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March 2026

SEFARI Fellowship to Analyse how Scotland's Agricultural Knowledge and Innovation System can Support a Just Transition to Sustainable and Regenerative Agriculture

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Executive Summary

SEFARI Gateway and NatureScot, have commissioned research to study how Scotland's Agricultural Knowledge and Innovation System (AKIS) could support a just transition to sustainable and regenerative agriculture.

Scotland has committed to becoming a global leader in sustainable and regenerative agriculture, with this ambition embedded in the Vision for Agriculture (2022), the Agriculture and Rural Communities (Scotland) Act 2024, and the Code of Practice on Sustainable and Regenerative Agriculture (2025). Achieving these goals requires an Agricultural Knowledge and Innovation System (AKIS) capable of supporting land managers through complex, long-term transitions under increasing climate, economic, environmental and regulatory pressures. This research investigates the capacity of AKIS Scotland to support a just transition, including recommendations for Tier 4 support framework.

A literature review, an online survey, semi-structured interviews, case studies analysis, and five workshops (three in person and two online) involving more than 120 participants from across Scotland and representing all type of AKIS actors were carried out to collect both qualitative and quantitative data.

Key Findings Across AKIS Capacities

Although sustainable agriculture is well established within existing advisory and compliance structures, regenerative agriculture is viewed as a longer-term, whole-farm transition that involves significant system redesign. While its principles are broadly supported, the term remains inconsistently defined and is sometimes divisive. In practice that transition depends less on terminology and more on trusted relationships, practical support, and robust, context-specific evidence. Farmers consistently seek financially grounded guidance and credible real-world examples, yet such sustained advisory support is only partially available within Scotland's current AKIS.

1. Structural capacity is weakened by fragmentation, unclear roles, poor signposting, and competitive short-term funding. The diversity of actors is an asset but also generates confusion and duplication. Farmer-led networks offer trusted, context-specific knowledge, yet funding is uneven and they are not embedded across the system.
2. Functional capacity shows strong technical expertise but limited ability to support whole-farm transition. Research translation remains a core weakness, with advisors spending substantial time interpreting complex outputs. Tailored one-to-one support is valued but restricted by capacity and reporting pressures, and CPD in regenerative or system-change skills is inconsistent.
3. Innovation Capacity is strongest in in peer-to-peer learning and on-farm experimentation, which farmers regard as the most effective drivers of change. However, both rely on skilled facilitation and stable funding, which are in short supply. One-to-many events raise awareness but seldom lead to sustained change without follow-up.
4. Process capacity is constrained by monitoring systems that track activities rather than outcomes. Current evidence frameworks emphasise compliance over learning and fail to capture long-term ecological or business impacts. Data primarily flows upward with limited feedback to farmers, and locally relevant case studies remain limited.
5. Human and institutional capacity is limited by uneven advisory coverage, shortages of regenerative expertise, lack of integrated financial–agronomic advice, and variable trust. Access gaps are greatest for crofters, remote and upland systems, and smaller or more diverse holdings. Short funding cycles reduce continuity and undermine collaboration.
6. Adaptive capacity remains underdeveloped. Despite strong research institutions, motivated organisations, and active farmer networks, the system lacks the coherence, stability, and transition-focused capability needed for regenerative change. Governance remains fragmented, and policy ambition exceeds current delivery capacity.

Scotland's AKIS has significant strengths but is not yet structurally or operationally configured to support large-scale sustainable or regenerative transition. A shift is needed from fragmented, compliance-driven knowledge transfer toward a coordinated, relational, learning-oriented support system.

Executive Summary

Recommendations for developing AKIS Scotland to support a just transition to sustainable and regenerative agriculture.

To support long-term, whole farm transition, Scotland's AKIS should prioritise:

1. **Transition expertise.** Advisors only. Develop regenerative specialist advice plans; expanding CPD to include facilitation skills and systems thinking; then develop transition-oriented support networks that move beyond technical advice.
2. **Research translation.** Produce practical, financially detailed, farm-ready outputs; strengthen two-way knowledge flows; and generate more context-specific evidence to reflect diverse geographies and production systems.
3. **System coordination and navigability.** Clarify roles across organisations, reduce duplication, establish shared governance mechanisms, and provide clear entry points or navigation tools to help farmers find relevant advice.
4. **Peer-led and facilitated learning.** Embed farmer clusters and small-group learning as core infrastructure; invest in facilitation skills; and support blended advisory models combining group learning with one-to-one support.
5. **Funding reform.** Move to long-term (3–5 year) core funding for local facilitators, advisory organisations, and farmer networks; reduce administrative burdens; and open opportunities for smaller and independent providers.
1. **Mentoring and tailored one-to-one support.** Expand mentoring beyond new entrants, allow choice of mentor, and provide stable funding to support long-term relationships essential for transition planning.
2. **Equity and access.** Improve digital and geographical access, support participation costs for remote or time-poor farmers and recognise farmer contributions to research and demonstrations.
3. **Support for experimentation.** Invest in on-farm trials, adaptive management tools, and financially informed risk mitigation to build confidence in regenerative practice.

Collectively, these reforms would help Scotland build an AKIS that is coherent, trusted, well-resourced, and capable of enabling a just transition to sustainable and regenerative agriculture.

The survey showed that budgets remain heavily concentrated in knowledge exchange and dissemination, while training, capacity building, facilitation, and monitoring receive far less investment, mirroring mixed ratings around incentives, clarity of roles, and training support, as well as the widespread shortage of time and resources; farmers rely primarily on peers, other farmers, personal interest, and hands-on experimentation rather than policies, advisors, or public bodies, underscoring the prominence of commercial and private advisory services, and together these findings suggest that AKIS Scotland has strong foundations but lacks the balanced investment, advisory coherence, and relational support needed to enable more consistent and confident adoption of regenerative practices.

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1.0 Introduction

Scotland has committed to becoming a global leader in sustainable and regenerative agriculture. Together, the Vision (2022), the Act (2024), and the Code of Practice (2025) form a coherent policy architecture that defines Scotland's goals for sustainable and regenerative agriculture, establishes the legal and funding systems to support them, and provides the practical, farm-level guidance for delivery, with Tier 4 Agricultural Knowledge and Innovation System (AKIS) functioning as the critical mechanism for advice, learning, innovation, and behavioural change.

The Scottish Government supports sustainable practices through a structured four-tier system that includes a mix of direct, supplementary, and targeted support payments. Under Tier 4, Scotland aims to establish a coordinated AKIS by April 2028, prioritising skills, training, knowledge exchange, advisory services, and innovation to support net zero, biodiversity, and rural resilience.

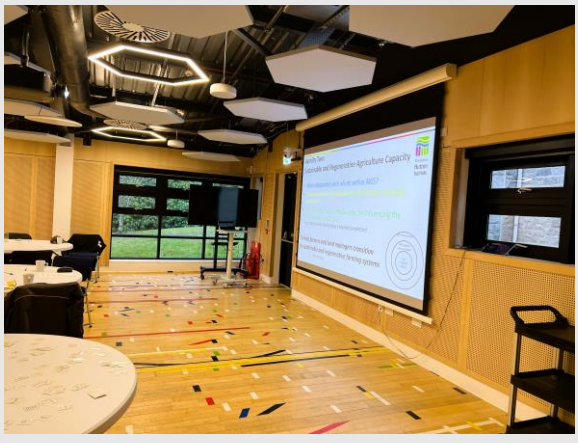
To assess how AKIS capacity can be strengthened to support a just transition to sustainable and regenerative agriculture, aligned with the Agriculture and Rural Communities (Scotland) Act 2024 and the emerging Tier 4 framework, this research was requested by SEFARI Gateway and NatureScot. The study had two main aims:

a) to examine the capacity of the existing system to deliver both general and business specific advice to farmers and land managers to help them transition to more sustainable and regenerative farming system;
b) to provide recommendations on changes to the funding and operation of AKIS that would better support the transition to more sustainable and regenerative farming system.

