



‘Farming is learned in the field, not in the classroom!’ – Enacting Sustainability as Social Organisation in Southeastern European Farming

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Abstract

Sustainability in agriculture is as much a policy goal as a cultural and political project: privileging scientific expertise, innovation, and entrepreneurship, it defines what counts as competent farming, sidelining the everyday, hands-on skills that actually sustain it. This paper examines how skills shape sustainability in Southeastern European agriculture, focusing on North Macedonia and Greece. Drawing on Science and Technology Studies, and specifically the concepts of in-difference and tinkering, we analyse three ethnographic episodes – ploughing, spraying, and hoeing – to show how farmers enact multiple versions of environmental, social, and economic sustainability. Beyond demonstrating multiplicity, our findings reveal that skill itself functions as a central coordinating mechanism, mediating between inherited knowledge, technoscientific guidance, social expectations, and labour organisation. Yet this coordination is not seamless: in making different sustainability demands workable in practice, certain forms of labour, knowledge, and responsibility are set apart and set aside. By focusing on the practices through which skill coordinates these demands, our approach reveals dynamics that remain hidden when policy focuses mostly on measurable outcomes, providing a basis for more socially just and inclusive sustainability interventions.

Keywords: Skills, Sustainable farming, Tinkering, In-Difference, Everyday Farming Practices



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Introduction & Literature Review

Over the past two decades, sustainability has become a central organising principle in agricultural policy, development programming, and academic research (Pawłowska 2025; Wineman 2025). Across global frameworks, national strategies, and local initiatives, the transition toward sustainable agriculture is framed as a matter of innovation, resilience, and adaptive capacity (Finger 2023). In this framing, sustainability operates not only as an environmental goal but as a cultural and political project that shapes what counts as responsible farming and legitimate expertise. Described by Gugganig et al. (2023) as following a ‘treadmill’ logic, this orientation increasingly addresses farmers as entrepreneurial actors who must integrate new technologies, participate in knowledge networks, respond to market signals, and remain flexible in the face of environmental uncertainty. In this landscape, sustainability becomes closely associated with upgrading – of systems, infrastructures, and, crucially, skills.

Within these narratives, skill is frequently invoked but rarely closely examined or interrogated. It appears as technological literacy (Arangurí et al. 2025), managerial competence (Pretty 1995; Dogliotti et al. 2014; Wezel et al. 2014), the ability to network effectively (Lamichhane et al. 2016; Rissing 2016), or the capacity to adopt innovative practices (Moschitz et al. 2015). Sociality, understood as a form of skilfulness, is similarly framed in terms of stakeholder engagement, collaboration platforms, and knowledge exchange networks (Leeuwis & Pyburn 2002; Šūmane et al. 2018). What tends to recede from view are the practice-based skills through which agricultural work is carried out on a daily basis – the repetitive, situated, and often manual forms of knowing that are neither easily codified nor readily scalable. This asymmetry is not simply epistemic but political. As Doggett et al. (2026) argue, the marginalisation of certain forms of agricultural know-how is not merely a matter of cultural misrecognition, but the outcome of sociotechnical systems that define whose knowledge counts, whose labour is made invisible, and who is recognised as an expert. Consequently, farmers’ everyday skills are often cast as basic, traditional, or residual, assumed to be self-evident or destined to be replaced by more ‘advanced’ techniques.

Yet in many agrarian contexts, sustainable agricultural life continues to depend precisely on these forms of practical competence (Laksmana 2024; Gorissen et al. 2025). Practices such as hoeing, pruning, planting, and spraying require fine-grained judgment, bodily calibration, and forms of coordination that unfold through sustained interaction with others and with the land (Burton et al. 2020). This paper begins from the premise that examining what falls into the background of sustainability talk – particularly the social organisation of everyday skill – offers a crucial vantage point from which to rethink what sustainability is, and whose practices it recognises. Focusing on the Southeastern European context, specifically

North Macedonia and Greece, the paper explores: How is skill recognised and enacted in contemporary agricultural life? How do these skills resonate, or clash, with dominant sustainability narratives? Which social structures render particular skills visible as expertise while obscuring others?

These questions are particularly urgent now because, as Gugganig (2025) shows, EU agricultural policy increasingly frames sustainability as a ‘technoscientific project’ where expertise is measured through digital tools, data schemes, and high-tech interventions. This renders tacit, practice-based knowledge (and knowers) largely invisible, even as it remains crucial for managing biodiversity, soil fertility, and local environmental conditions. Studying Southeastern Europe specifically – here, North Macedonia and Greece – is important because farmers in this region often operate within small- and medium-scale, heterogeneous agricultural systems that are highly sensitive to place-based conditions. Unlike more industrialised regions of Europe, the local skills, knowledge networks, and adaptive practices of these farmers are at particular risk of being overlooked as CAP reforms emphasise standardised, digitised, and performance-oriented measures of sustainability. As Beck et al. (2021) argue, ‘sustainability imaginaries’ are not just ideas – they bring material projects into being, justify certain interventions, and open up or close down options for how transformations are governed. So, against this context, we seek to understand how ‘place’ is made for these forgotten skills, and how processes of recognition, sidelining, and forgetting are socially organised and situated in contemporary Southeastern European agriculture.

