QuantiFarm

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Smart Farming, Smarter Policy

A behaviour-aware policy roadmap for accelerating digital technologies in European agriculture.

POLICY BRIEF

Highlights

Context: Current agricultural policies focus on a technology-push approach but the adoption gap is fundamentally behavioural; on-farm implementation remains low because policies fail to account for how farmers actually think and decide.

Problem Statement: Farmers often resist digital tools due to risk aversion, high cognitive load, and a lack of social proof, rather than just the cost of the technology itself.

Key Policy Action: Policymakers must integrate behavioural determinants into national plans, shifting success metrics from tech purchased to tech integrated, for long-term stability.

Key Behavioural Finding: Farmers' trust stems from regional familiarity and independent advisors rather than vendor marketing.

Potential Impact: Implemeting these seven pathways will foster a people-centred digital ecosystem, creating an attractive predictable sector for future generations. Peer networks build confidence, while performance-linked incentives reward sustainable results. Independent advisors increase technology retention rates through informed, independent guidance. Reducing administrative complexities reduces mental overload while data sovereignty and co-creation models ensure tools are practially relevant. Ultimately, this framework reduces the cost of failure to create a more equitable value chain that improves work-life balance, helping EU agricultural policymakers to evolve digital transition strategies towards meaningful, long-term behavioural integration.

Background & Challenges faced

Policy and Socioeconomic Context: The current European agricultural policy landscape is undergoing a complex transition towards the sustainability objectives defined in the Green Deal's Farm to Fork strategy. This transition occurs against a backdrop of significant socio-economic pressures, including low agricultural incomes, challenges to generational renewal, and widespread protests sparked by a lack of policy certainty and stability. While DATSs are significant tools for solving problems related to operational costs, labour shortages, and environmental compliance, a significant adoption gap persists. Despite the slower than desired adoption of DATSs being inextricably linked to broader barriers such as rural infrastructure (e.g., poor broadband), land access, and the recognition of women's labour in farm management; the gap is fundamentally a behavioural issue rather than a technical one. On farm implementation remains low because current policies often fail to account for how farmers actually think, learn, and decide.

The Main Challenge: Systemic Technology-Push Lock-in

The primary bottleneck in the current policy framework is a technology-push model that prioritises hardware-centric subsidies—essentially subsidising the purchase of tools, without addressing the human elements of technology integration. This has created a systemic lock-in with impacts felt across diverse European farming systems and regions.

Pressing Relevance and Affected Sectors

This issue is urgent for generational renewal and gender inclusivity. Younger farmers increasingly view digitalisation as a necessary tool for work-life balance, yet high up-front costs and policy instability deter investment. The lack of gender-inclusive strategies means that the significant management roles of women on family farms are often dismissed as "unpaid help", resulting in digital tools that are not tailored to their specific workflows. However, the urgency of helping farmers address profitability, competitiveness, and social and environmental factors cuts across all farming sectors. The following sectors are particularly impacted:

- **SMEs:** Risk aversion, particularly the fear of operational failure acts as a primary deterrent for SMEs who cannot afford the risk of experimentation.
- **Farmers are individuals:** Country-specific test cases highlight localised despair, from Spanish and Belgian farmers overwhelmed by administrative "red tape" to Romanian and Greek farmers struggling with data-related hurdles and historical distrust in authorities.
- **Gender and Youth:** Policies remain largely gender-blind, failing to tailor tools to the specific administrative workflows managed by women, who often feel "unseen" in the core farming business. Youth often can't access financial loans or make DATSs adoption decisions because they don't yet have financial control of farm finances.
- **Cognitive Load:** Farmers are burdened by administrative red tape and non-harmonised standards, leading to a mental overload where digital tools are abandoned because they duplicate reporting or keep the farmer "stuck behind a screen".
- **Lack of Social Proof:** Farmers remain sceptical of vendor marketing, preferring regional context and familiarity which are currently undervalued in top-down policy delivery.

Policy Initiatives, Gaps, and Barriers

While the CAP 2023-2027 and its National Strategic Plans (CSPs) offer flexibility, and new regulations like the EU Data Act (2025) and AI Act (2024) aim to foster trust, several implementation barriers remain.

- Success is currently measured by tech purchased rather than tech integrated behavioural change.
- There is a critical shortage of independent, trusted advisors who are equipped to actively legitimise new tools.
- Regulatory timelines and climate targets are often not aligned with the realised ROI timelines for DATSs use, causing financial despair among adopters.
- Gaps in data governance and a lack of clear economic value exchange for data sharing also stall adoption, as farmers fear losing their economic autonomy.

Existing frameworks including AKIS and Eco-schemes within the CAP can support behaviourally aware revisions going forward.

- Social Influence: Governed by CAP Objective 10 under Articles 114–118, AKIS serves as a critical instrument for strengthening the human layer of digital adoption by funding peer-to-peer learning networks, demonstration farms, and the combined technical and soft skills training of independent advisors who act as behavioural gatekeepers in the DATSs adoption process.
- Reduce Cognitive Load: Eco-schemes are governed by CAP Article 31. This mechanism is used to transition from simple hardware purchase subsidies to performance-linked or result-based payments that reward farmers for measurable on-farm benefits, such as input reduction or yield stability.
- Risk Aversion: CAP Pillar II under Articles 76-79, supports rural development measures with programmes that fund trialling new technologies to absorb the costs of experimentation.

The Necessity for Policy Action

Policy action is needed to move the digital transition toward a collaborative pull approach that prioritises human-centric factors like trust, social influence, and accessibility. Without a strategic shift toward performance-linked incentives, peer-to-peer learning networks, and co-creation through Living Labs, the digital transition will remain exclusive and unsustainable. Policymakers must move beyond market-mending subsidies to create a safety net for innovation that rewards active, sustainable performance and restores farmer autonomy. By addressing these human-centric factors – trust, social influence, and accessibility – policymakers can ensure that the digital transition

QuantiFarm Insights

Project Evidence Informing Policy Recommendations: A Behavioural Framework

Evidence for the 7 Policy Pathways is derived from a multi-method research approach, including WP1 farmer interviews, stakeholder engagement sessions, and 30 European Test Cases (TCs), across diverse European biogeographical regions. This project evidence confirms that the DATSs adoption gap is a behavioural issue, not a technical one, and provides the empirical foundation for the proposed people-centred policy shift.

