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Review

Socio-cultural factors influencing farmers' adoption of sustainable agricultural practices: A systematic literature review (2020–2025)

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ABSTRACT

Adoption of sustainable agricultural practices (SAPs) remains uneven across regions, suggesting that existing approaches insufficiently account for the socio-cultural conditions shaping farmers' decisions. While prior studies acknowledge social and cultural influences, they often examine these factors in isolation, limiting understanding of how they interact to enable or constrain adoption. This systematic literature review addresses this gap by synthesizing empirical evidence on the interconnected socio-cultural drivers of SAP adoption. Drawing on Scopus-indexed English-language journal articles published between 2020 and 2025, the review follows PRISMA 2020 guidelines. From 884 records, 87 empirical studies were included after screening. Using inductive thematic coding aligned with reflexive thematic analysis, five interrelated themes were identified: community social norms, cultural values and traditions, gender relations, knowledge and trust, and the institutional environment. The findings show that SAP adoption is not determined by single factors but by the interaction of social legitimacy, cultural alignment, trust-based knowledge exchange, and institutional responsiveness. Knowledge and trust emerge as key connecting factors linking other dimensions, mediating how norms, cultural meanings, and institutional support influence adoption. Conversely, adoption is constrained where entrenched norms reinforce existing practices, interventions conflict with local values, gendered inequalities limit access to resources and learning, and institutional arrangements fail to reflect farmers' realities. The review highlights effective approaches, including peer-based social learning, participatory extension and co-design, trust-building processes, and institutionally supported interventions that are culturally resonant and gender-sensitive. These findings advance current understanding by reframing socio-cultural factors as interacting systems rather than discrete variables, with implications for designing more context-responsive and socially embedded agricultural interventions. Limitations include reliance on a single database, English-language publications, and the absence of formal quality appraisal.

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INTRODUCTION

Adoption of sustainable agricultural practices (SAPs) remains uneven and relatively low across many regions of the world despite their recognized importance for food security and climate resilience. Recent global assessments show that farmers' uptake of sustainable practices varies widely, particularly in developing countries where structural and cultural constraints remain significant (Rosário et al., 2022; Sánchez Bogado et al., 2024). A meta-analysis covering more than 327,000 farmers across 23 European countries also highlights substantial regional disparities in adoption patterns, underscoring the complexity of behavioural and contextual drivers (Swart et al., 2023). At the global policy level, progress toward the Sustainable Development Goals (SDGs) related to sustainable agriculture remains below target, signalling persistent challenges in translating sustainability frameworks into farmer-level action (Rizzo et al., 2024). Understanding recent developments in the literature is therefore essential to capture how current research addresses these challenges.

This review focuses on literature published between 2020 and 2025 to capture a recent theoretical shift toward socio-cultural, relational, and context-sensitive perspectives on sustainable agricultural practice adoption, moving beyond the earlier dominance of economic and technical explanations (Rizzo et al., 2024; Rosário et al., 2022). This period also reflects intensified global attention to sustainability transitions in the context of the Sustainable Development Goals (SDGs) and climate change adaptation, where social dynamics, local knowledge systems, and institutional trust have become more explicitly recognized (Sánchez Bogado et al., 2024). Methodologically, this restriction enables a more coherent synthesis of contemporary approaches while reducing heterogeneity from earlier paradigms, allowing the review to consolidate current evidence and identify recurring socio-cultural configurations shaping present-day adoption processes.

The urgency of strengthening sustainable agriculture adoption is amplified by the increasing ecological and socio-economic risks associated with conventional farming. Unsustainable agricultural expansion contributes to soil degradation, biodiversity loss, and climate change, which in turn heighten farmers' vulnerability and undermine long-term food system resilience (Coulibaly et al., 2021; Sánchez Bogado et al., 2024). Empirical evidence shows that adopting sustainable practices improves farm income, enhances environmental stewardship, and supports community-level food security benefits that are critically needed in the era of climate uncertainty (Ma & Rahut, 2024; Setsoafia et al., 2022). Failure to broaden adoption threatens not only individual livelihoods but also national and global development goals.