And four main objectives:

1. to identify which actors and approaches most effectively influence land manager behaviour;
2. to understand how to expand the diversity of advisory providers;
3. to assess the capacity of key organisations to deliver both general and business-specific regenerative agriculture advice; and
4. to determine what changes to AKIS funding and operations are required to accelerate farmer adoption of sustainable and regenerative practices.

JHI Aberdeen, Workshop C. Lozada, 2026



2. 0 Agricultural Knowledge and Innovation System for just transition

Scotland's agricultural sector is supported by a wide network of advisors, researchers, producer groups, consultants, NGOs, and government agencies serving approximately 66,800 people in the agricultural labour force (Scottish Government, 2025). A strong Agricultural Knowledge and Innovation System (AKIS) is essential to provide coherent advice, innovation, and skills needed for a just transition to sustainable and regenerative agriculture.

AKIS encompasses the organisations, people, and processes involved in creating and sharing agricultural knowledge. While earlier models focused on linear transfer from research to farm, contemporary AKIS approaches emphasise multi-actor collaboration, feedback loops, and interactive innovation, a systems perspective now widely adopted across Europe and increasingly shaping UK agricultural reform.

Network of Actors Supporting Scotland's Sustainable and Regenerative Transition

1. Based on previous research (Raviol, 2023; supervised by Lozada), in which actors were identified according to their contribution to the transformation of the food system in Scotland, the study classified organisations that place agroecological approaches, including sustainable and regenerative agriculture, at the centre of their message. Using discourse analysis, the research examined their claims regarding peer-to-peer learning, the food system, and access to land as central elements of sustainable and regenerative agriculture.
2. The Soil Association, Nourish Scotland, the Landworkers' Alliance and FFCC previously formed the core group promoting sustainable and regenerative agriculture with each organisation placing systemic transformation at the centre of its work. However, this has now changed and as of 2026 the core group is made up of Nature Friendly Farming Network (NFFN), Pasture for Life (PFL) and Propagate.
3. Surrounding organisations contribute through targeted themes: Agricology, PFL, NFFN and, Propagate strengthen farmer-to-farmer learning, while Slow Food, the Food Ethics Council and the Open Food Network focus on healthy, fair and accessible food systems.
4. Structural issues are addressed by The Gaia Foundation on seed sovereignty, and The Scottish Farm Land Trust on access to land, reinforcing the broader transition to sustainable and regenerative practices.

Together, these organisations show how Scotland's shift toward sustainable and regenerative agriculture is driven by a network of actors whose complementary roles connect the knowledge necessary to support a just transition.

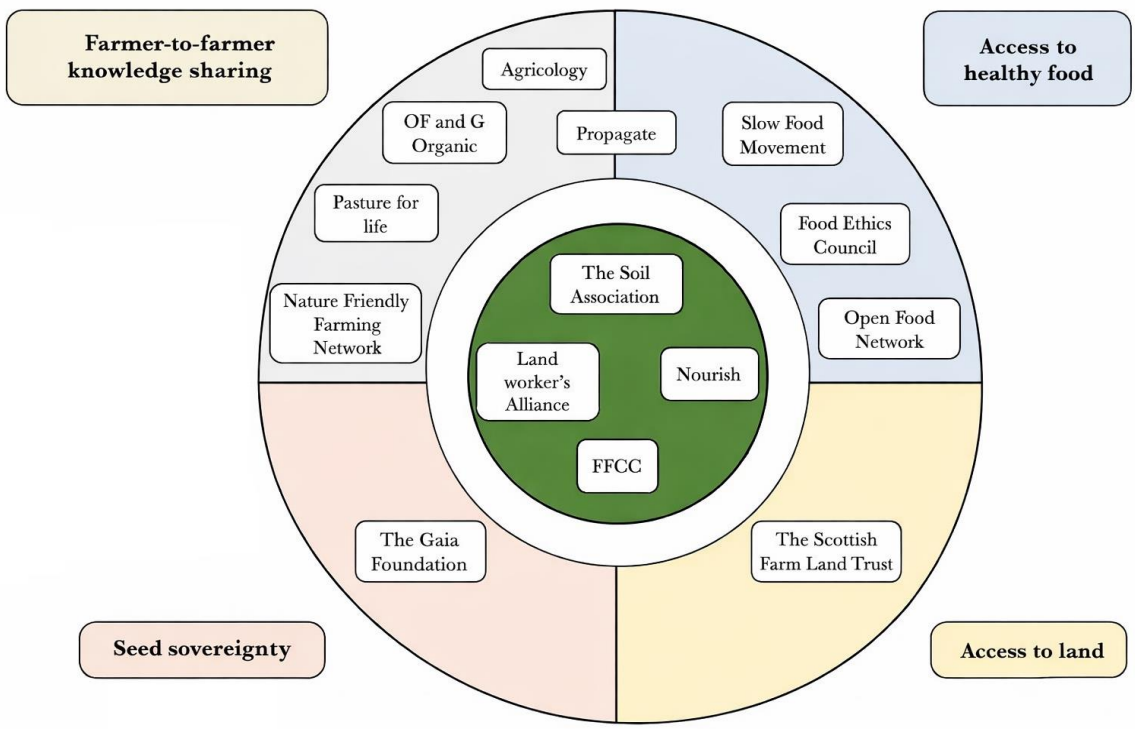


Figure 1 : Sustainable and regenerative agriculture (including agroecology) as a core focus of the organisation by their main area of engagement (Raviol 2023; supervised by Lozada). *This figure does not reflect changes over time.*

3.0 Research Methods

The research was carried out in collaboration with the James Hutton Institute and Pasture for Life. To meet the aims and objectives, the research team followed a three-stage programme.

First, an evidence review and capacity framework were developed, building on recent studies (e.g., Sutherland et al., 2023; Sutherland and Prager, 2024; Knierim and Ingram, 2024; Germundsson et al., 2021; Tasleem et al., 2023) and supplemented by case studies of on-farm innovation and farmer-led initiatives (Farm Advisory Service and FRAMEWORK).

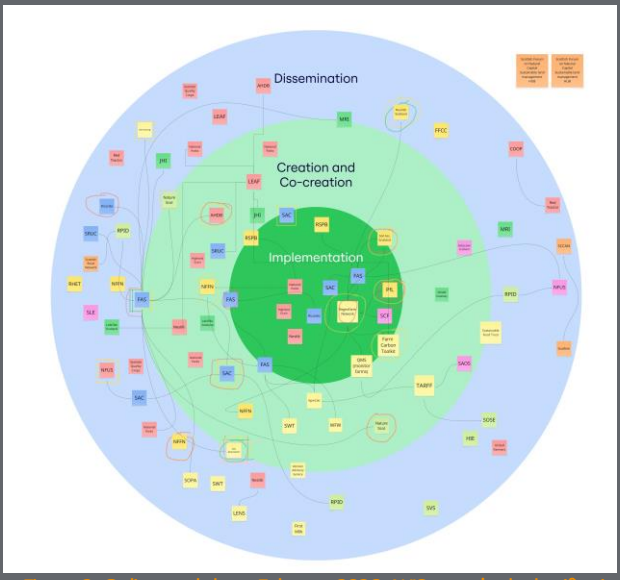


Figure 2. Online workshop, February 2026. AKIS actors' role classification.

Second, an online survey (Appendix A) and a series of semi-structured interviews (Appendix B) with farmers, crofters, supply-chain actors, advisors, and research and education providers were undertaken to evaluate the capacity of AKIS to deliver transition to sustainable and regenerative agriculture and identify opportunities for strengthening AKIS capacity.