WP1 research (D1.1, D1.2, D1.4) highlighting test-case and behavioural research evidence confirms that stakeholders value trust, social influence, and accessibility as primary catalysts to adoption.

01 The Power of Social Proof & Peer Validation.

Project research confirms that while technical performance is a top priority, the decision to adopt is primarily driven by regional context and familiarity rather than technical specifications. Qualitative data from Portugal (TC #2) and The Netherlands (TC #6) reveal that arable farmers only commit to high upfront costs after professional dialogue and observing peers' results firsthand in their own production systems or regions.

02 Risk Mitigation through Performance and Experience.

Evidence shows that farmers shift from purchasing to integrating technology when the benefits to their daily labour routine and risk management become visible. Qualitative data from Germany (TC #27) shows a young dairy farmer successfully adopted automated sensors when he found the tool shifted his labour from constant physical presence to the flexibility of remote observation, reducing mental and physical overload. While in Croatia (TC #30), seafood farmers utilised a DATS as a logging mechanism to learn from operational mistakes, effectively using the tool as a financial risk-mitigation strategy. In Ireland (TC #26), farmers involved in multi-season Living Labs demonstrated higher long-term uptake compared to those attending one-off training events.

03 Addressing Cognitive Load & the Red Tape Barrier

Qualitative data from TCs highlight that mental overload caused by administrative complexity is a leading cause of early technology abandonment. For example, in Spain (TC #3) and The Netherlands (TC #16), arable farmers reported a massive overload of bureaucracy and abandoned digital tools that were intended to help but were instead shifting their attention "away from the land" and "toward their desks". A pig farmer in Belgium (TC #24) found current subsidy schemes so significantly "complicated" that they were viewed as attempts to "mend a broken market" rather than provide a viable path to innovation.

04 Addressing Trust & Inclusivity

Evidence from TCs indicate that adoption is not merely an economic decision but is tied to historical trust and gender-specific workflows. In Romania (TCs #10, #17, #28), farmers on family-run farms required independent advisors to vouch for data security due to a historical distrust in authorities rooted in the country's political past. While in Ireland (TC #26) and The Netherlands (TC #24, TC #16), female operators and spouses often feel "unseen" by policy structures, with their essential management of farm shops or orchards not being recognised as core "farming business" labour.

" The extreme demands of a 14-hour workday leave little room for women to move beyond traditional roles... **We need digital tools** that actually improve work-life balance to make this lifestyle sustainable. "

Synthesised from Romanian & Greek Test Case Evidence

Visualising the Strategic Shift

Infographics for the 7 Policy Pathways serve as visual roadmaps, acting to help policymakers meaningfully reconsider policy strategies. Policies must act as a bridge to overcome the overarching barriers of trust, complexity and risk. Eight infographics are included in the following section, Policy Recommendations. One overarching infographic with supporting text summarises the 7 Policy Pathways and is followed by one infographic with supporting text for each of the seven behaviourally aware policy recommendations.

Links to Scientific Deliverables and Strategic Mapping. The recommendations in this policy brief are supported by the following project research:

- **Deliverable 1.4 (Chapter 5):** Detailed behavioural frameworks and mapping to 10 CAP Objectives, UN SDGs, and EU projects with QuantiFarm synergies.
- **Integrated DATSs Adoption Framework (D1.2):** Analyses phases of the farmer's DATSs adoption journey from "Encounter" and "Consideration" to post-installation "Use".
- **Scientific Foundation:** Grounded in the Unified Theory of Acceptance and Use of Technology (UTAUT) and aligned with research and outputs of other EU-funded projects (e.g., CODECS, BEATLES, FARMTOPIA, MEF4CAP).
- **Test Case qualitative and quantitative data (D4.2-4.4):** Evaluates individual test-cases and results from DATSs usage based on the application of the Assessment Framework. It concludes by providing aggregate metrics, best practices, and recommendations aimed at improving operational efficiency for the testing year.

Strategic Imperative

EU policymakers must shift the metric, moving the success of the next CAP cycle from measuring tech purchased to measuring tech integrated, keeping people at the centre of policy decisions.