There is a growing recognition in the literature of the role social relations play in shaping agricultural practice and sustainability. Scholars note that social relations can either facilitate or impede the adoption of sustainable practices (Lai et al 2025) – for example, the uptake of water-saving irrigation technologies is often mediated by networks, peer norms, and local hierarchies (Mu et al. 2024). More nuanced analyses have linked skill to gender and social positioning (Brandth 2006), showing that even when women acquire technical proficiency, such as driving a tractor ‘like a man,’ they may not be recognised as ‘skilled’ because prevailing social norms assume that certain capacities are inherently masculine (Saugeres 2002). Thus, Doggett et al. (2026) invite us to see skill not simply as a capacity but as a form of political classification. According to them, the division of workers into ‘skilled’ and ‘unskilled’ categories is not neutral; it is deeply political, often racialised and gendered in ways that naturalise some actors as competent knowers and others as merely manual labour. Once institutionalised, these distinctions operate as ‘political infrastructure,’ shaping who is authorised to speak as an expert, which forms of agricultural knowledge are codified into policy and technology, and which remain unrecognised despite being indispensable to everyday practice.

A second theme in the literature concerns the dichotomy between formal

and informal skill (Šūmane et al. 2018). As we shall cover in the next section, we encountered this dichotomy in the context of the EU Horizon Europe project NEXTFOOD, where, as participants, we were asked to formulate an ‘inventory of skills.’ For us, this process of formalisation highlighted how certain modes of skilling and ways of being skilled can be obscured – or even lost – when skills are translated into standardised categories. Similar concerns are raised in critiques of participatory research. Stolzenbach (1997), for instance, problematises the ambitions to improve farmers’ experimentation, arguing that it is not a lack of skill that limits experimentation, but rather that the flexibility and adaptive judgment inherent to farmers’ practices do not align neatly with formal scientific procedures. As he observes, “‘scientification’ of farmers’ experiments would miss the point” (p. 46). Put more broadly, attempts to formalise farming skills – under, for example, labels such as ‘collaboration’ or ‘networking skills’ – risk obscuring the diversity of ways in which people actually engage in farming practice (Fischer et al 2025). Importantly, what is obscured is not simply ‘informal’ skill, as if this were a stable counter-category to the ‘formal,’ but forms of practice that do not sit comfortably within that distinction in the first place. This, in turn, underscores the need to approach skill as an ongoing accomplishment of practice, rather than as a stable attribute captured by classificatory schemes.

A third pattern in the literature on sustainable agriculture is to frame farmers in terms of adoption frameworks. Farmers are often assumed to face constraints – such as climate change, soil nutrient depletion, or biodiversity loss – that lead to them being ‘in need’ of adopting sustainability paradigms, such as certified organic agriculture. Within this ‘deficit logic,’ non-adoption is interpreted as stemming from lack of knowledge, skill, or resources (Charatsari & Lioutas 2019; Ahmed et al., 2017), rather than as a reflection of farmers’ own strategies or adaptations. The concept of ‘in-difference’ (Gugganig et al., 2026) challenges this framing by highlighting that farmers may engage with sustainability schemes critically and selectively, taking up, modifying, or ignoring measures according to their ecological, labour, and practical realities. Importantly, for us, this stance directs attention to the concrete work of ‘enactment’ (Mol 2002): how farmers, for example, take up or adapt recommended measures such as hoeing, crop rotations, or soil management – not simply whether they ‘adopt’ sustainability as an abstract paradigm. This resonates with the notion of ‘tinkering,’ which Higgins et al. (2023) use, drawing on Mol et al. (2015), to address, in the context of agriculture, the deliberative work through which farmers make new technologies workable within their existing knowledge-practices and farming goals. Conceptualised as ‘care-ful’ work, tinkering captures how farmers navigate between ‘local cares’ – rooted in everyday farming realities – and ‘non-local cares,’ such as environmental management, food security, or smart technologies. These non-local concerns are

not simply absorbed; they are selectively translated and reshaped so that they fit within established routines and commitments. In this sense, tinkering reinforces the argument that farmers' engagements with sustainability schemes are practical and situated processes of adaptation and negotiation, rather than straightforward indicators of compliance, resistance, or deficiency.