Empirical research consistently shows that access to knowledge, social networks, and supportive policies act as major enablers of adoption, while limited technical skills, risk

aversion, and unsupportive social norms function as prominent barriers (Ma & Rahut, 2024; Rizzo et al., 2024; Sánchez Bogado et al., 2024). Studies also reveal that socio-cultural dynamics such as local traditions, community expectations, and culturally shaped perceptions of innovation, which deeply influence how farmers evaluate and implement sustainable practices (Adamsone-Fiskovica & Grivins, 2024; Bhujel & Joshi, 2024). However, despite these consistent findings, the literature often treats social and cultural factors separately with limited empirical integration of their interactions, leaving limited understanding of how they interact to structure adoption behaviours.

This gap is particularly evident in the limited number of studies that explore the integrated effects of social norms, cultural values, and community structures on sustainability-related decisions. Many existing models apply constructs derived from non-agricultural contexts, reducing their relevance for farming communities whose decisions are embedded in collective traditions and risk-sharing norms (Rosário et al., 2022). Furthermore, cross-cultural and system-level analyses remain scarce, especially in developing-country settings where socio-cultural factors tend to exert stronger influence (Anibaldi et al., 2021; Rizzo et al., 2024). This lack of integrated understanding restricts the development of effective, context-sensitive interventions.

The relevance of addressing this gap has increased substantially in light of climate change, market volatility, and policy pressures for sustainability. Recent studies argue that agricultural interventions that overlook social and cultural contexts often fail to gain traction, particularly where traditional norms and community practices guide risk-taking and innovation (Piñeiro et al., 2020; Sánchez Bogado et al., 2024). At the same time, emerging transitions toward climate-smart and diversified farming systems highlight the need for adaptive, community-based strategies that reflect local realities and socio-cultural diversity (Arsyad, 2025; Ma & Rahut, 2024). Understanding socio-cultural determinants is therefore essential for designing interventions that truly resonate with farming households.

Despite the growing empirical literature on farmers' adoption of SAPs, socio-cultural influences are still commonly treated as parallel determinants, including social norms, cultural values, gender relations, trust, and institutions, rather than as interacting conditions that jointly structure adoption decisions. This fragmentation limits cumulative explanation and often yields intervention recommendations that are mechanically transferred across contexts. To address this gap, this systematic review develops an evidence-informed conceptual mechanism map that moves beyond cataloguing which factors matter and instead clarifies how socio-cultural conditions are recurrently configured in shaping adoption processes. These configurations represent recurring interpretive patterns reported across studies rather than definitive causal

effects. Specifically, the synthesis is organized as a mechanism map that traces plausible configurations such as community social norms shaping knowledge and trust, cultural values and traditions moderating acceptance or resistance, gender relations regulating access to networks and learning opportunities, and institutional environments shaping trust formation and sustained uptake. Accordingly, this study aims to (1) identify socio-cultural factors that act as barriers to and drivers of farmers' adoption of SAPs, (2) analyze how social dimensions (e.g., community norms, gender relations, and institutional networks) and cultural dimensions (e.g., values and traditions) interact to influence SAP adoption, and (3) synthesize intervention strategies documented in the literature to address socio-cultural barriers and/or strengthen socio-cultural drivers of SAP adoption. The contribution of this research lies in offering a comprehensive synthesis that integrates socio-cultural dimensions often examined separately, thereby providing a more holistic conceptual foundation for policy and community-based interventions, and by highlighting context-sensitive pathways for improving adoption across contexts (Anibaldi et al., 2021; Bhujel & Joshi, 2024; Ma & Rahut, 2024).