Policy Recommendations

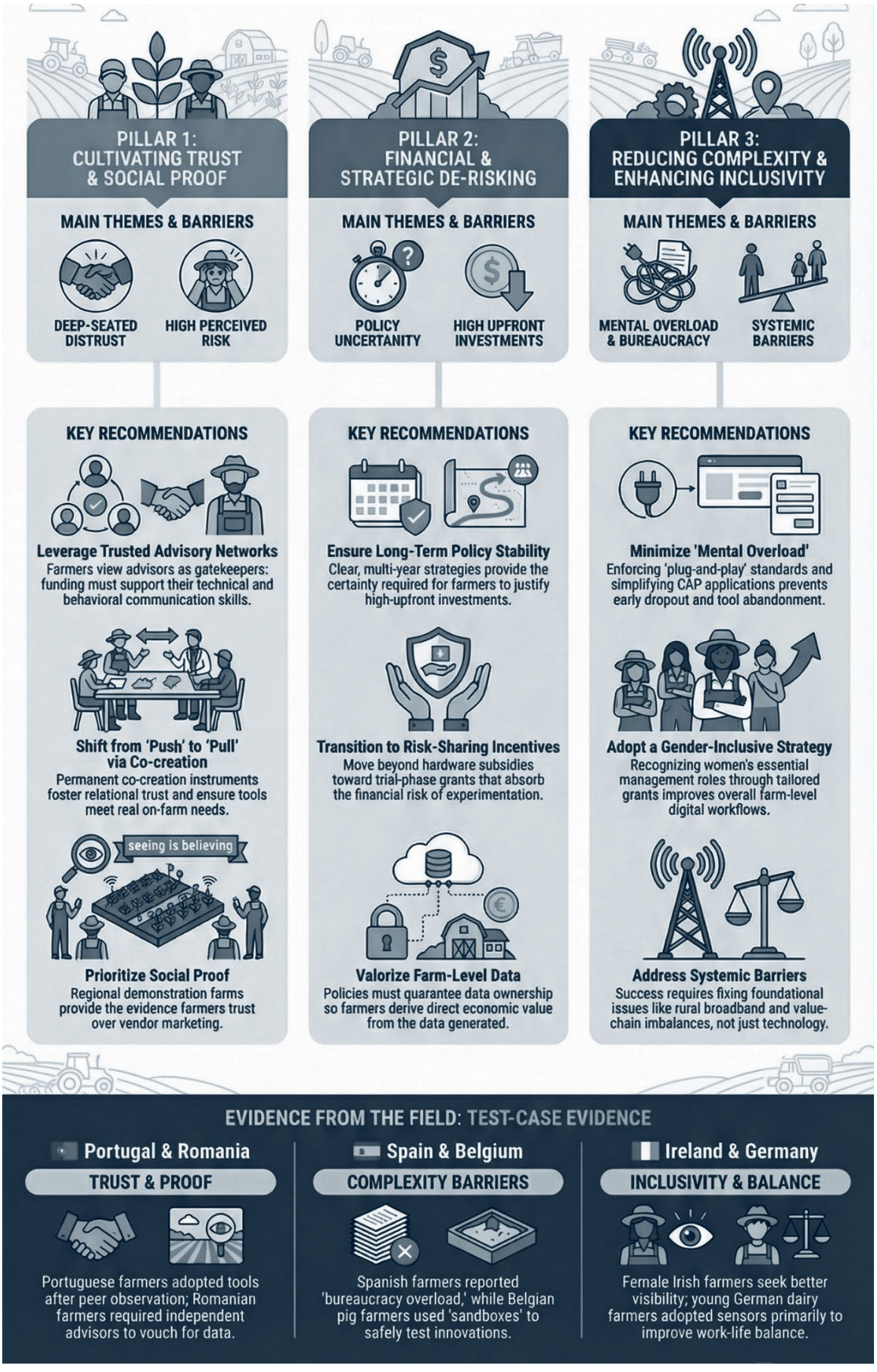
Smart Farming, Smarter Policy: A behaviour-aware, people-centred policy roadmap for accelerating digital technologies in European agriculture

This policy brief outlines seven strategic behaviour-aware recommendations designed to help transition European agricultural policy from a technology-push to a people-centred approach. Current technology-push models tend to treat adoption decisions as isolated purchases instead of accounting for the complex behavioural drivers for farmers. With specific emphasis on inclusion in the next CAP cycle (2028-2034), recommendations aim to help EU, Member State (MS), and local policymakers implement policies which help farmers succeed, ensuring DATSs are adopted effectively across diverse agricultural contexts. By aligning funding and support with how farmers actually make DATSs adoption decisions, policies can help bridge the gap between innovation and implementation.

The format of the policy brief follows a pattern. Each policy brief subsection will first show an infographic before supporting text is found on the subsequent page, beginning with the overarching policy action which summarises the 7 Policy Pathways. Supporting text for each of the 7 Behaviour-aware Policy Pathways contains Context, Need Addressed, Key Policy Action, Behavioural Insight, Test-case Evidence, and Policy Link.

7 PATHWAYS TO DIGITAL PROGRESS: BEHAVIOURALLY AWARE RECOMMENDATIONS FOR EU AGRICULTURAL POLICY

A synthesized, behavior-informed roadmap to increase DATSs adoption by addressing phychological and social barriers.



7 PATHWAYS TO DIGITAL PROGRESS:
BEHAVIOURALLY AWARE RECOMMENDATIONS FOR EU AGRICULTURAL POLICY

The overarching concept is to enable smarter farming through smarter policy using a people-first, behaviour-informed approach to agricultural technology adoption.

Overarching Strategic Recommendation: Shift policy metrics from technology-push to people-centred DATSs adoption.

Context: Current agricultural policies often focus on a technology-push approach, primarily subsidising the purchase of hardware and gadgets. However, the adoption gap is a behavioural issue rather than a technical one; on-farm implementation remains low because policies fail to account for how farmers actually think and decide.

Key Challenges: Farmers frequently resist new digital tools due to behavioural barriers – specifically risk aversion, high cognitive load, and a lack of social proof – rather than just the cost of the technology itself.

Need Addressed: The adoption gap, where on-farm implementation remains low because policies prioritize hardware sales over how farmers actually think and decide.

Key Policy Action: EU agricultural policymakers must integrate behavioural determinants into National CAP Strategic Plans (CSPs*), shifting success metrics from tech purchased (hardware sales) to tech integrated (long-term behavioural change). *Note: CSPs may be referred to as National and Regional Partnership Plans (NRPPs) in the future CAP.

Behavioural Insight: Farmers are unlikely to invest in DATSs if their first encounter is through vendor marketing; awareness and trust are instead shaped by familiarity and regional context.

Test-case Evidence: Farmers in Portugal (TC #2) adopted tools only after professional dialogue and observing regional peers. A young German dairy farmer (TC #27) demonstrated that digital tools must reduce "mental effort" and physical burdens to be considered sustainable for successors. Arable farmers in Spain (TC #3) reported cognitive overload from "red tape" and a Belgium pig farmer (TC #24) used sandboxes to safely test innovations. While in Ireland (TC #26), female dairy farmers felt they must work twice as hard as male counterparts to be "seen".