Third, the team designed a series of online and in-person workshops to map AKIS Scotland, (Appendix D) identifying the roles that different actors play in disseminating knowledge, co-creating knowledge, and implementing innovation. These workshops used previous characterisation of AKIS Scotland (see Appendix C), and also explored new models for capacity building, advisory diversity, governance improvement, and alignment with Tier 4 of the Agricultural Reform Programme.

Our proposal emphasised co-design, multi-actor collaboration, and policy relevance, with a commitment to iterative engagement with NatureScot, SEFARI Gateway, and the Scottish Government.

The research protocols were approved by the steering group and by Social Research Ethics Committee of James Hutton Institute; these are appended to this report. All participants received information about the project and signed informed consent forms.

The results presented here draw on contributions from more than 120 participants engaged across the different research methods, representing all types of actors within AKIS Scotland, in line with the actor identification conducted in previous research (Appendix C).

For detailed descriptions of the workshops, survey questions, and semi-structured interview guides, see Appendices A, B, and D.

Image 1 . In person workshop C. JHI Aberdeen, February 2026.

4.0 AKIS Capacity to Support a Just Transition

The Scottish Government's Code of Practice sets out national guidance for sustainable and regenerative agriculture, defining "sustainable" as land management that minimises environmental harm and avoids long-term depletion of natural resources, and "regenerative" as restoring and renewing natural assets, particularly soils and ecosystem health, through principles-based, ecological improvement.

Definitions and terminology

Across workshops and interviews, participants agreed these concepts are important but often contested, shaped as much by language and perception as by practice. Sustainable agriculture was seen as the more familiar and less contentious term, widely understood as balancing productivity with environmental stewardship, soil fertility, resource efficiency, and long-term business viability. Because current advisory systems, compliance frameworks, and traditional mixed or low-input practices already support many of these aims, sustainability was viewed as an established baseline rather than a new direction.

Regenerative agriculture, in contrast, was described as a mindset and a long-term, whole-farm transition involving system redesign, risk management, and ecological restoration. Participants emphasised that it requires sequencing, adaptation, and context-specific decision-making, making it more complex than adopting individual practices. However, regenerative agriculture was also seen as loosely defined, variable, and sometimes divisive. Many farmers and advisors expressed discomfort with the terminology, concerned that it can feel judgmental. As a result, some preferred alternatives such as "resilient farming," which were viewed as more inclusive and less politically charged.

A recurring theme was the gap between policy language and on-farm reality. Advisors reported avoiding the term "regenerative" to prevent defensiveness, and participants stressed that terminology alone does not drive change. What matters is the availability of practical support, trusted relationships, and guidance tailored to farm context.

Framework to analyse AKIS capacity

To achieve the aims, we developed a multidimensional framework, with each domain grounded in empirical findings, evaluation guidance, and established conceptual models (FAO, 2022, Alex and Byerlee, 2000, Germundsson et al., 2021, Tasleem et al., 2023). AKIS performance is inherently systemic, relying on strong structures, functions, actor relationships, innovation processes, governance, resources, and continuous learning and evaluation. Appendix E presents the details of each domain.

Structural Capacity

Fragmentation and System Navigation

Scotland's AKIS is diverse but structurally fragmented, spanning government bodies, research institutes, advisory organisations, NGOs, private consultants, farmer-led groups, and local initiatives. While this diversity provides a rich pool of expertise, it also produces duplicated effort, unclear roles, and weak signposting—leaving many farmers without a clear entry point into the system. Confusion around organisational responsibilities and competitive, project-based funding further reinforce fragmentation, making it difficult to deliver the integrated, multidisciplinary support required for regenerative agriculture and whole-farm transitions.

Domains and Indicators of AKIS System Capacity

	Domains	Indicator
Multi-dimensional Framework	Structural Capacity	Actor Diversity & Role Clarity
		Linkages and Network Functioning. Coordination
	Functional Capacity	Knowledge generation and dissemination
		Advisory services
	Innovation Capacity	Interactive innovation
		Knowledge Infrastructure, Communication & Data Systems. Digital tools
	Process Capacity	Learning and feedback loops
		Monitoring and evaluation systems.
	Human and Institutional Capacities	Human resources
		Financial resources
		Institutional and policy support and governance.
	Adaptive, Reflexive and Learning Capacity	Adaptation to new challenges

Figure 3. AKIS capacity framework.

Collaboration, Bottlenecks, and Implications for Transition

Collaboration within the AKIS is active but uneven: strong partnerships exist, particularly in peer networks and interdisciplinary clusters, yet systemic barriers, funding competition, inconsistent advisory capacity, and variable research–advice–farmer linkages, limit strategic coordination. These issues create bottlenecks in knowledge flow and can result in large organisations becoming gatekeepers, while smaller or farmer-led groups struggle to participate. Such dynamics reduce system flexibility, restrict experimentation, and ultimately slow Scotland's progress toward sustainable and regenerative agricultural change.

Functional Capacity

Uneven Technical Expertise

AKIS Scotland contains notable strengths in areas such as soil health, biodiversity assessment, nutrient management, and farmer-led practical knowledge, but expertise is unevenly distributed and weaker in whole-farm grazing, integrated livestock–arable systems, upland farming, and applied regenerative practice. Although substantial knowledge exists across research institutions and advisory organisations, translation into clear, farm-ready guidance remains limited, with advisors frequently needing to interpret scientific outputs before they become usable. This uneven technical capability supports incremental improvements but is insufficient to drive whole-farm regenerative transitions, especially in regions with limited specialist provision.

Transition Expertise and Capacity Building Gaps

The most significant functional gap identified was transition expertise, the capability to support multi-year, system-level change through sequencing, risk management, adaptive learning, and collaborative decision-making. Advisors were often described as technically strong but less confident in whole-farm planning, behavioural support, and facilitating complex transitions, leaving farmers without the tailored guidance required for regenerative change. Capacity-building opportunities remain fragmented, difficult for independent advisors to access, and heavily focused on technical skills rather than system change, with limited integration of farmer experience into training or research priorities. Without stronger local advisory capacity, improved CPD pathways, and long-term investment in research translation, Scotland's AKIS will continue to be better suited to awareness-raising than to enabling transformative, context-specific regenerative transitions.

Innovation Capacity

Strengths in Peer Learning but Weaknesses in Support Models

AKIS Scotland shows strong innovation potential in farmer-led experimentation and peer-to-peer learning, which participants consistently described as the most effective drivers of behaviour change and adoption. Small, interactive peer groups—such as clusters, discussion groups, and monitor farms—were seen as credible, cost-effective, and central to regenerative uptake, provided skilled facilitation is available. In contrast, one-to-one advisory support, while highly valued for complex decision-making, remains inconsistent across regions and sectors and is often constrained by heavy reporting requirements. Workshops, events, and online materials help raise awareness but lack the depth and continuity needed to support sustained system-level transformation.

Facilitation and Trust as Critical Enablers of Innovation

A major finding was that facilitation, not information provision, is the core capability enabling innovation, yet facilitation skills remain scarce across the AKIS. Participants emphasised that regenerative transition requires coaching, group dynamics management, and context-specific dialogue, but current provision is limited and uneven. Trust also emerged as a critical factor shaping engagement: farmers place highest legitimacy in farmer-led initiatives and long-term advisory relationships, while top-down terminology and institutional complexity can undermine credibility. Weak facilitation capacity and uneven trust relationships limit the AKIS's ability to support multi-year regenerative change, reinforcing incremental rather than transformative innovation.

Process Capacity

Misaligned Monitoring Systems

Participants agreed that monitoring, evaluation, and evidence are essential for farm decision-making and validating regenerative practices, yet current M&E systems remain poorly aligned with the realities of whole-farm transition. Existing frameworks focus on activity counts, compliance, and short-term outputs, metrics widely viewed as weak indicators of system change, while farmers value measures such as soil health, biodiversity, grazing performance, business resilience, and profitability. This mismatch reinforces superficial "tick-box" behaviours, and short reporting cycles fail to capture slow, non-linear ecological and economic trajectories, leaving the AKIS without the adaptive, long-term evaluation needed to support transformational change.