Taken together, these studies provide useful conceptual tools for examining the social organisation of skilling in shifting sustainability contexts. Drawing on the concepts of in-difference and tinkering, we situate this study within agri-food technoscience scholarship, a strand of Science and Technology Studies (STS) (Gugganig et al. 2023), highlighting the contingency, indeterminacy, and material heterogeneity (Higgins et al. 2023) of what might otherwise appear as stable, individualised, and universally (un)recognisable farming skills. While sharing Sennett's (2008) interest in practice-based skill, this paper departs from his emphasis on skill as an embodied capacity. Bridging into STS scholarship, we treat skill instead as an enacted accomplishment arising through social relations that recognise, organise, and evaluate particular practices (and people) as skilful. In STS and the wider agricultural literature, skill is often addressed as an externally judged category (that is, how farmers are labelled skilled or unskilled), while paying less attention to how farmers themselves organise relations of skill in everyday work. This study addresses that gap by examining how farmers negotiate and make skill visible in the lived realities of agricultural work in Southeastern Europe.

Through three ethnographic moments – conflicting generational understandings of 'proper' ploughing in North Macedonia, the performative intensification of spraying among Greek farmers as a marker of competence alongside an agricultural education professor's emphasis on critical thinking, and Macedonian farmers' own accounts of hoeing as a collectively organised accomplishment – the analysis examines how skill is variously attributed, demonstrated, and handled. By foregrounding the cultural and political work through which skill is enacted, the paper contributes to ongoing debates about the governance of sustainability, the politics of expertise, and the distribution of recognition in contemporary environmental transition.

Methodology: From Skills Inventory to Situated Practice

The empirical material for this article was produced within the framework of the NEXTFOOD project, a Horizon Europe-funded initiative aimed at developing an educational roadmap for "the next generation of agrifood professionals." As part of the project, we developed an inventory of skills intended to support sustainable development across the social, environmental, and economic dimensions of the agrifood sector. The inventory was based on a review of 34 peer-reviewed articles

and 30 grey literature publications, 20 focus group interviews conducted in nine countries across Europe, South America, Asia, and Africa, and a questionnaire survey with 31 international researchers and activists. These materials were used to develop the skills inventory and to suggest improvements to agricultural education and collaboration in the agrifood sector. Both authors were actively involved in the project, contributing to desk research and qualitative studies of skilling practices.

This article draws on three specific empirical sources generated within the broader project. The first consists of two focus group workshops with farmers and agricultural advisors in the Kavala region and in Thessaloniki, Greece, conducted in November 2018. The sessions, each lasting approximately two hours, were facilitated by one of the authors with the assistance of a Greek-speaking project participant. They were documented through audiovisual recordings and subsequently transcribed. The purpose of these focus groups was to identify and elaborate the skills that farmers themselves considered essential for sustainable farming.

A decisive moment during one of these focus groups shaped the analytical direction of the present article. When participants were asked what forms of education they regarded as most important for future generations on their farms, the question was met with prolonged silence. One participant eventually remarked that many farmers attend courses primarily for the financial compensation provided by such programs. Another added that: “Farming is learned in the field, not in the classroom!” This exchange revealed a tension between the abstract ‘skill-talk’ evident in earlier discussions – where participants fluently referenced ‘networking,’ ‘digital capacities,’ and ‘precision farming’ – and a more tacit, practice-based understanding of skill grounded in everyday farm work. The episode suggested that prevailing conceptualisations of skill, including those mobilised in policy and educational frameworks, might overlook forms of knowing embedded in routine agricultural practice.

To explore this dimension more closely, four unstructured interviews (following Atkinson 2015) were conducted in February 2021 with organic farmers based in North Macedonia. Each interview lasted between one and two hours and was carried out online via Zoom in Macedonian. The interviews were transcribed and translated into English by one of the authors to facilitate joint analysis. Interviewees were invited to reflect on what skill meant to them and how they identified and evaluated skill in their daily work as organic farmers. Particular attention was given to the practices of ploughing and hoeing, which informants emphasised as situations in which attentiveness to varying levels of experience – ranging from novice to highly skilled – was especially critical. These detailed accounts enabled an examination of how skill is recognised and negotiated in concrete farming situations.

The educator perspective is represented through an interview with a professor

of precision agriculture based in Thessaloniki, Greece, conducted in October 2020 as part of a related study on the role of learning outcomes in agricultural education. The interview was carried out in English. While additional educator perspectives were collected within the broader project, the present article focuses specifically on how this interviewee makes sense of farmers' positions on skilfulness in relation to institutionalised sustainability discourses. Rather than examining pedagogical techniques as such, our interest lies in how educational actors – teaching what they describe as “real farmers' kids” – interpret and respond to farmers' more practice-based understandings of skill.

The skills inventory and associated tools developed within the NextFood project presented skill as definable, transferable, and applicable across contexts – an approach aligned with the expectations of the project's policy stakeholders and European Commission reviewers. In this highly formal setting, everyday forms of skill described by farmers found limited expression. The present article thus seeks to bring these mundane, practice-based experiences of skilfulness we collected into analytical focus.