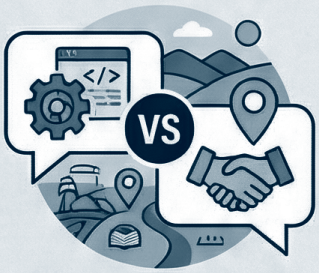
Policy Links: Improved implementation of existing CSPs and regulatory adjustment of success indicators particularly: AKIS (Articles 114-118), Eco-schemes (Article 31), Risk Management (Art. 76-79), Pillar II supports (Rural development measures, Technology investment, Advisory, Innovation and Digital Infrastructure, Young/Women Farmer supports), EIP-AGRI and multi-actor projects, and cross-cutting simplification. These modifications support broader EU initiatives like the AI Act and the EU Data Act.

PATHWAY 1: ESTABLISHING LONG-TERM POLICY STRATEGIES FOR AGRICULTURAL INVESTMENT

BARRIERS TO DIGITAL ADOPTION

FINANCIAL AND POLITICAL UNCERTAINTY

High upfront costs and shifting political leadership create investment risks for farmers.



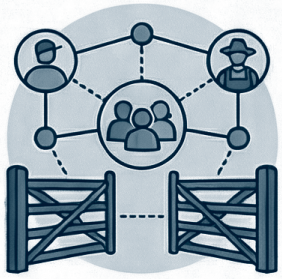
TECHNICAL SPECS VS. REGIONAL CONTEXT

Farmers value regional familiarity and peer success over vendor marketing or technical specifications.

THE NEED FOR "SOCIAL PROOF"

Farmers require evidence from trusted, local sources before committing to long-term digital investments.

STRATEGIC POLICY RECOMMENDATIONS



FUND PEER-TO-PEER LEARNING NETWORKS

Prioritize funding for demonstration farms where farmers see digital tools successfully implemented

ALIGN WITH LONG-TERM EU VISIONS

Strategies should mirror CAP Pillar II objectives and the UN Sustainable Development Goals

ENSURE TRANSPARENT COMMUNICATION

Build trust by providing clear information on the real implications of DATS adoption

TEST-CASE EVIDENCE

PORTUGAL: PEER-LED IRRIGATION

An arable farmer adopted precision irrigation only after observing it with regional peers

NETHERLANDS: PROFESSIONAL DIALOGUE

Arable farmers used peer networks to confirm management expertise through professional dialogue

GREECE: WORK-LIFE BALANCE

Young cotton farmers viewed digitalization as a tool to improve personal work-life balance

PATHWAY 1:
SOCIAL PROOF, AWARENESS, AND STABILITY

Context: Farmers require a stable policy environment and long-term vision to justify the high upfront costs of digital investments.

Need Addressed: Scepticism toward vendor marketing and lack of policy certainty to justify high upfront costs.

Key Policy Action: Prioritise and fund peer-to-peer learning networks and demonstration farms to provide social proof to farmers within real-world production systems.

Behavioural Insight: Social proof reduces perceived risk by demonstrating efficacy in a familiar, real-world context; regional familiarity is more influential than technical specifications.

Test-Case Evidence: Survey data shows that while performance is the top priority, farmers often rely on validating decisions through peer systems. A Portuguese arable farmer (TC #2) only decided to implement a precision irrigation system for corn after observing it being used by peers in his region and visiting their farms to see the tool in action and results firsthand. In The Netherlands (TC #6), farmers managing wheat, onion, and potato crops used peer networks to validate their own management expertise and adoption of tools through dialogue with peers and advisors. Younger Greek farmers (TC #4) identified digitalisation via VRA add-ons for cotton as a way to improve work-life balance, making the profession more attractive to the next generation.

Policy Link: Financial funding, improved implementation of AKIS networks (Articles 114-118), and Pillar II rural development measures.

PATHWAY 2: PROVIDE TARGETED FINANCIAL INCENTIVES AND SUPPORT FOT DATSs ADOPTION

A behavioral shift in policy - rewarding measurable benefits and absorbing the risks of experimentation to support small, mid-sized. and vulnerable farming groups

Identifying the Barriers to Digitalization

Financial & Operational Risk Aversion

Farmers often fear operational failure and high upfront costs more than they value potential long-term gains.

The "Learning by Doing" Gap

Adoption is hindered when economic or environmental benefits are not immediately visible or credible to the farmer.

Under-represented Demographics

Small/mid-sized farms, women farmers, and young farmers face steeper financial hurdles in accessing digital tools.

Key Policy Recommendations

Shift to Performance-Linked Incentives

Move from hardware-only subsidies to incentives rewarding measurable results, such as input savings or productivity gains.

Implement Trial-Phase Risk Sharing

Use trial grants and "living labs" to allow farmers to experiment with new tools without financial penalties.

Targeted Grant Rates

Provide higher grant rates and CAP Pillar II support specifically for young and women farmers to ensure inclusivity.

Strategic Alignment

UN SDGs

Supports SDG 1 (Poverty), SDG 2 (Food Security), and SDG 5 (Gender Equality).

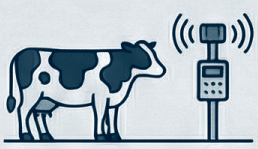
CAP Objectives

Directly supports Objective 1 (Viable Farm Income) and Objective 10 (Digitalization).

Pillar Support

Utilizes Pillar I (Eco-schemes) and Pillar II (Investment Support/Loans).

Real-World Test-Case Evidence



Germany

A dairy farmer adopted automated sensors after remote observation proved to reduce daily physical labour requirements.

Croatia

Seafood farmers used DATS as a logging mechanism to learn from mistakes and mitigate financial risks.

Ireland

Multi-season experimentation in "living labs" resulted in significantly higher long-term technology uptake than one-off training.

PATHWAY 2:
RESULTS-ORIENTED INCENTIVES AND RISK-SHARING

Context: Policy support must move beyond simple hardware subsidies to ensure usage is based on visible, credible benefits.

Need Addressed: The fear of operational failure acts as a primary deterrent for SMEs who cannot afford experimentation risks.