Insufficient Interpretation and Localised Evidence

Participants emphasised that data becomes useful only when interpreted through benchmarking, peer comparison, financial analysis, and facilitated discussion—yet advisors are overstretched, and current data flows often feel extractive, providing little actionable insight back to farmers. Although participatory and farmer-led monitoring was widely supported for its relevance and legitimacy, time, skills, and institutional support remain limited. Significant gaps persist in local financial evidence, region-specific case studies, and practical demonstrations, leaving the evidence base fragmented and insufficiently contextualised. As a result, farmers lack the trusted, locally relevant information needed to adopt regenerative practices with confidence.

Human and Institutional Capacity

Business Capability and Workforce Constraints

Participants emphasised that regenerative transitions must be economically viable, yet business and financial advisory capability within AKIS Scotland remains inconsistent and often disconnected from environmental guidance. While pockets of strong expertise exist, many farmers do not receive integrated agronomic–economic support, limiting their ability to assess trade-offs, plan multi-year transitions, or manage risk confidently. Workforce pressures compound this challenge: advisor shortages in key regions, limited transition-specific expertise, heavy administrative burdens, and uneven access to CPD all reduce the time and depth of support available. These constraints result in advisory provision that is stretched, unevenly distributed, and often unable to offer the continuity required for long-term regenerative change.

Structural Barriers, Inequities, and Weak Support for Advisors

Institutional and funding structures were widely seen as misaligned with transition timescales, with short-term, compliance-driven funding cycles undermining continuity, staff retention, and the development of specialist advisory capability. Commissioning models tend to favour large providers and reward deliverables over outcomes, limiting space for locally relevant, innovative, or relational approaches. Significant inequities in access persist—particularly for crofters, upland farmers, remote communities, women, new entrants, and tenant farmers—reflecting geographic, digital, and structural barriers. Meanwhile, advisors themselves lack coherent professional support pathways, relying heavily on informal peer learning and ad-hoc upskilling. These combined limitations weaken the system's capacity to provide the stable, skilled, and regionally relevant support needed to drive Scotland's regenerative transition.

Adaptive Capacity

Overall System Readiness

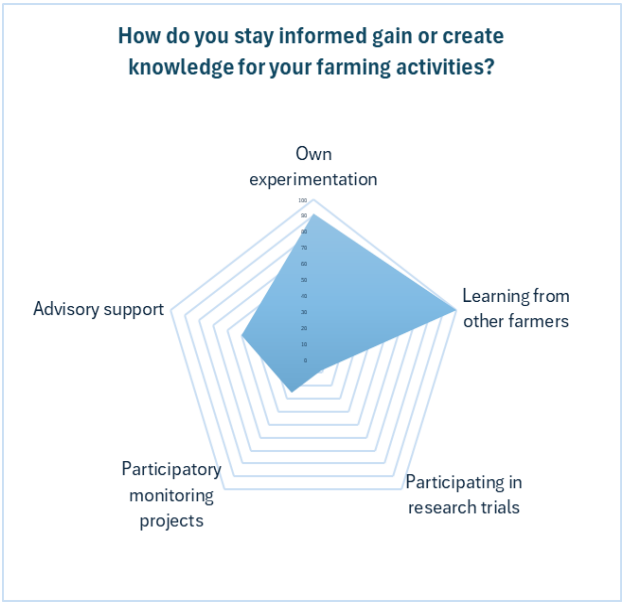
Participants viewed Scotland's AKIS as not yet ready for large-scale transition, citing fragmented delivery, limited specialist capacity, unclear policy signals, and weak coordination, despite strong building blocks such as active organisations, farmer networks, and growing interest in change. While some felt the system is partially positioned for transition, most emphasised the need for clearer goals, stronger advisory capability, and greater coherence across institutions.

Critical Capabilities Needed

Looking ahead 5–10 years, respondents highlighted four essential capacities: improved scientific and technical capability to guide system goals; stronger facilitation and social learning to build behavioural confidence; financial structures that support risk-sharing and multi-year experimentation; and more coherent governance with stable, long-term funding. Participants stressed that progress depends on investing in integrated AKIS coordination, facilitation and CPD, more diverse and better-resourced advisory services, and locally embedded, farmer-led approaches—seen as crucial for building legitimacy, adaptability, and system-wide resilience.

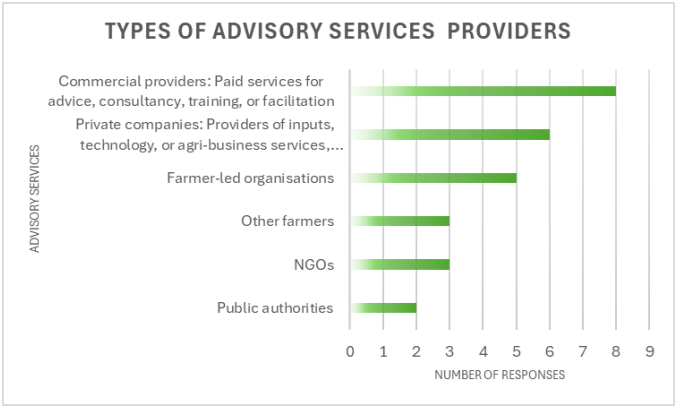
5.0 Survey Findings

This survey was carried out to explore how different actors engage within AKIS Scotland and how knowledge, capacities, and resources shape support for sustainable and regenerative farming. Responses were gathered from 22 land managers and 41 participants representing advisory services, public bodies, research and education institutions, NGOs, private-sector organisations, and other collaborative groups. Together, these perspectives provide a broad and informative picture of how knowledge is exchanged across the system and where key strengths and gaps may lie.



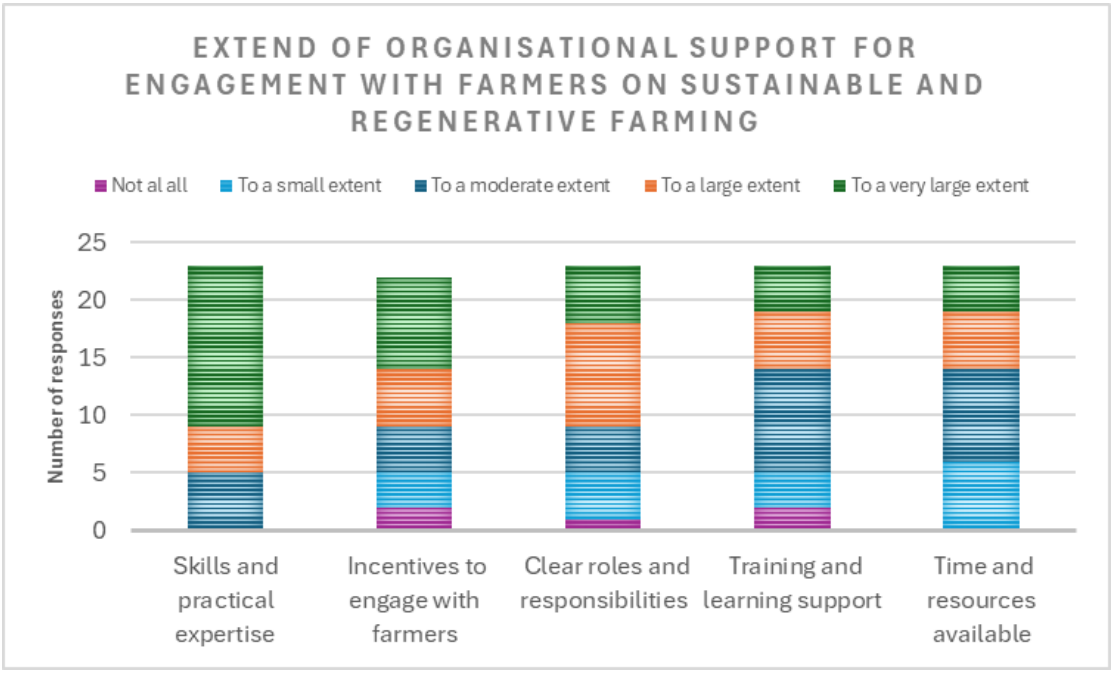
Graphic 1. Farmers' information sources.