METHOD

Study Design and Reporting Standard

This study employed a systematic literature review to synthesize empirical evidence on socio-cultural factors shaping farmers' adoption of sustainable agricultural practices. Systematic literature review was selected to support a structured, transparent, and replicable process for identifying, screening, and synthesizing evidence within a defined scope (Snyder, 2019; Tranfield et al., 2003). The review process and study selection reporting followed PRISMA 2020 guidance to enhance transparency across identification, screening, eligibility assessment, and inclusion (Page et al., 2021).

Review Framework and Scope

The review scope and screening logic were structured using the PICO framework (Population, Interest, Context). In this review, the population comprised farmers and farming communities involved in agricultural decision making. The phenomenon of interest was socio-cultural factors related to adoption of SAPs, including social dimensions and cultural dimensions as well as socio-culturally oriented strategies or interventions. The context covered crop-based sustainable agriculture settings across any geographic region. Studies were included when the adoption decision related to land-based practices with an explicit crop component (including agroforestry and mixed systems), even if livestock was present as an additional enterprise, provided the analysis reported adoption evidence for crop-based practices.

Table 1. PICO components of the systematic literature review

Element	Definition in this review
Population (P)	Farmers and farming communities involved in agricultural decision making
Interest (I)	Socio-cultural factors influencing adoption, including social and cultural dimensions, and socio-culturally oriented strategies or interventions
Context (Co)	Crop-based sustainable agricultural settings any geographic region

Source: Developed by the author (2026)

Information Source and Search Strategy

The literature search was limited to publications indexed in Scopus between 2020 and 2025 and focused on English-language journal articles. The final search was conducted on 22 October 2025 using the TITLE-ABS-KEY field, which captures records in which the main concepts appear in the title, abstract, or author keywords. This approach was intended to ensure that the search remained closely aligned with the review focus while maintaining a transparent and reproducible retrieval process.

Scopus was used as the sole database because of its extensive multidisciplinary coverage and its established indexing standards for peer-reviewed literature across the agricultural, environmental, and social sciences (Baas et al., 2020; Mongeon & Paul-Hus, 2016). Within the scope of this review, reliance on a single database also provided a pragmatic and internally consistent basis for evidence identification. However, this decision introduces an important limitation, as studies published in regional outlets or non-English sources may be less visible in Scopus and therefore underrepresented in the final sample (Gusenbauer & Haddaway, 2020; Mongeon & Paul-Hus, 2016). Future review updates could help address this limitation by incorporating additional multidisciplinary and agriculture-focused databases to improve coverage and reduce potential geographic and linguistic bias. The complete Scopus query was:

TITLE-ABS-KEY (("sustainable agricultur*" OR "conservation agricultur*" OR "organic farm*" OR "climate-smart agricultur*" OR "sustainable practice*") AND ("socio-cultural" OR "social factor*" OR "cultural factor*" OR "social norm*" OR "cultural norm*" OR "tradition*" OR "local wisdom") AND ("adoption" OR "acceptance" OR "diffusion" OR "implementation" OR "barrier*" OR "driver*" OR "facilitator*") AND ("farm*" OR "smallholder*" OR "agricultural communit*")).

Eligibility Criteria

Studies were eligible if they were peer reviewed empirical journal articles (quantitative, qualitative, or mixed methods), written in English, published between 2020 and 2025, focused on farmers, and reported evidence relevant to at least one review question on socio-cultural barriers or drivers, socio-cultural interactions, or strategies supporting adoption. Studies were excluded if they were non empirical outputs, non-English, published before 2020, outside the defined crop-based context, lacked socio-cultural relevance to adoption, or were not available in full text.