Key Policy Action: Shift from purchase subsidies to performance-linked incentives that reward measurable results (e.g., reward input savings) and offer trial-phase grants to absorb experimentation risks.

Behavioural Insight: Adoption is hindered by loss aversion; a guaranteed safety net encourages trialling innovative digital tools without the threat of financial penalty.
Test-Case Evidence: A young German dairy farmer (TC #27) adopted automated livestock monitoring sensors after seeing how remote observation reduced his daily physical labour. Croatian seafood farmers (TC #30) used digital tools as a logging mechanism to learn from operational mistakes (e.g., timing oyster lifting), effectively using the tool to mitigate the risk of financial loss from unwanted results. Related to the Irish test case (TC #26), farmers were more likely to use digital tools in the long-term if they first had the opportunity to experiment with the technology in Living Labs over multiple seasons instead of exposure through once-off training.

Policy Link: Regulatory adjustment of subsidy criteria for Eco-schemes (Article 31) and new financial incentives (trial grants) via Pillar II investment supports and loans.

POLICY PATHWAY 3: ENHANCING DATSs ADOPTION THROUGH TRUSTED ADVISORY & TRAINING SERVICES

Overcoming the digital trust gap and skills deficit to ensure effective use of Digital Agriculture Technology Solutions (DATSs) by EU farmers.

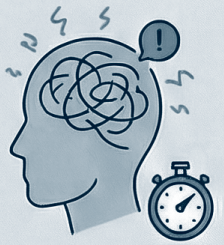
BARRIERS & BEHAVIOURAL INSIGHTS

The Digital Trust & Skills Gap

Lack of digital skills and trust are primary barriers to technology adoption in agriculture.

Advisors as Behavioral Gatekeepers

Farmers adopt tools when they see trusted advisors using digital outputs in routine consultations.

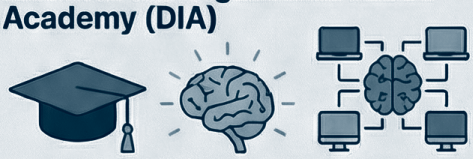


Advisor Anxiety

Advisors require continuous, funded training to overcome anxiety regarding rapid technological shifts.

POLICY RECOMMENDATIONS FOR DATS SUCCESS

Invest in the Digital Innovation Academy (DIA)



Fund training for advisors in both technical competence and behavioral communication skills.

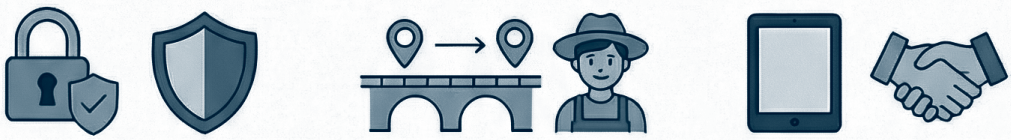
Empower Independent Advisory Services

Ensure funding for objective, non-commercial assessments that farmers trust more than provider claims.

Prioritize Peer-to-Peer Learning

Support demonstration farms and farm walks to showcase tangible benefits in real-life conditions.

TEST-CASE EVIDENCE (EU Regions)



ROMANIA	ITALY	PORTUGAL
Test Case Focus: Data Security	**Test Case Focus:** Knowledge Gaps	**Test Case Focus:** Implementation
Behavioral Insight/Finding: Farmers required independent advisors to vouch for security due to political history.	**Behavioral Insight/Finding:** Digital tools bridged critical gaps in farm history for young vineyard farmers.	**Behavioral Insight/Finding:** Long-time trusted advisors were identified as the primary partners for navigating DATS.

PATHWAY 3:

ENHANCING DATSs ADOPTION THROUGH TRUSTED ADVISORY & TRAINING SERVICES

Context: Advisors act as behavioural gatekeepers whose endorsement is necessary to legitimise new tools within a specific farming culture.

Need Addressed: Farmers can lack trust in DATSs that are not endorsed by independent advisors.

Key Policy Action: Invest in the Digital Innovation Academy (DIA) to train independent advisors in both technical competence and behavioural communication skills.

Behavioural Insight: Farmers are significantly more likely to retain DATSs when they see advisors actively using digital outputs during routine on-farm consultations.

Test-Case Evidence: The advisor's role in digital technology adoption with farmers is heavily influenced by the basis of trust within a specific culture. In certain regions, like Northern Europe, a farmer may readily trust a DATS if an advisor demonstrates extensive technical knowledge with the system. For example, in Romania (TCs #10, #17, #28), independent advisors were essential to vouch for data security due to historical political distrust. While in other cultures, like Southern Europe, the advisor must first build a personal connection before their endorsement of a digital tool is accepted by a farmer. For example, a young Italian vineyard farmer (TC #13) relied on a trusted advisor to help use digital tools to bridge a generational knowledge gap.

Policy Link: Improved implementation of advisory funding and educational initiatives through Pillar II Advisory Services and AKIS.

POLICY PATHWAY 4: ADDRESSING REGULATORY FRAGMENTATION & STANDARDISATION ISSUES

THE BARRIER: Cognitive Load & Regulatory Fragmentation

Administrative "Red Tape" Triggers Abandonment.

High Costs of Fragmentation.

Non-harmonised standards increase costs for providers and end-users while causing vendor lock-in.

Time Demands Cause Dropouts.

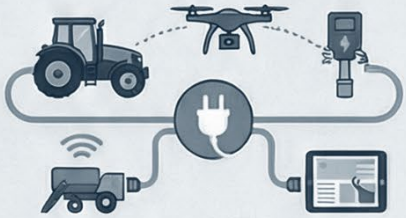
The digital environment shifts focus of farmers from land to desks.

THE SOLUTION: Strategic Policy Recommendations

Simplify Applications.

Reduce administrative burdens in grant applications to prevent compliance reporting duplication.

Enforce "Plug-and-Play" Standards.