The analysis was conducted collaboratively and iteratively by both authors. Each independently identified themes within the empirical material, after which interpretations were compared and refined through discussion. Analytically, we draw on the approach developed by Smith (1987), which examines how discursive organisation renders visible ‘relations of ruling.’ In a way resonant with STS arguments that practices enact (Mol 2002) realities, Smith shows that what an account ‘conveys,’ or apparently ‘reports upon,’ is not so much an antecedent phenomenon as the upshot of particular ‘practices of enactment’ (Schneider & Woolgar 2015). Inspired by this perspective, we closely analysed informants' accounts of farming practices – namely ploughing, spraying, and hoeing – to explore how they organise and articulate ‘relations of *skilling*’ within sustainable agriculture. Following in particular the way Smith's approach is taken up by Woolgar and Lezaun (2013), we examined how these narratives construct relevant actors, attribute competencies and responsibilities to them, and delineate the networks of rights and obligations that shape specific farming situations.

The empirical section that follows is organised around distinct farming practices. This structure reflects the way in which skills and skilling were discussed by informants – namely, in relation to concrete activities rather than abstract categories. Three cases focusing on ploughing, spraying, and hoeing form the core of the analysis. These are followed by a discussion of skill as an active process of organising social relations around contrasting notions of ‘good’ or ‘proper,’ in this way actively assembling what counts as ‘sustainability’ in particular farm settings, and a conclusion highlighting the main points of the paper.

Ploughing in the ‘Wrong’ Direction

A young farmer from North Macedonia recounts attempting a solution to soil nutrient depletion on the family farm:

A while back, my brother and I were talking about why some parts of our hilly fields always yield more than others. He’d learned in school that rain and irrigation wash nutrients from the higher ground down to the lower areas, and you can see it in the harvest. On our land, the lower parts have always produced better than the top of the slopes. He said that if we ploughed across the slope instead of up and down, we could make the yields more even. It made sense to me, so we decided to give it a try.

The young farmer, who runs a family farm specialising in the certified organic production of cereals and alfalfa, admits that the result was not as good as he expected:

At that time, I was not as skilled at ploughing as I am now. I didn’t do it well, so the surface of the field became uneven and bumpy. It is still bumpy to some extent because of it. I mean, that field has always been ploughed in one direction, so when we did it in the other direction, the result was poor.

The farmer takes the ‘bumpiness of the field’ as evidence of lacking skill. Skill, for him, is made visible in the material traces left by the plough – it is not simply a personal capacity, but something that others too can see and judge. In this way, the field itself becomes the standard of evaluation. The scientific reasoning behind ploughing across the slope does not disappear, but it is assessed through the practical and aesthetic logic of the farm.

The excerpts above thus point to some of the challenges arising when introducing institutionalised knowledge, taught and learnt at school, into an established farming practice. Seen through the notion of in-difference (Gugganig et al. 2026), this is not simply a case of adopting or rejecting school knowledge. Rather, the farm relates to it from a position ‘set apart’: the idea must prove itself within existing routines and standards before it can count. The informal exchange between the brothers connects school and farm, but it also shows that the farm remains its own centre of evaluation.

It is not simply the idea – whether it makes sense or how scientifically sound it is – that moves this process forward, but also the conversations and negotiations with family members. For example, what stuck with this farmer was his father’s

reaction when he first saw the results of ‘ploughing in the other direction’:

When my father saw what I’d done, he was shocked. He said: ‘What have you done? You don’t know what you’re doing. You’ve been messing around.’

In both the farmer’s and his father’s reactions, we see that they approach ‘ploughing’ as a skilled operation, and they both demonstrate an ability to judge the skilfulness of the execution in terms of its material traces. This implies a certain internalised understanding of what a field should look like after a given operation. In this case, then, skill concerns the extent to which a field deviates from that internalised standard.

Importantly, this retelling demonstrates that ‘ploughing’ is not just an agrotechnical measure, but in this family farm context, it is an emotionally charged social event. When we asked the farmer if he had discussed this situation with other members of his family, he told us:

I only talked with dad. Mom doesn’t care about ploughing. She needn’t bother about this, as she doesn’t do ploughing. Simply, she wouldn’t have any opinion about it.

By emphasising that the mother “doesn’t do ploughing,” she is positioned as outside the domain where skill is enacted and judged. Through the lens of in-difference, this is not simple lack of interest, but a setting apart. Because she does not participate in the embodied practice, she is excluded from evaluating the field and from decision-making: ploughing is done in-difference to her. Note that, not only is she now disallowed from participating in the assessment of the field, but also, thereby, from appreciating ‘ploughing in the other direction’ as a potential solution to soil-nutrient depletion.

Initially, the father was sceptical, emphasising the possibility of tractor accidents, although upon the young farmer’s insistence, eventually, the father (as the young farmer put it) “allowed it.” The phrasing of ‘allowance’ highlighted the hierarchical relationship between family members, marking the father as the authority who sets the boundaries for experimentation. In this hierarchy, the mother is not simply at the bottom, but, as already pointed out, positioned outside the domain of ploughing altogether. This makes farming ‘gendered’ – not because of a blanket assumption about women, but because the practice itself defines who counts as a ‘doer.’ Note, for example, that the brother is also excluded from the relationship that constitutes skill on this farm: he can propose ideas, but does so in-difference to the ploughing practices and the field that embody skill.