Table 2. Inclusion and exclusion criteria for study selection

Criteria	Inclusion	Exclusion
1. Document type	Peer reviewed journal empirical studies (quantitative, qualitative, or mixed methods)	Non empirical outputs (reviews, theoretical papers, opinion pieces, editorials)
2. Years	2020 to 2025	Before 2020
3. Language	English	Non English
4. Topical focus	Focuses on farmers and provides evidence relevant to at least one review question on socio-cultural factors and adoption	Purely technical, biophysical, or economic studies without socio-cultural analysis linked to adoption
5. Context	Crop-based sustainable agriculture, including agroforestry and mixed farming provided a crop component is present	Livestock only, aquaculture only, or systems without a crop component as defined in this review
6. Accessibility	Full text available	Full text not available

Source: Developed by the author (2026)

Study Selection

Records retrieved from Scopus were deduplicated prior to screening and assessed in two stages: title and abstract screening followed by full text eligibility assessment. Screening was conducted by a single reviewer using a predefined rulebook aligned with the review questions and eligibility criteria. To reduce the risk of selection bias and to support consistency, a subset of title and abstract decisions and full text exclusion rationales was rechecked against the

rulebook at regular intervals, and borderline cases were documented and revisited during full text assessment. Deduplication and screening workflows were managed in Parsifal, while Excel was used to log screening decisions and extracted variables. As shown in the PRISMA 2020 flow diagram (Figure 1), 884 records were identified and 38 duplicates removed, leaving 846 records for screening; 344 full texts were sought, 16 could not be retrieved, 328 were assessed for eligibility, and 87 empirical studies were included in the final synthesis.