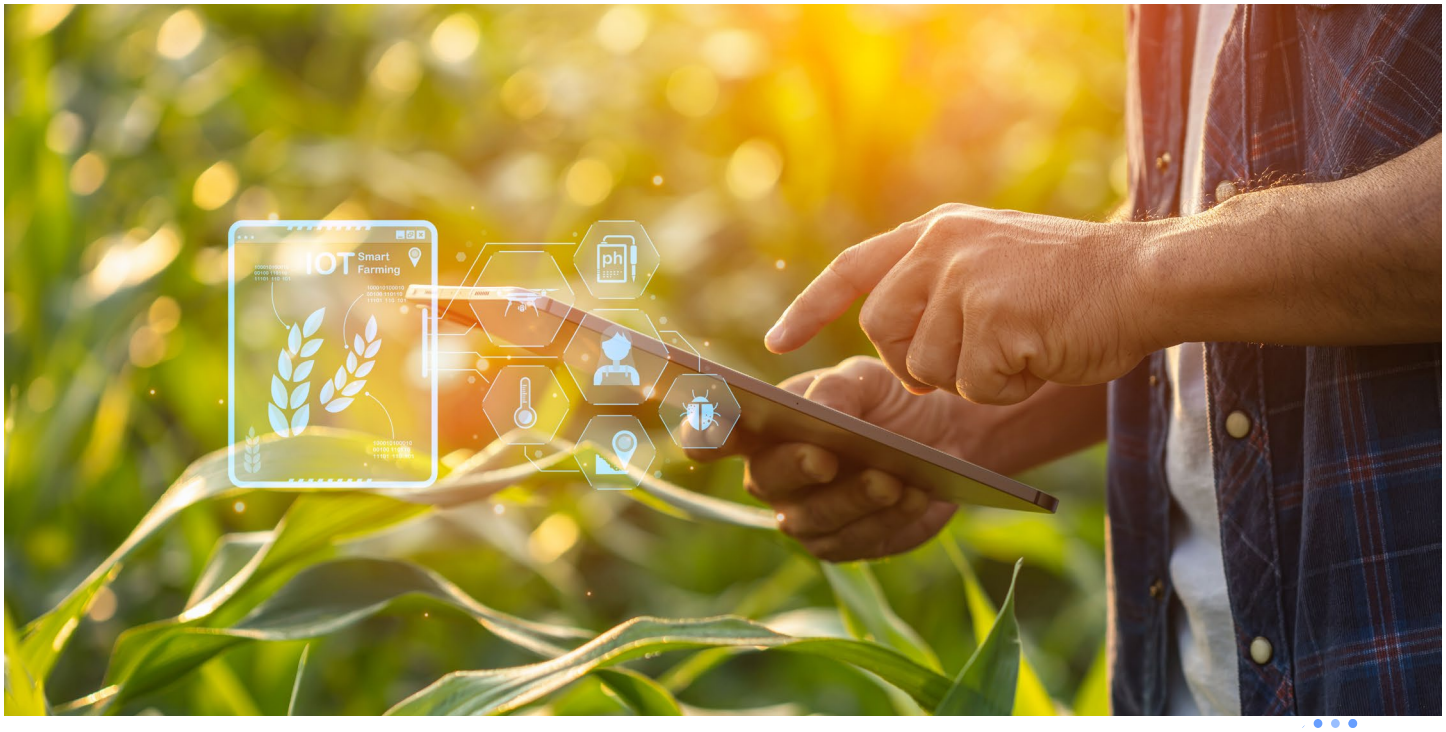
Incentivise interoperable standards and common data formats across all regional tools.

Farmer-Centric Technology Design.

Align technology design with real-time data use to reduce the administrative burden.

TEST-CASE EVIDENCE: Country-Specific Regulatory & Administrative Barriers

Country	Evidence Found
Spain	Arable farmers reported significant time loss due to administrative overhead.
Belgium	Pig farmers found current subsidy schemes significantly complicated and difficult to navigate.
Netherlands	Apple farmers viewed tools duplicating compliance reporting as obstacles to field work.



PATHWAY 4:
REDUCE COGNITIVE LOAD & REGULATORY COMPLEXITY

Context: Tools perceived as difficult to learn or those that duplicate administrative red tape are frequently abandoned.

Need Addressed: Mental overload and early dropout caused by non-harmonised standards and paperwork which shifts a farmer's attention away from the land and toward their desk.

Key Policy Action: Simplify CAP and Horizon Europe applications and enforce 'plug-and-play' standards to prevent vendor lock-in and redundant reporting.

Behavioural Insight: High time demands lead to early dropout; farmers fear being stuck "only behind a screen" and losing their intuitive "feeling with the crop".

Test-Case Evidence: Mixed farming systems frequently drop out of digital programs due to complex interfaces and high time demands. Spanish arable farmers (TC #3) reported a massive overload of paperwork and bureaucracy, which frequently shifted their attention away from the land and toward their desks. A Belgium pig farmer (TC #24) found current subsidy schemes significantly "complicated" and difficult to navigate effectively. Apple farmers in The Netherlands (TC #16) abandoned tools that duplicated existing reporting routines.

Policy Link: Regulatory adjustments (cross-compliance simplification) and new standardisation requirements in Pillar II Innovation and Digital Infrastructure.

POLICY PATHWAY 5: IMROVING DATA GOVERNANCE, PRIVACY AND TRUST IN AGRICULTURE

A framework for EU policymakers to address farmer concerns, enhance trust and ensure economic value from data.

BARRIERS TO DATA ADOPTION & ECONOMIC AUTONOMY

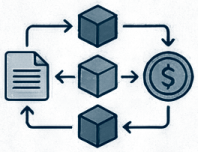
THE AUTONOMY GAP

Farmers resist tools perceived as externally controlling or prescriptive regarding data sharing and usage.

COMPLEX REGULATORY FEAR

Unclear EU regulations like the AI Act create a fear of non-compliance among farmers.

ECONOMIC VALORISATION



A critical barrier is the lack of frameworks ensuring farm data is not given away for free.