But addressing soil nutrient depletion was not as simple as the young farmer originally thought:

Five years later, we had some Swiss experts visiting. They examined the soil on that hilly field. It was still very bad. The problem was not yet resolved. I told them about the ploughing, which they thought was a good way to go about it. But they also said this was a long-term solution. You don't achieve it overnight. We need to continue doing it so that after some years the effects become visible. Since then, we plough that way. And we will continue to do so.

This tells us that 'ploughing in the other direction' does not end with the field. As we see in the excerpt above, even five years later, the field was subjected to the gaze of the Swiss soil experts, for whom skill continued to be visible, not as a material trace left by a tractor, but as soil composition produced in a lab. This demonstrates temporal tinkering, in the sense that the idea and event of 'ploughing in the other direction' are respecified as an open-ended *process*. As such, 'ploughing in the other direction' is allowed to unfold over years, in which farmers and experts repeatedly observe, assess, and adjust the practice, negotiating between institutionalised knowledge, and local, everyday ways of knowing. Rather than a binary moment of adoption or rejection, this points to an ongoing process of calibration, in which ploughing itself remains open, provisional, and subject to revision.

Spraying to Be Seen

While farmers often privileged local knowledge, this did not mean they were unable to engage in more formally taught, institutionally recognised forms of expertise. For example, the Greek farmers we interviewed during the focus groups emphasised the importance of 'social skills,' particularly 'networking.' They linked this to what they identified as their most pressing challenge: wholesalers' lack of interest in product quality. In their view, there was little incentive to produce higher-quality goods when both low- and high-quality products received the same price. As a result, they argued that alternative market channels willing to reward quality were necessary. Achieving this, they suggested, would depend on 'strengthening networks' and 'fostering collaboration.' Moreover, all participating farmers reported using smartphones for farming-related activities, such as monitoring weather conditions. They also described engaging in online communities where they exchanged information – for example, sharing observations about pest movements. These 'digital networks' enabled them to implement protective measures in a timely manner, thereby safeguarding their harvests. Some farmers

had even installed humidity and temperature sensors in their fields, which they could monitor remotely via their phones. Taken together, these accounts point to farming practices that align with a ‘technoscientific’ (Gugganig 2025) vision of sustainability, in which digital tools, data exchange, and technological monitoring are central to agricultural decision-making.

However, when, in one of the focus groups, the discussion turned toward pesticides and sustainability, the farmers emphasised social expectations rather than technology. They told us that weather conditions in recent years had led to an increase in plant diseases, and that their response was often to apply more pesticides. Yet this was not always because the plants strictly required it; rather, spraying also served to show their local communities that they were doing everything possible to ensure quality. They described the practice almost as a ritual, applying pesticides because ‘the time has come’ (as one might speak of dyeing eggs at Easter), thereby demonstrating to other local farmers that they were managing the farm ‘well.’

They were not rejecting dominant sustainability frameworks that prescribe reducing pesticide use in agriculture; indeed, the Greek farmers acknowledged that minimising pesticides is important. Rather than rejecting these prescriptions, they were operating in-difference to them – they acknowledged and accepted the norms, while simultaneously performing a version of ‘doing well’ in which skill is rendered visible through pesticide applications. This differs from Burton et al.’s (2020) account, which implies that unsustainable practices persist because they provide the only available symbols of competence (see also Lavoie & Wardropper 2021). What we see here instead is that farmers recognise both set of norms. What matters in practice depends on the situation: sustainability prescriptions such as pesticide reduction may be acknowledged as ‘good,’ but skill is demonstrated through visible actions such as spraying. In this sense, different ‘registers’ (Heuts & Mol 2013) of skill may coexist, and farmers navigate them without either displacing or clashing with the other. Contemporary agriculture, then, involves multiple evaluative registers that can operate in parallel rather than, as Burton et al suggest, a single symbolic economy in which new markers replace old ones.

The socially informed approach to pesticide application seen here differs markedly from school-taught pest management, which is rooted in observation and analysis. This contrast came up during an interview with a professor of precision agriculture in Thessaloniki, Greece. When asked to explain what, in his view, makes a student ‘non-skilled,’ the professor responded:

I think, for a student, non-skilled is one that has not learned to think critically – doesn’t learn to evaluate stuff. Who, for example, can read a news item and take everything they tell them for granted, as if that’s the way it is. They don’t critically evaluate the information they get

based on their knowledge, and then try to find out if this is true or not. For example, if you are a farmer, and somebody tells you ‘Spray this chemical!’ or ‘this very safe preparation on your field,’ they just go ahead and do it. They don’t ask questions.