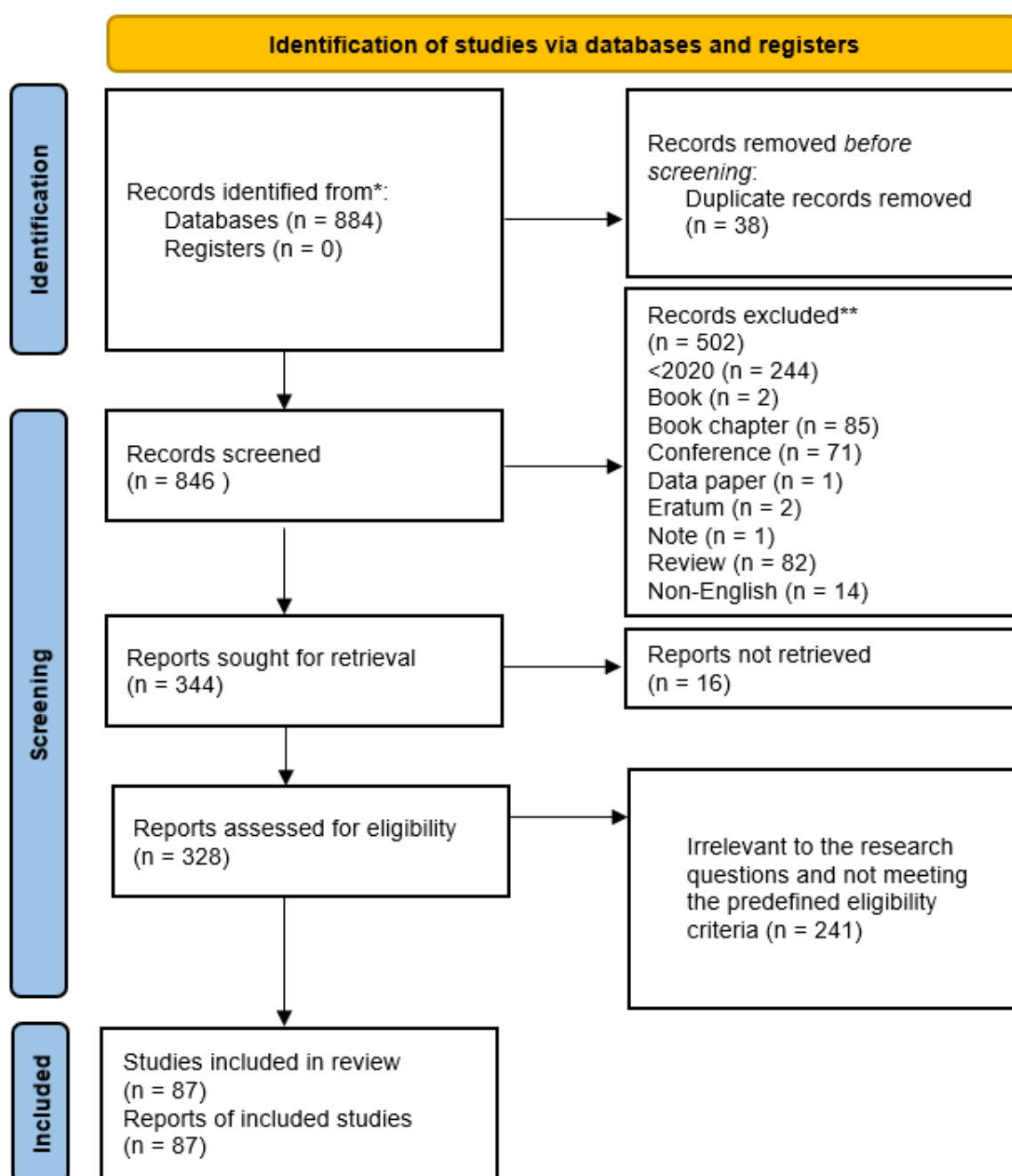


Figure 1. PRISMA 2020 flow diagram for study literature review

Source: Developed by the author (2026)

Data Extraction

Data were extracted using a structured extraction form to capture study characteristics and the study's socio-cultural focus. Extracted variables included bibliographic details, country or region, farming system or practice, research design, sample and data collection approach, and a concise summary of the socio-cultural mechanisms linked to adoption as reported in the findings. Extraction was conducted at the full-text level, prioritizing results, and discussion sections where socio-cultural determinants, interactions, and strategies were explicitly described. For quantitative studies, extraction captured the socio-cultural constructs assessed, how they were operationalized, and the direction of reported associations with adoption outcomes, alongside author interpretations relevant to mechanisms. For qualitative studies, extraction captured interpretive findings describing how socio-cultural conditions and relationships shaped adoption decisions. For mixed methods studies, both forms of evidence were captured. The extraction form and codebook were iteratively refined to clarify variable definitions and to ensure consistent capture of evidence relevant to the review questions.

Reporting Transparency Check

To support careful interpretation of a heterogeneous evidence base, a reporting transparency check was applied during data extraction. This check was not designed as a formal critical appraisal or risk-of-bias assessment and was not used to exclude studies. Instead, it documented whether studies reported essential methodological information with sufficient clarity, including the alignment between aims and the adoption focus, description of context and participant characteristics, transparency in how socio-cultural factors were conceptualized and measured or elicited, adequacy of sampling and data collection procedures, transparency of the analytical approach, and reporting of key limitations. The resulting notes were used to contextualize the strength of evidence during synthesis, for example by flagging patterns that were primarily supported by studies with limited methodological reporting and by avoiding overinterpretation of findings where methodological detail was insufficient. Building on these structured extraction notes, the synthesized evidence was subsequently organized through thematic coding to identify recurring socio-cultural mechanisms and to structure the results (Braun & Clarke, 2006, 2021).

Thematic Synthesis

Evidence synthesis followed an inductive thematic coding approach consistent with reflexive thematic analysis (Braun & Clarke, 2006, 2021). Coding proceeded iteratively through four steps: (1) familiarization with extracted findings and author interpretations across quantitative, qualitative, and mixed methods studies relevant to the review questions; (2) generation of initial open codes capturing recurring socio-cultural concepts, mechanisms, and conditions

linked to adoption; (3) clustering related codes into candidate themes and refining theme boundaries through repeated comparison across studies; and (4) reviewing, naming, and defining themes to ensure internal coherence and clear differentiation. To strengthen transparency and reproducibility, an evolving coding framework was documented in a codebook that recorded code labels, brief definitions, and inclusion/exclusion boundaries. Operational definitions were refined only to clarify recurring patterns identified in the evidence base and to support consistent theme assignment across studies. Quantitative evidence informed coding through the socio-cultural constructs assessed and the reported direction of relationships with adoption outcomes, while qualitative evidence informed coding through interpretive descriptions of mechanisms and contextual conditions. This analytic process yielded five socio-cultural themes: community social norms, cultural values and traditions, gender relations, knowledge and trust, and the institutional environment. Studies were allowed to map onto multiple themes to reflect co-occurring mechanisms.