STRATEGIC POLICY RECOMMENDATIONS

TRANSPARENT COMMUNICATION

Explicitly communicate how the EU Data Act protects farmers and aligns with GDPR.

RELIABLE ADVICE & "FARMINARS"

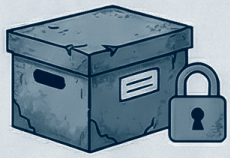
Fund educational tools like webinars to help farmers review contracts and data governance.

FARMER-CENTRIC TECH DESIGN

Ensure providers use transparent contract terms and explainable AI interfaces to build trust.

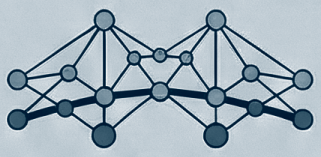
EVIDENCE FROM THE FIELD

ROMANIA: HISTORICAL DISTRUST



Resistance in test cases #10, #17, and #28 was linked to historical socialist-era distrust of authorities.

GREECE: STRATEGIC COORDINATION



Test case #4 highlights that a coordinated strategy is vital to prevent farmer "despair" over data hurdles.

PATHWAY 5:
DATA TRUST, SOVEREIGNTY & ECONOMIC AUTONOMY

Context: Farmers resist digital platforms if they are perceived as externally controlling or extractive regarding sensitive data.

Need Addressed: Uncertainty regarding data governance and a lack of clear economic value exchange for sharing data stall adoption.

Key Policy Action: Clearly communicate how the EU Data Act protects farmers and ensure policy frameworks allow them to derive direct economic value from their data.

Behavioural Insight: Building trust through transparent ownership restores a sense of autonomy and independence.

Test-Case Evidence: Resistance to technology adoption on Romania farms (TCs #10, #17, #28) was linked to historical distrust in authorities rooted in the country's political history. Greek stakeholders (TC #4) identified the need for a coordinated strategy to prevent farmers from "despairing" over data hurdles.

Policy Link: Regulatory adjustment (clarifying fair use) and improved implementation of data spaces, particularly in EU Data Act, AI Act, and Pillar II Digitalisation Frameworks

POLICY PATHWAY 6: PROMOTE COLLABORATION AND STAKEHOLDER INVOLVEMENT

PROBLEM: TOP-DOWN TECH PUSHES

SPORADIC PROJECT FUNDING

FARMERS & OPERATORS

Current efforts lack practical, sustained interaction with farmers and food chain operators at local levels.

TECH-PUSH BARRIER

Current agricultural digitalization is hindered by top-down technology 'pushes'.

SOLUTION: COLLABORATIVE CO-CREATION & TRUSTWORTHY ECOSYSTEMS

CO-CREATION DRIVES VOLUNTARY ADOPTION

Shifting from 'push' to 'pull' increases usability, satisfaction, and relational trust through voluntary design involvement.

SUSTAINED TRUSTWORTHY ECOSYSTEMS

Transitioning from unstable sporadic project funding to permanent co-creation and decision-making instruments.

KEY POLICY RECOMMENDATIONS

ESTABLISH NATIONAL FORUMS & SANDBOXES

Create national digital agriculture forums and regulatory sandboxes to test innovations in controlled environments.

ANNUAL YOUTH POLICY DIALOGUES

Formally include young fermers in regional and European decision-making processes regarding investment and policy.

MULTI-ACTOR APPROACH FUNDING

Continue funding projects that integrate public and private advisors into high-level decision-making.

TEST-CASE EVIDENCE

ITALY: BRIDGING THE GENERATIONAL GAP

Success relied on advisors and digital tools working together to transfer knowledge to young farmers.

IRELAND: THE 'LIVING LAB' ADVANTAGE

Multi-season experimentation in Living Labs led to significantly higher long-term uptake than one-off training.

BELGIUM: REDUCING FINANCIAL FEAR

Regulatory sandboxes allowed pig farmers to test high-risk innovations without solo financial exposure.

PATHWAY 6:
CO-CREATION AND LEARNING BY DOING

Context: Digital transformation is a continuous journey; "learning by doing" translates most effectively into successful field practice.

Need Addressed: Top-down technology pushes often lack practical relevance to specific needs of the farmer and daily farm realities.

Key Policy Action: Fund Living Labs and regulatory sandboxes to involve farmers, advisors, and researchers in co-designing technology and business models.

Behavioural Insight: Co-creation shifts adoption to a collaborative pull approach, increasing usability and creating psychological ownership.

Test-Case Evidence: Irish farmers (associated with TC #26) involved in multi-season experimentation in Living Labs showed significantly higher long-term uptake than those attending one-off training. Belgian (TC #24) pig farmers used co-creation to test high-risk innovations in controlled environments, reducing financial fear.

Policy Link: New instruments (sandboxes) and financial incentives for multi-actor projects via EIP-AGRI, Multi-Actor Projects, and Pillar II Cooperation.

POLICY PATHWAY 7: ADDRESSING BROADER SOCIETAL AND VALUE CHAIN ISSUES

To inform EU policymakers that digital technology (DATS) adoption requires addressing systemic barriers like infastructure and gender inequity-through risk-sharing accross the entire agricultural value chain.

STRATEGIC POLICY ACTIONS & SYSTEMIC BARRIERS

Beyond the "Silver Bullet"

Foundational barriers like poor rural infrastructure and land access must be fixed to make digital adoption viable.

Value Chain Risk-Sharing

Develop business models where processors and retailers share investment costs, ensuring farmers receive direct financial benefits for societal goods.

Gender-Inclusive Innovation

Policy must recognize women's roles in management by tailoring grants and co-designing tools for their specific workflows.

BEHAVIOURAL INSIGHTS FOR ADOPTION

End "Market Mending" Despair

Farmers are discouraged by subsidies that feel like "mending a broken market" rather than creating healthy value-chain conditions.

Work-Life Balance as a Magnet

Digital tools are seen as essential for reducing "mental effort" and physical burdens to attract the next generation.