While the farmers’ ‘social use of pesticides’ marks them as ‘skilled’ within their local communities, the professor’s perspective characterises this approach as ‘non-skilled.’ He elaborates this further as follows:

So, in the past, my father for example could have told me ‘That’s how we do farming’ or ‘I do these specific practices on those specific dates.’ And it used to be that this was sufficient to continue an operation. But nowadays, with extreme variance in temperature and water precipitation becoming very disturbed and not having any regular sequence you must be able to adapt. So, to adapt to all these changes you must be able to think very critically and be able to take a lot of input – from your advisor, or from soil analysts, or from the government, information services, and integrate all that and be able to apply it to your system. So critical thinking is one of the top things. If you lack that it’s very hard to become a successful and skilled professional in this field.

The professor establishes a contrast between habitual modes of farming and doing farming ‘reflexively’ via responding critically to external inputs. This is not to say that the professor is unable to appreciate the forms of skilfulness he associates with the habitual farmer. For example, he pointed out that some of his students come from farming families where they have learned how to “prepare a field” or “plant stuff,” and are “good at doing a lot of the physical work.” At the same time, he says “we are not teaching farmers.” The programme this professor teaches aims to produce ‘agricultural professionals’ with the ability to collect and analyse data and interpret the results. In this context, being skilled at certain farming activities – glossed by the professor as ‘physical work’ – does not amount to professional qualifications.

Between the previous section on ploughing and this one on spraying, a clear rhetorical separation emerges between ‘the field’ and ‘the classroom.’ This divide is explicitly enacted in the Greek farmers’ remark that “farming is learned in the field, not in the classroom.” In the ploughing case, the father’s reaction – “You don’t know what you’re doing” – makes this implication visible: by following the school’s recommendation (ploughing in the ‘wrong’ direction), the young farmer is shown as not having learned the practical skills of the farm. Interestingly, both the professor, representing ‘classroom farming,’ and the farmers, representing

‘field farming,’ accuse each other of acting ‘non-reflexively’ (captured through the phrase both sides use: ‘not thinking’), revealing a shared concern with the proper enactment of skill, albeit from very different perspectives.

This constitutes tinkering through boundary-making, or, to use Singleton and Law’s (2013) term, ‘disconnection rituals’ oriented toward creating and maintaining a distance between on-farm practices and wider, institutional expectations, even as farmers engage with those expectations. Such devices discursively produce a separation between the highly abstract ‘skill talk’ demanded by sustainability discourses to mark farmers as ‘skilled,’ and the practical, work-related skills that constitute ‘real’ farming in the farmers’ own eyes. In the focus groups, farmers appeared particularly adept at navigating this boundary – for instance, performing abstract ‘skill talk’ around high-tech and precision agriculture, while simultaneously (and without apparent conflict) engaging in the ‘social use of pesticides,’ which fundamentally contradicts the technoscientific model. This ability to navigate multiple registers appears especially important in Southeastern European agriculture, where farmers rely on EU funding that requires adherence to the ‘correct’ forms of skill work and discourse.

Hoeing and the Politics of the ‘Line’

Hoeing, when conducted as part of professional farming, is a collective endeavour. It consists of individuals who, initially, are willing to do this kind of work for money. The Macedonian farmers we interviewed consider such a (seasonal) workforce scarce, as, according to them, hoeing is something that “nobody wants to do.” In this way, hoeing skills are not the primary consideration when assembling a group of workers. Further, the interviewed farmers were generally not the ones assembling the workers group. They typically rely (and depend) on ‘mediators’ – mostly women who know of others willing to do hoeing and who are willing to organise a group of them for the farmer at a fee. When the farmer ultimately meets the workers, their hoeing skills are unknown to her or him.

So, how do farmers discover the individual hoeing skills in the group? How are these skills being organised in the accomplishment of the hoeing activity? And how is the variability of hoeing skills dealt with on the field?

When we asked a farmer from North Macedonia how she determined the skills at hoeing of individual workers, she said:

According to the way he is doing hoeing: the way he holds the hoe, the way he treats the soil, the way he goes about the cultivated plants; how he holds the body.

Farmers assess skill by observing specific aspects of how a worker performs the activity, such as hoeing technique, soil handling, and movement among the plants. These aspects reflect a worker's overall performance rather than being judged from isolated actions. Thus, even skilled workers could, on a given instance, 'hold the hoe' the wrong way, 'treat the soil' poorly, and so on. To understand how the generalisability of skill for an individual in a group is provided for we need to look at the socio-material organisation of the hoeing activity.

The photo below was given to us by an organic farmer from North Macedonia. It shows a group of workers engaged in hoeing on the farmer's family farm. By photographically capturing the activity, the farmer has turned hoeing into a rhetorical resource. She said she would often post images like this on her social media – on Facebook, for example – as a way of demonstrating 'being organic' to people who were not entirely convinced that one can grow crops without using pesticides. As she put it, "there is a lot of mistrust in organic farming."