Graphic 1 illustrates the different ways farmers obtain, develop, or share knowledge to support their farming activities. The most common sources of learning are *learning from other farmers* (100%) and *own experimentation* (91.7%), showing the strong value placed on peer networks and practical, hands-on experience. Moderate engagement is seen in *advisory support* (50%) and *participatory monitoring projects* (25%), indicating that some farmers seek structured or collaborative forms of guidance.

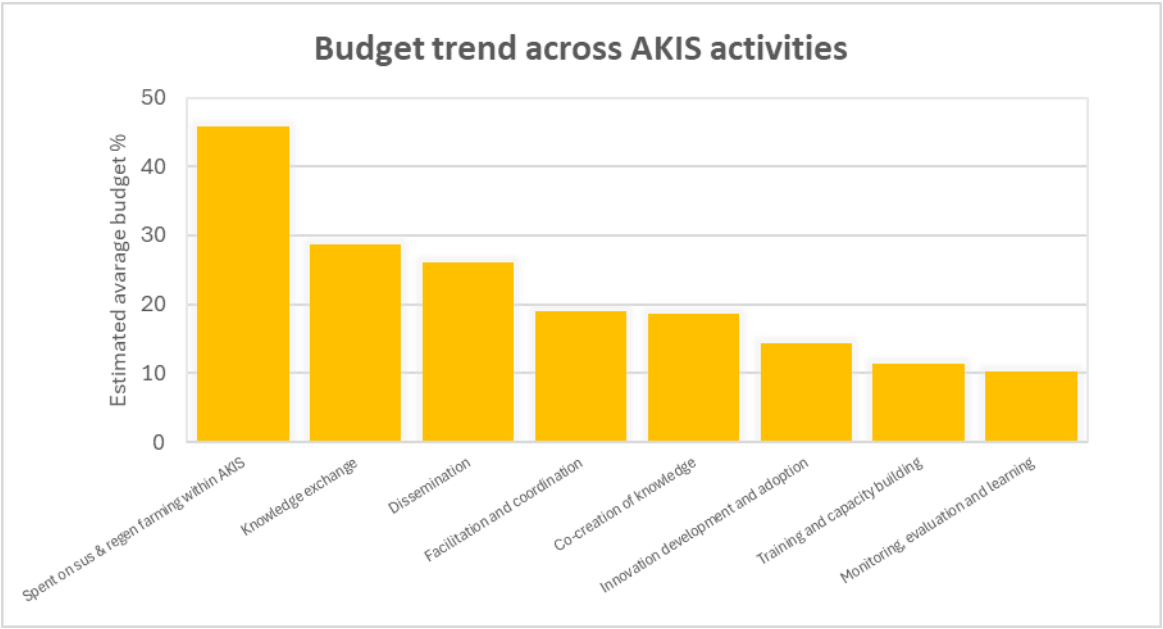


Graphic 2. Types of advisory services providers.

In contrast, *participation in research trials* is relatively low (8.3%), suggesting that only a small proportion of farmers engage directly in formal scientific studies. Overall, the chart demonstrates that informal and experiential knowledge pathways play a central role in how farmers stay informed and innovate in their practices.



Graphic 3. Organisational support for sustainable and regenerative agriculture.



Graphic 4. Budget trend Across AKIS activities.

Graphic 2 summarises which advisory actors farmers report engaging with. The results show that commercial advisory, followed by private companies and farmer-led organisations are the most important actors. Public bodies, NGOs, and other farmers appear far less frequently.

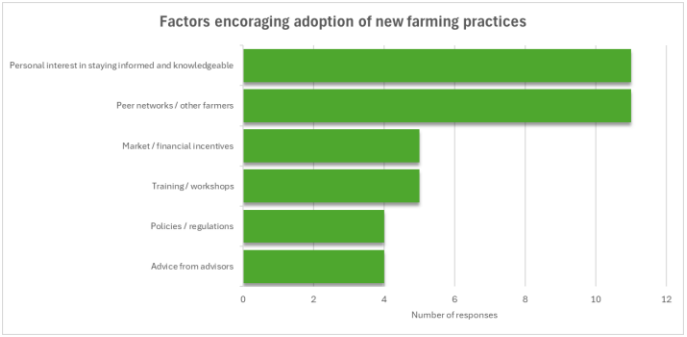
Graphic 3 presents organisations which reported generally strong capacity to engage with farmers on sustainable and regenerative farming, with skills and practical expertise rated highly by most respondents. However, incentives, clarity of roles, and training support were more mixed, with many rating them only to a moderate extent. Time and resources were identified as the biggest constraint, with over half indicating limited availability.

Graphic 4 Budget Trend Across AKIS, shows the estimated average share of annual budgets allocated to different AKIS activities. Overall, budgets are concentrated in knowledge exchange and dissemination. Training and capacity building, monitoring-evaluation-learning, receive notably lower allocations. Most actors spend an important part of the budget in sustainable and regenerative farming within AKIS.

Graphic 5 shows factors that encourage farmers to learn about or adopt new farming practices, based on land managers' responses. The results indicate that peer networks, other farmers, and personal interest in staying informed are the strongest drivers of adoption, while policies, advisor input, and other external factors are mentioned far less frequently.

Survey conclusion

Overall, the results suggest that while organisations show strong practical capability to engage farmers in sustainable and regenerative farming, structural and resource constraints limit how effectively this support can be delivered. Budgets are concentrated in knowledge exchange and dissemination, while training, capacity building, facilitation, and monitoring receive much lower investment—mirroring the mixed ratings for incentives, clarity of roles, and training support, and the widespread shortage of time and resources. Farmers themselves rely most on peer networks, other farmers, personal interest, and hands-on experimentation as their primary learning pathways, with far fewer turning to policies, advisors, or public bodies; this is reflected in the prominence of commercial and private advisory services as key information sources. Taken together, these findings indicate that AKIS Scotland has strong foundations but lacks the balanced investment, advisory coherence, and relational support needed to drive more consistent and confident adoption of regenerative practices.



Graphic 5. Factors encouraging adoption of new farming practices.

6.0 Strategies for Increasing AKIS Capacity

AKIS Scotland has strong foundations but currently lacks the coherence, capacity, and stability required to support a large-scale transition to sustainable and regenerative agriculture. To enable meaningful, long-term, whole-farm change, future reforms must prioritise the development of transition-focused expertise, the translation of research into accessible and practical evidence, improved system coordination, more inclusive and effective learning models, and stable, long-term funding.

1. Build Transition Expertise as a Core AKIS Function

Multi-year, whole-farm transitions require dedicated expertise that goes beyond technical advice.

- ✓ Develop whole-farm transition plans with specialist regenerative advisors.
- ✓ Establish regional networks linking advisors, facilitators, and transitioning farmers.
- ✓ Use Tier 4 Stabilise transition support (figure 5)

2. Translate Research Into Practical, Localised Evidence

Research must be accessible, locally relevant, and financially meaningful to support decision-making.

- ✓ Produce case studies with clear financial and production data.
- ✓ Tailor guidance to specific regions and farm systems (e.g. upland, arable).
- ✓ Use Tier 4 Integrate business and environmental advice (figure 5)

3. Improve System Coordination, Role Clarity, and Navigability

A more coherent system is needed to reduce fragmentation and improve access to support.

