sorting, sizing, grading, and quality control system
- Semi-automated rouging and in-field inspection
- Data capture linked directly to audits and traceability

GREEN areas were acknowledged as established and therefore not prioritised.

5.3 What a Robotic or Automated Solution Must Have

Potato growers identified that solutions must:

- Handle **variety differences and inconsistent crop conditions**
- **Identify and grade** different potatoes

- Improve **consistency and throughput** without increasing fatigue
- Be **modular and incrementally deployable**
- Fit within **existing sheds and processing lines**
- Link data directly to **buyer, audit, and compliance requirements**

6. Cross-Cutting Themes Across All Workshops

Across all three sectors, common themes emerged:

- **Labour:** Persistent shortages and skills challenges
- **Data:** Abundant data but limited integration and usability
- **Cost realism:** Clear return on investment is essential
- **Interoperability:** Solutions must work with existing systems
- **Scottish context:** Weather, scale, and infrastructure matter

GREEN-rated areas across sectors help define where intervention is not currently required, supporting more focused and realistic innovation.

7. Information on Advice, Support, and Funding

During the workshops, farmers raised questions about where to start when exploring digital, automation, or robotic solutions, and how to access independent advice before making investment decisions.

As highlighted in the follow-up email shared by SRUC, Highlands and Islands Enterprise (HIE) offers support routes that may be relevant for some businesses. These are included here for information only, reflecting what was discussed during the sessions.

Farmers may wish to begin with an initial conversation with Andrea to discuss their circumstances and explore whether any support is appropriate.

The grant schemes referenced during the workshops were:

- **HIE Digital Specialist Advice Grant** – to support access to specialist advice to help decide what is worth buying and assess feasibility
- **HIE Digital and Technology Adoption Capital Grant** – to support the purchase of suitable digital, automation, or technology solutions once a clear case has been established

Engaging with these routes is entirely optional and will depend on individual business needs, priorities, and eligibility.

8. Role of The National Robotarium

The National Robotarium can support the sector by:

- Conducting task-level feasibility studies and engineering led requirement reviews
- Rapid proof of concept (POC) projects – designing, building, and testing innovative robotics
- Independently evaluating commercial solutions
- Supporting data integration and human-centered design
- Acting as a neutral bridge between farmers, funders, and technology providers

9. Conclusion of Report

These workshops provided valuable insight into the challenges Scottish farmers face today and how they prioritise them within their own businesses.

By linking farmer-defined RED and AMBER priorities to a small number of practical focus areas and by acknowledging GREEN areas where intervention is not currently required. This report aims to accurately reflect what was heard during the sessions.

The intent of sharing this report with attendees is to validate those discussions, provide clarity on how focus areas were selected, and offer a common reference point for future conversations. Any next steps, adoption decisions, or engagement with technology will remain firmly led by individual farmers, based on what is right for their own operations.

10. Future Strategic Potential

Technology adoption in Scottish agriculture is currently constrained by time, knowledge, and capital risk. For farmers, investing in robotics and automation remains at a high risk unless there is clear evidence that a solution will work in their specific operating environment, integrate with existing practices, and deliver tangible value over time. Without this confidence, uptake will remain limited.

The workshops demonstrated a clear strategic alignment and an unmet need for a more structured pathway to adoption. Farmers consistently highlighted the importance of being able to see, test, and assess robotics and automation solutions in conditions that reflect real farming operations before committing to investment. Access to independent technical guidance, early insight into emerging technologies, and opportunities to trial systems in practice were all seen as critical enablers of adoption.

Addressing these barriers requires more than awareness-raising. It requires accessible, location-appropriate infrastructure that allows farmers to evaluate technologies in a low-risk setting, supported by unbiased expert advice and direct engagement with technology providers. This includes understanding integration requirements, realistic costs, and long-term reliability, as well as avoiding lock-in to single vendors.

In this context, there is a strong case for the development of a regional robotics assessment and testing facility in and around Inverness, incorporating live testing environments representative of Scottish agricultural conditions. Such a facility would build farmer confidence, support informed purchasing decisions, and accelerate practical adoption of robotics and automation.

For the National Robotarium and Highlands and Islands Enterprise, this represents a clear opportunity to align future investment with demonstrated sector need. A testbed facility in Inverness would support agricultural productivity and resilience, attract commercial investment, strengthen local supply chains, and provide regional access to state-of-the-art robotics capability, delivering long-term benefit to both the sector and the local economy.

11. Contact

If you have any feedback, comments, or questions after reviewing this report, please contact Naomi Battison, N.Battison@hw.ac.uk, as we would be delighted to hear from you.

12. Acknowledgements

This report documents the series of workshops and related work commissioned and funded by Highlands and Islands Enterprise (HIE), prepared with their support.

The series of workshops was organised in partnership with SRUC RAVIC.





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The National Robotarium is supported by £21 million from the UK Government and £1.4 million from the Scottish Government as part of the £1.3 billion Edinburgh and South East Scotland City Region Deal - a 15 year investment programme jointly funded by both governments and regional partners.