Figure 1: Workers hoe between 'lines' of sunflower to remove weeds.
Image provided by a research participant, used with permission.

As can be seen in the photo, the workers are organised so that each holds a “line” (as the farmers called it) of sunflowers, using hoes to remove weeds without damaging the plants. Each line becomes a material record of the work, and together the lines form a spatial grid that allows for on-the-spot observation and analysis of hoeing, including how thoroughly weeds are removed, whether any sunflowers are damaged, the worker’s position relative to the group, and the perceived weediness of the lines. This arrangement, with each line assigned to a single worker, makes it possible to attribute hoeing skills to individuals. In this way, the lines are not just remnants of earlier farming operations like ploughing; rather, they serve as a material framework for organising hoeing work, coordinating tasks, and assessing skills. But how are these observable and analysable skills structured within the hoeing activity?

Several factors influence how workers are arranged in the field. Ethnicity is one important consideration: farmer accounts indicate that Albanian and Roma workers, for example, often work separately and do not assist each other even when help is needed. Interpersonal relationships are another factor. Workers bring prior connections – typically family ties, such as spouses, mothers and daughters, or cousins and their partners, as well as neighbours and friends. Taking adjacent lines in the field is one way these relationships are enacted, often reinforced through displays of deference. A farmer’s account illustrates this in the case of a particularly unskilled worker:

The girl has a back and drags herself after her mother. I must tolerate the girl because her mother is a good hoer. Sometimes, at the end of the day, I actually approach the mother and say: ‘If possible, could you not bring your daughter tomorrow because I can see that this is too difficult for her? Maybe she should work something else.’ I tell her that. Directly. But not always. It depends on how powerful the mother is in the group.

This example shows that individual skills are closely intertwined with the social relationships within the worker group. These relationships influence how skills are managed during and after the hoeing activity. In this case, the farmer ‘tolerates’ the girl in deference to her mother, not merely for being a skilled hoer, but also for the extent to which the mother is able to influence the group’s dynamics and decisions. Such strategies, however, are not always feasible and are often seen as costly. What other approaches, then, do farmers use to handle variability in skill?

Skilfulness is a resource for farmers. The Macedonian farmers we interviewed, for example, believed that skilled workers can finish a field more quickly, reducing labour costs. With this in mind, some farmers engaged in real-time tinkering with

workers' techniques to improve their performance in the field.

If I notice that somebody cannot do it properly, I take their hoe and show them how to do it. How to do it easier. That means that I need to know how to do it properly, so that then I can also explain it to them. If I don't train them, if I don't explain it to them, if I don't show it to them, then I would pay much more than I do.

However, the farmers also know (or believe it to be the case) that skilfulness is a resource for the workers too. Consider this farmer account:

Usually, in the group, they take five or six very young persons that have absolutely no skills at hoeing. For some of them, it is the first time they hold a hoe in their hands. I don't like that because they [the workers] have their own method of work through which they manage to achieve one extra day of payment. I don't like that because I am not in the position to pay for it.

The account suggests that workers leverage skilfulness – either by withholding it or by deliberately including less-skilled labour – to secure more workdays. Skilling, therefore, involves competing interests. Importantly, things can backfire: if efforts to improve skills are seen as conflicting with workers' interests, they may abandon the task before it is completed. The farmers we interviewed tried to avoid such situations, not only because the field would remain unfinished, but also because of potential long-term consequences. One farmer, for example, recalled that after her workers left the field following a negative experience, they widely spread that she was a “bad lady,” which, she believed, prevented her from finding any workers that entire summer. So tinkering, in this case, requires tact:

When I show them [how to do hoeing], they like it. They have never said that that is stupid, and they take it seriously. That's because I try to help them. I tell them: 'Don't hold the hoe tightly – your hands will hurt.' So, I show them some basic techniques. If there are no weeds, I tell them: 'Just drag the hoe and go ahead.' There are people who don't know how to command others. They blackmail them. They tell them 'Dig!' and they stand above the worker like some boss. By contrast, the whole time, I try to help them.

In this way, the farmer's tinkering is carried out in-difference to the financial sustainability of the work: she actively guides and trains workers to improve

efficiency, but does so while carefully attending to their interests, methods, and social dynamics. Her interventions are shaped not only by what needs to be done to reduce costs, but by how it will be received, ensuring that instruction is experienced as support rather than imposition. This balancing act allows her to enhance skilfulness without provoking resistance, showing how practical, relational, and efficiency concerns are negotiated simultaneously in the everyday accomplishment of hoeing.