- ✓ Create a single entry-point platform for advice, funding, and programmes.
- ✓ Clearly define organisational roles across research, advice, and delivery.
- ✓ Use Tier 4 Improve system coordination (figure 5)

4. Embed Peer-to-Peer and Small Group Learning as Core Infrastructure

Peer learning is a key driver of behavioural change and practical knowledge exchange.

- ✓ Support small farmer groups with regular meetings and digital communication channels.
- ✓ Facilitate farm walks where farmers share experiences and challenges.
- ✓ Use Tier 4 Improve access and inclusion (figure 5)

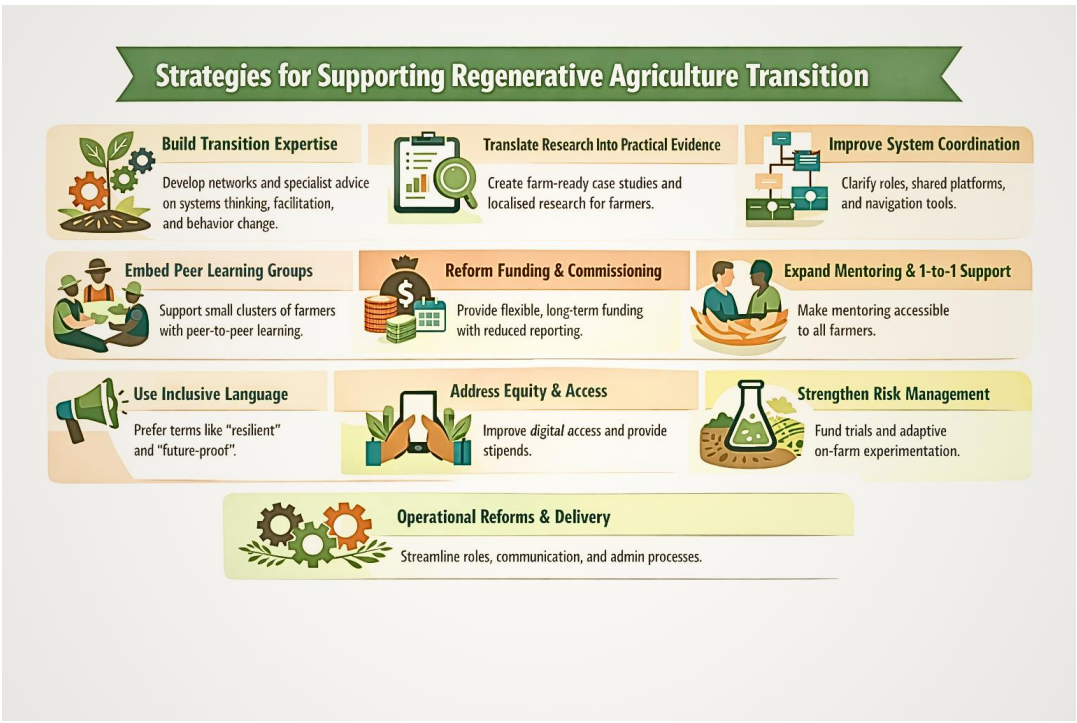


Figure 4. Strategies for supporting regenerative agriculture transition

Strategies for Increasing AKIS Capacity

5. Reform Funding and Commissioning for Stability and Flexibility

Long-term, flexible funding is essential to enable continuity and effective collaboration.

- ✓ Provide 3–5 year funding for facilitators and advisory services.
- ✓ Streamline reporting requirements to reduce administrative burden.
- ✓ Use Tier 4 Increase providers diversity (figure 5)

6. Expand Mentoring and One-to-One Transition Support

Personalised mentoring supports confidence, trust, and effective decision-making.

- ✓ Pair farmers with experienced mentors for ongoing transition support.
- ✓ Allow farmers to select advisors based on trust and relevance.
- ✓ Use Tier 4 Expand mentoring and one-to-one support (figure 5)

7. Use Inclusive, Non-Polarising Language

Language should engage farmers and avoid creating division or resistance.

- ✓ Use terms such as "resilient" or "future-proof" farming where appropriate.
- ✓ Share farmer-led narratives that build on existing practices.

8. Address Equity, Inclusion, and Access Barriers

Inclusive access is necessary to ensure all farmers can participate in transition support.

- ✓ Provide travel or backfill funding to enable attendance at events.
- ✓ Offer training and tools to improve digital accessibility.
- ✓ Use Tier 4 Improve access and inclusion (figure 5)

9. Strengthen Support for Risk Management and On-Farm Experimentation

Farmers need support to manage risks associated with adopting new practices.

- ✓ Fund small-scale on-farm trials to test regenerative approaches.
- ✓ Develop tools that track both financial and environmental outcomes.
- ✓ Use Tier 4 Improve access and inclusion; and create transition pathways (figure 5)

10. Operational Reforms to Support Delivery

Effective delivery depends on coordinated systems, clear processes, and reduced complexity.

- ✓ Introduce referral pathways between advisory, research, and farmer networks.
- ✓ Use diverse communication formats (e.g. workshops, videos, guides) to share knowledge.
- ✓ Use Tier 4 Improve system coordination; and Formalise policy-delivery feedback (figure 5)

These recommendations highlight the need for a more coherent, well-resourced, and farmer-centred AKIS capable of supporting long-term system change. Implementing these reforms will be critical to enabling a resilient, adaptive, and scalable transition to sustainable and regenerative agriculture across Scotland.

Support & Delivery	System Capacity & Governance
1. Stabilise transition support Protected funding for key one-to-one services (whole-farm planning).	**6. Increase provider diversity** Enable smaller and specialist advisory providers.
2. Create a transition pathway Link diagnostics, learning events, peer networks, and tailored advice.	**7. Improve access & inclusion** Expand support for small farms, crofters, and underserved groups.
3. Integrate business & environmental advice Combine technical guidance with cost, labour, and risk planning.	**8. Strengthen monitoring & learning** Track practice adoption and transition outcomes.
4. Expand mentoring & one-to-one support Extend mentoring beyond new entrants and allow mentor choice.	**9. Formalise policy–delivery feedback** Strengthen collaboration between government and advisers.
5. Build adviser capacity Develop CPD on systems thinking and transition planning.	**10. Improve system coordination** Clear entry points, referrals, and alignment across services.

Figure 5. Conclusions on changes to the funding Tier 4 and operational of AKIS that would better support the transition to more sustainable and regenerative agriculture.

7.0 Conclusion

Scotland's Agricultural Knowledge and Innovation System (AKIS) has a strong foundation, with a diverse network of actors, established research capacity, and growing engagement in sustainable agriculture. However, this research highlights that the system is not yet fully equipped to support the scale and complexity of transition required for sustainable and regenerative, whole-farm change. Structural fragmentation, short-term funding models, limited transition-focused expertise, and gaps in research translation continue to constrain its effectiveness. While technical knowledge exists, it is unevenly distributed and often not accessible in forms that support practical, financially grounded decision-making at farm level.

A consistent finding across workshops, surveys, and interviews is that farmers rely most heavily on peer networks, trusted relationships, and experiential learning, rather than formal advisory or policy-driven channels. This underscores the importance of shifting from a linear, compliance-focused knowledge transfer model towards a more relational, coordinated, and learning-oriented system. Peer-to-peer exchange, facilitation, and locally embedded support structures emerge as critical enablers of behavioural change, yet these remain under-resourced and inconsistently supported across the system.

To enable a just and effective transition, AKIS should evolve to prioritise long-term, system-level change. This requires investment in transition expertise, whole-farm approaches that integrate economics, ecological, social, cultural aspects of the farm system as a coherent whole, stronger integration between research and practice, improved coordination and navigability, and more inclusive, accessible support mechanisms. Equally important is the need for stable, multi-year funding that enables continuity, builds trust, and supports collaboration across organisations and regions. Without these reforms, the system risks continuing to deliver incremental improvements rather than the transformational change required.