The Gender Efficacy Gap

"Female operators often report lower tech self-efficacy despite managing core business tasks and secondary decision-making."

Digital technology adoption is not a "silver bullet" for generational renewal. To succeed, policy must move beyond technical adoption and fix foundational issues like rural infrastructure, income stability, and the "unseen" labor of women, while ensuring processors and retailers share the investment risks.

TEST-CASE EVIDENCE (REGIONAL INSIGHTS)

BELGIUM & GREECE: The Infrastructure Gap

Farmers report "despair" over poor data coverage and complicated subsidies that fail to address low market margins.

GERMANY & CROATIA: Risk Mitigation

Young farmers use DATS to reduce mental effort and "learn by doing" through operational risk-mitigation tools.

IRELAND & ROMANIA: The Invisible Workforce

Women in farming feel "unseen," often balancing 14-hour workdays that limit their participation in technical training.

PATHWAY 7:
INCLUSIVE INNOVATION
(GENDER AND SOCIETY)

Context: DATSs adoption is not a silver bullet for issues like generational renewal; success depends on addressing foundational barriers like rural infrastructure and gender inequality.

Need Addressed: Broad systemic barriers like land access and income stability for young farmers. Gender-blind policies where women's contributions are often categorised as "unpaid help" rather than essential business labour.

Key Policy Action: Tailor CAP grants to the unique position of women on family farms; develop risk-sharing business models that distribute costs across the entire value chain (retailers/processors).

Behavioural Insight: Adoption is tied to identity and work-life balance; female respondents frequently report lower self-efficacy despite significant management roles.

Test-Case Evidence: Irish female dairy farmers (TC #26) reported feeling "unseen" in the sector and believed they must work twice as hard to be heard. In The Netherlands and Belgium (TC #24, #16) women running orchards or farm shops felt their labour was not recognised as "core" business. Farmers in Romania (TC #10, #17) observed that the extreme demands of a 14-hour workday leave little room for women to move beyond traditional roles of household and childcare, reinforcing distinct gender divisions in labour and technology use.

Policy Link: Improvements to social inclusion objectives in Risk Management (Articles 76-79) and tailored grants through Pillar II Young/Women farmer supports.

CONCLUSION:
A STRATEGIC GOAL FOR
EU POLICYMAKERS

By addressing these human-centric factors – trust, social influence, and accessibility – policymakers can foster a digital transition that is both sustainable and inclusive. The ultimate imperative for the next CAP cycle is to ensure that agricultural policy moves beyond pushing technology hardware subsidies toward a behaviourally aware safety net for innovation.

Feasibility & Impact Potential

The strategic shift from a technology-push to a people-centred approach is practically feasible as it leverages existing legal instruments and structural frameworks within the CAP. By aligning behavioural insights with CAP articles, public bodies at the national, regional, and local level (Managing Authorities) can audit and evolve their national Strategic Plans (CSPs) to ensure DATSs are effectively integrated rather than merely viewed as a purchase.

Practical feasibility is high because the recommended actions are designed to be embedded into established systems:

- Existing CAP Mechanisms: Pathways utilise known instruments such as AKIS (Articles 114-118) for peer learning, Eco-schemes (Article 31) for performance-linked payments, and Risk Management (Articles 76-79) for trial-phase grants.
- Regulatory Alignment: Policy actions complement recent EU initiatives, including the AI Act (2024) and the EU Data Act (2025), which address concerns regarding interoperability and fair data exchange.
- Advisory Capacity: The QuantiFarm Digital Innovation Academy (DIA) provides a scalable model to train advisors in the behavioural communication skills necessary to act as trusted gatekeepers.

Barriers and Strategic Trade-offs

Implementation must navigate several systemic bottlenecks:

- The ROI Mismatch: High upfront costs often conflict with long-term ROI timelines, requiring stable policy environments to prevent operational failure and financial loss.
- Cognitive Load vs. Compliance: A critical trade-off exists between the need for robust data for regulatory monitoring and the farmer's mental overload caused by administrative red tape. Simplifying IT systems and user interfaces is essential to ensure farmers do not lose their "feeling with the land" by being stuck "behind a screen".
- Data Sovereignty: Balancing the open exchange of data for public benefit with farmers' fears of external control requires transparent ownership frameworks that provide direct economic value to the data generator.

Prioritising Urgent and High-Impact Measures

To maximise immediate impact, policymakers should prioritise three strategies:

1. Shift the Metric (Urgent): Move from measuring tech purchased (hardware sales) to tech integrated (behavioural change). Success must be defined by long-term usage and on-farm results.
2. De-Risk the Journey (High Impact): Immediately utilise Risk Management Articles 76-79 to create a safety net for innovation through trial-phase grants, removing the cost of failure for SMEs.
3. Empower the Human Layer: Invest heavily in independent advisors (AKIS Articles 114-118). They are the essential infrastructure of trust required to bridge the gap between DATSs availability and implementation.

Expected Economic, Environmental, and Social Impacts

- A behavioural policy roadmap, as presented above, delivers multi-faceted benefits across the sustainability triad:
- Economic: Transitioning to performance-linked incentives rewards active input savings and yield optimisation, directly contributing to farm profitability and resilience.
- Environmental: Precision tools (e.g., VRA for cotton) facilitate resource efficiency and soil health, directly supporting Green Deal and Farm to Fork objectives.
- Social: Digitalisation significantly enhances work-life balance, making the profession more attractive to successors. Tailoring grants for women on family farms addresses self-efficacy gaps and recognises previously "unseen" management labour as core business.

Further reading-references

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Related EU policy documents: CAP 2023-2027, CAP Strategic Plans, EU Data Act (2025), AI Act (2024), Green Deal's Farm to Fork, EU Code of Conduct on Agricultural Data Sharing, Vision for Agriculture and Food

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Smart Farming, Smarter Policy
A behaviour-aware policy roadmap for accelerating digital technologies in European agriculture.

POLICY BRIEF

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