Discussion: The Skilful Coordination of Sustainability in Everyday Farming Practice

In Southeastern Europe, sustainability is largely shaped by EU policy imaginaries that emphasise technoscientific solutions, digital monitoring, and standardised performance metrics (Vardopoulos et al 2018; Gugganig 2025). Yet what we have found about skill suggests that these top-down imaginaries only tell part of the story. Across ploughing, spraying, and hoeing, sustainability appears not as a purely technical project, but as a deeply cultural accomplishment embedded in local standards of what counts as ‘doing well.’ In the Macedonian ploughing case, the scientific rationale for contour ploughing did not automatically translate into sustainable practice; it had to prove itself within an inherited aesthetic and practical logic of what a ‘properly’ ploughed field should look like. The uneven surface became a visible sign of insufficient skill, regardless of the agronomic reasoning behind it. Similarly, in spraying, Greek farmers’ pesticide applications were shaped as much by community expectations and the need to display diligence as by formal prescriptions to reduce chemical inputs. Spraying became a ritualised sign of care for quality and competence, embedded in local moral economies of farming. In hoeing, the posting of photographs to demonstrate ‘being organic’ responded to mistrust not through certification documents alone, but through culturally legible images of hard manual labour. In all three cases, sustainability is enacted through shared understandings, reputations, internalised aesthetics, and locally meaningful signs. Rather than being simply implemented, sustainability is interpreted, negotiated, and materialised through local cultural norms about what good farming looks like.

This paper thus aligns with agri-food technoscience scholarship (Higgins et al. 2023) by showing how often overlooked farming practices enact multiple versions of sustainability. Crucially, we extend this work by identifying the coordinating role of skill as the primary mechanism for mediating between these versions. We argue that farmers’ adjustments and improvisations are not merely technical, but must be done ‘well’ to meet local as well as institutionalised standards, social expectations, practical knowledge, and local aesthetics. By foregrounding this ‘careful, competent tinkering’

– the social organisation of everyday expertise – we have demonstrated that skill is not just a byproduct, but is central to what sustainability looks like in practice.

Crucially, these enactments are structured through selective inclusion and exclusion: some actors, like the mother who does not plough or the brother who proposes ideas but does not execute them, are not recognised as participants in skilful practice. Sustainability, understood as the upshot of skilful organisation, depends on these relational boundaries. What counts as competent ploughing is defined within a patriarchal hierarchy in which the father authorises experimentation and the mother is positioned in-difference to the evaluative domain. In spraying, farmers draw boundaries between ‘real farming’ learned in the field and ‘abstract’ knowledge associated with the classroom, even as they strategically mobilise technoscientific language to access funding and legitimacy. This boundary work distributes authority unevenly, distinguishing between those who can judge proper pesticide use and those who are marked as naïve or ‘non-reflexive.’ In hoeing, political differentiation becomes even more explicit: workers are recruited through gendered mediation networks, arranged along ethnic and familial ‘lines,’ and assessed in ways that tie individual skill to collective bargaining power. Decisions about who is tolerated, trained, dismissed, or publicly labelled as a ‘bad lady’ are not merely managerial choices; they shape who can participate in agricultural livelihoods and under what conditions. Sustainability, in this sense, is inseparable from power (Dogette et al. 2026). It is produced through hierarchies of gender, ethnicity, and labour, and through decisions about whose skills count, whose bodies matter, and whose interests are prioritised.

This highlights that what looks like ‘sustainability’ in practice often relies on relational exclusions – the ‘unsustainabilities’ masked by visible outcomes such as healthy soil, protected crops, or timely hoeing. The implication for policy is that it should look beneath the polished surface of these outcomes to the hidden dynamics that sustain them, and seek to transform these underlying structures, rather than simply optimising the visible metrics. If ploughing across slopes becomes sustainable only when it aligns with inherited standards of skill, then policy must engage those standards rather than assume automatic uptake. If reduced pesticide use competes with local reputations for diligence, then interventions must address the social visibility of competence, not only the chemical dosage. And if organic production depends on precarious, hierarchically organised labour, then improving sustainability requires confronting the organisation of that labour itself. In other words, *you change skill not primarily by asking farmers to learn new techniques, but by reconfiguring the social organisation that constitutes who is recognised as skilled, how competence is evaluated, and whose participation is made possible*. Sustainability policy, therefore, must move from prescribing correct practices toward reshaping the social relations through which practices become meaningful, legitimate, and durable.

Conclusion

This paper has shown that sustainability in Southeastern European agriculture is not a singular goal or set of metrics, but a set of practices that unfold through the coordination of skill. By examining ploughing, spraying, and hoeing, we have highlighted how farmers enact multiple versions of scientific, social, and economic sustainability, and how these are held together through relational, and context-sensitive skills. Skill is not simply a means to an end; it structures who participates, whose work counts, and how practices are organised, making the visible successes of sustainable agriculture possible while masking the relational hierarchies and exclusions on which they depend. These findings challenge dominant policy imaginaries that frame sustainability primarily as a technoscientific project, suggesting instead that attention to the everyday, practice-based, and socially mediated dimensions of skill is essential both for understanding how sustainability is achieved and for imagining alternative, more just ways of enacting it. In this sense, sustainability is not just about outcomes or measurable indicators, but about the careful, ongoing negotiation of skills, cooperation, and recognition that makes farming work in social context.

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