Overall, the findings point to the need for a more coherent, well-resourced, and adaptive AKIS that places land managers at the centre of innovation and learning. By strengthening relationships, improving evidence flows, and aligning structures with long-term transition goals, Scotland can build a system capable of delivering a resilient, inclusive, and scalable shift towards sustainable and regenerative agriculture.

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Appendix A – Survey

Survey Purpose and Scope

The online survey was designed to gather quantitative insights into the functioning of Scotland's Agricultural Knowledge and Innovation System (AKIS). It focused on understanding how different actors engage in knowledge exchange, advisory work, innovation processes, and collaboration across the system. The survey formed one of the core data-collection components of the wider research project and sought to capture experiences from both farming and non-farming stakeholders. The questionnaire covered structural, functional, innovation, and process capacities of AKIS, including topics such as actor roles, collaboration, policy alignment, information sources, training, funding, and the incorporation of farmer knowledge in research and advisory activities.

Information Collected Through the Survey

Participants were asked a series of structured and multiple-choice questions designed to map their contributions and interactions within AKIS. These included:

Background and roles: Respondents indicated their role in AKIS (e.g., farmer/crofter, advisor, researcher, NGO staff, public sector, private sector) and the sector or subject areas in which they work.

Knowledge, advice, and innovation pathways: Questions explored where respondents obtain or provide knowledge, how they collaborate with others, and the types of interactions they engage in (e.g., projects, farmer-led initiatives, advisory visits, training events).

Policy and governance perceptions: Respondents assessed the extent to which Scottish policies support co-creation, innovation, and collaboration, including incentives and clarity of roles.

Functional capacities: Items investigated how knowledge is generated, shared, and disseminated; how participatory approaches are used; and how digital tools support communication and learning.

Learning, flexibility, and feedback: Participants reflected on whether their organisations or activities include structured learning loops, flexibility in responding to external changes, and the extent to which monitoring and evaluation informs improvements.

Financial and human resources: The survey also collected information on funding levels, budget allocation to AKIS activities, staff competencies, and organisational support for ongoing learning.

Participant Profile

A total of 66 individuals began the survey. Of those who identified their role in AKIS, 22 participants (representing farmers, crofters, or land managers) and 41 participants from non-farming roles took part, along with three respondents who selected "N/A." This distribution indicates strong engagement from advisory organisations, research institutions, NGOs, public bodies, and private-sector actors, while still capturing a meaningful representation of farmers and crofters whose experience is central to understanding AKIS performance. The breakdown reflects the diverse composition of AKIS in Scotland and highlights the range of perspectives included in the analysis of knowledge flows, collaboration, and systemic capacity.

Data Processing and Analysis

Survey data were processed using R and excel. Multiple-choice questions were reshaped into long format to capture all selected responses, recoded into labelled factors, and summarised using counts and percentages. Only non-zero responses were included in the displayed results. A flex table was generated to present frequencies, total responses per question, and percentage values, with a note clarifying that percentages in multi-response questions may not sum to exactly 100%. The processed data provided quantitative insight into areas such as perceived policy support, the prevalence of collaboration, and the distribution of knowledge and advisory activities, complementing the qualitative findings generated through interviews and workshops.

Appendix B – Semi-Structured Interviews

Purpose and Approach

Semi-structured interviews were conducted to complement the survey data by generating in-depth qualitative insights into the functioning of AKIS Scotland. The interviews explored how different actors experience the system in practice, including how they collaborate, where they access or provide knowledge, how well current structures support sustainable and regenerative agriculture, and where they see gaps, challenges, and opportunities for improvement. Interviews followed a flexible guide that allowed respondents to elaborate on issues most relevant to their role, while ensuring that core themes, such as advisory capacity, policy alignment, peer learning, and system readiness, were covered consistently across participants.

Information Collected Through the Interviews

Participants were prompted to reflect on a wide range of themes related to AKIS function and capacity. Key topics covered included:

Understanding of sustainable and regenerative agriculture, highlighting areas of consensus and divergence across the sector.

Functional capacity, including technical expertise, practical skills, areas of strength, and capability gaps within advisory and support services.

Knowledge exchange, innovation, and collaboration, such as how farmers and advisors participate in trials, co-creation processes, farmer-led initiatives, and participatory research.

Human and institutional capacity, including levels of trust, credibility, organisational support for staff, and the consistency of advisory messaging.

Peer-to-peer learning, its importance within the sector, and the extent to which it is supported or left to compensate for system gaps.

Access and inclusion, exploring uneven distribution of AKIS capacity across farming contexts, including remote areas, LFAs, crofting counties, and small holdings.

Governance, funding, and policy alignment, including reflections on funding mechanisms, structural constraints, and gaps between policy ambition and delivery.

Future capacity needs, including which technical, social, institutional, or financial capabilities will be most important over the next decade.

These topics allowed the interviews to move beyond descriptive accounts and capture deeper perceptions of system functioning, strategic priorities, and practical constraints.

Participant Profile

A total of 19 participants took part in the semi-structured interviews, representing a broad mix of AKIS roles. The sample included: 7 farmers, 2 land-based organisations, 3 private advisors, 2 facilitators, 2 private-sector representatives, 1 participant from education, and 2 from state-funded organisations (participant IDs A–S). This distribution ensured that perspectives from across advisory, practice-based, organisational, and institutional settings were included.

GDPR and Ethical Compliance

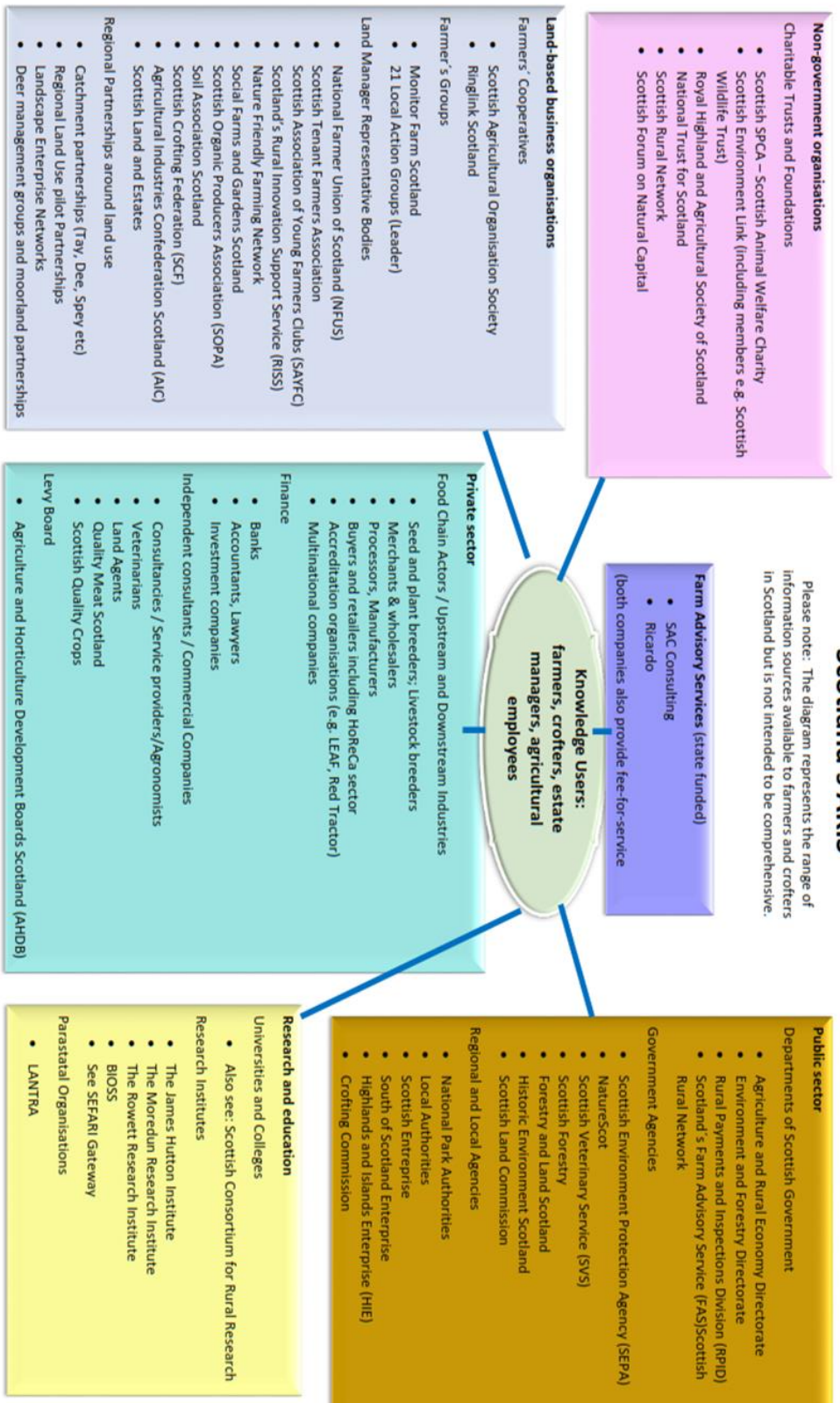
All interviews were conducted in accordance with the ethical guidelines of The James Hutton Institute and in full compliance with UK GDPR and the Data Protection Act 2018. Participants received an information sheet, provided informed consent, and were reminded that participation was voluntary and could be withdrawn at any time. Interview data were recorded, transcribed, and stored securely on password-protected servers, with personal identifiers removed during analysis.

Data Processing and Analysis

Interview recordings were transcribed and analysed using a structured coding framework. Themes were grouped by the major analytical framework allowing responses to be compared across participant types. Coding summaries were used to cluster viewpoints and identify areas of consensus, variation, or systemic tension. This approach provided a robust qualitative foundation that complemented the survey data and strengthened the overall assessment of Scotland's AKIS.

Appendix C – AKIS Scotland

Please note: The diagram represents the range of information sources available to farmers and crofters in Scotland but is not intended to be comprehensive. Sutherland et al., 2023



Appendix D – Workshops

Purpose of the Workshops

The workshops were designed to deepen understanding of how AKIS Scotland functions in practice by enabling participants to collaboratively map system relationships, identify capacity strengths and gaps, and discuss priorities for supporting a transition toward sustainable and regenerative agriculture. The workshops complemented the survey and interviews by providing a collective, co-creative space for reflection and validation of findings.

Information Collected Through the Workshops

The workshops generated qualitative and participatory data through a sequence of structured activities. Information collected included:

- Descriptions of actors, organisations, and linkages within Scotland's AKIS
- Group-generated system maps illustrating knowledge flows, advisory interactions, and innovation pathways
- Perceptions of current strengths and limitations in AKIS capacity for sustainable and regenerative agriculture
- Reflections on collaboration, coordination, and systemic challenges
- Participant-identified priorities for improving AKIS functioning and future capacity
- Thematic insights produced during structured group discussions and plenary presentations
- These data contributed to the overall system analysis by capturing collective experiences and shared interpretations.

Participant Profile

Across January, a series of workshops were delivered in Larkhall, Dingwall, and Aberdeen, supplemented by two online sessions, bringing total participation to approximately 40 individuals. Participants represented a diverse mix of AKIS actors, including advisory services, environmental NGOs, climate-action networks, private consultants, farm businesses, research and facilitation organisations, and public bodies.

Organisations represented across the workshops included SAC Consulting, AHDB, Agrii, RSPB Scotland, Game & Wildlife Conservation Trust, Soil Association, Pasture for Life, LEAF, SAOS Ltd, NatureScot, East Lothian Climate Hub, Scottish Borders Climate Action Network, Agroecosystems Ltd, Propagate – Regenerative Farming Network, Highlands and Islands Land Services, Ceres Agri Services, Stout Livestock Consulting, Strutt & Parker, Foodlink NE, and several farm businesses and independent advisors.

This diversity ensured that workshop discussions captured a broad cross-section of system perspectives, spanning advisory practice, environmental management, community-level support, regenerative farming networks, and policy-adjacent organisations.

Confidentiality and Ethics

The workshops were conducted under the **Chatham House Rule**, allowing information to be shared while ensuring that individual comments are not attributed to specific participants or organisations. This created a safe environment for open and honest dialogue.

The workshops were approved by the **James Hutton Institute Research Ethics Committee**, and all participants provided informed consent prior to participation. Recordings were made solely to support accurate note-taking, and all data were stored securely and anonymised during analysis.

Data Processing and Analysis

Workshop recordings and notes were synthesised using a thematic and participatory-analysis approach. Outputs included:

Composite system maps

Thematic summaries of capacity strengths and gaps

Lists of participant-identified priorities and proposals

Consolidated reflections from plenary discussions

These outputs were integrated with survey and interview findings to triangulate evidence and strengthen the overall assessment of AKIS.

Appendix E – Framework

The framework was developed to analyse AKIS capacity and capacity to support a just transition to sustainable and regenerative agriculture in Scotland. Sources include Alex and Byerlee, 2000; Parissaki, 2025; Germundsson, 2021; Knierim, and Ingram, 2024; Sutherland, et al., 2023, Sutherland, and Prager, 2024; Tasleem, et al., 2023.

	Dimension	subdimension	Question	Description
Multi-dimensional Framework	**Structural Capacity**	Actor Diversity and Role Clarity.	Are all relevant actors (research, advisory, education, private sector, NGOs, farmers) present and fulfilling complementary roles?	Identify actors involved (research, education, advisory, farmers, private sector etc).
		Linkages and Network Functioning. Coordination.	How effectively do actors interact and collaborate?	Assess how well these actors are connected and coordinated. Institutinal Integration (how well are actors connected -researchers, advisors, farmers etc).
	Functional Capacity	Knowledge generation and dissemination.	Is knowledge generated and disseminated inclusively, incorporating all actors' knowledge?	Evaluate how knowledge is generated and translated into practice. How practice is represented in research.
		Advisory services.	Are advisory services generating and disseminating knowledge inclusively?	Review coverage, quality, and responsiveness of farm advisory systems.
	Innovation Capacity	Interactive innovation	Is the creation of knowledge interactive?	Extent of co-creation between farmers, researchers, and advisors.
		Knowledge Infrastructure, Communication and Data Systems. Digital tools.	Are knowledge resources, tools, and digital systems accessible and interoperable? How effective is communication?	Assess use of ICT platforms, databases, and online networks for knowledge sharing.
	Process Capacity	Learning and feedback loops.	What are the adapting mechanisms in place?	Examine mechanisms for continuous learning and adaptation.
		Monitoring and evaluation systems.	Is there M and E in place?	AKIS built-in M and E to track performance and impact.
	Human and Institutional Capacities	Human resources.	Do individuals and organisations have the skills, culture, and resources to engage effectively?	Skills and training of AKIS personnel.
		Financial resources.	Do incentives, and funding mechanisms support co-creation and learning?	Funding adequacy and sustainability. long-term KE funding; innovation support measures
		Institutional and policy suppor. Governance.	Do policies, support co-creation and learning?	Legal and policy frameworks enabling AKIS functions. Alignment of policy instruments; governance coherence; innovation support measures.
	Adaptive Capacity.	Reflexive and learning Capacity	Can the AKIS learn from experience and adapt to new challenges?	How rapidly can AKIS adapt and recover to a funtional state in response to external changes.

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