RESULTS AND DISCUSSION

Characteristics of The Included Studies

As reported in the PRISMA 2020 flow diagram (Figure 1), a total of 87 empirical studies met the inclusion criteria and were included in this review. The included studies were published from 2020 to 2025, with a noticeable rise in the final two years of the review period. The annual distribution was 2020 (n = 5), 2021 (n = 13), 2022 (n = 12), 2023 (n = 8), 2024 (n = 20), and 2025 (n = 29). Overall, the annual distribution shows an increase in publications in 2024 and 2025, with the highest count in 2025.

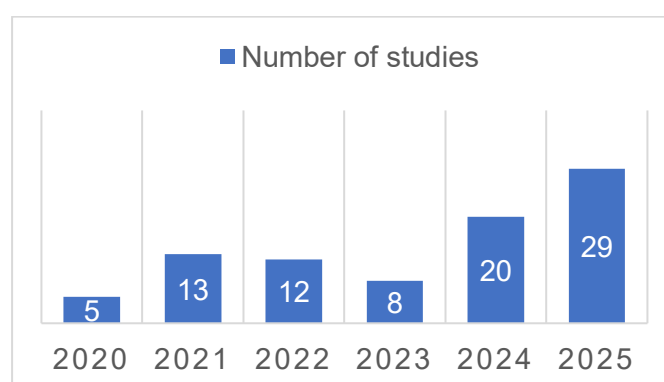


Figure 2. Publications by year 2020 to 2025

Source: Processed data (2026)

In terms of study design, quantitative approaches dominated the evidence base (46 studies), followed by mixed methods (25) and qualitative designs (16). This evidence base comprises

both survey-based modelling of adoption determinants and qualitative inquiry into meanings, lived experience, and social relations shaping farmers' decisions.

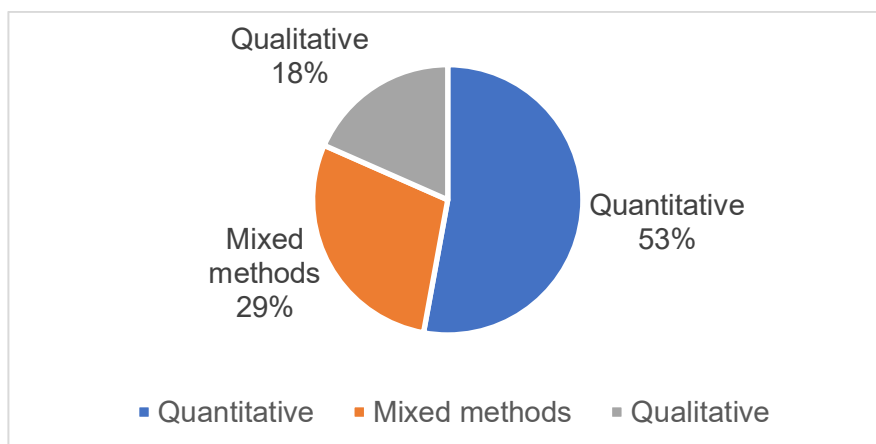


Figure 3. Study design composition

Source: Processed data (2026)

Geographically, the evidence spans 44 country or regional contexts, with the largest contributions from China (12 studies), South Africa (6), Iran (6), Kenya (5), Zimbabwe (4), India (4), and Germany (4). Several additional contexts contributed repeatedly, including Ghana, Malawi, Pakistan, the United States, and Indonesia. These studies examine socio-cultural dynamics across diverse regions and farming systems, although the density of evidence remains uneven across contexts.

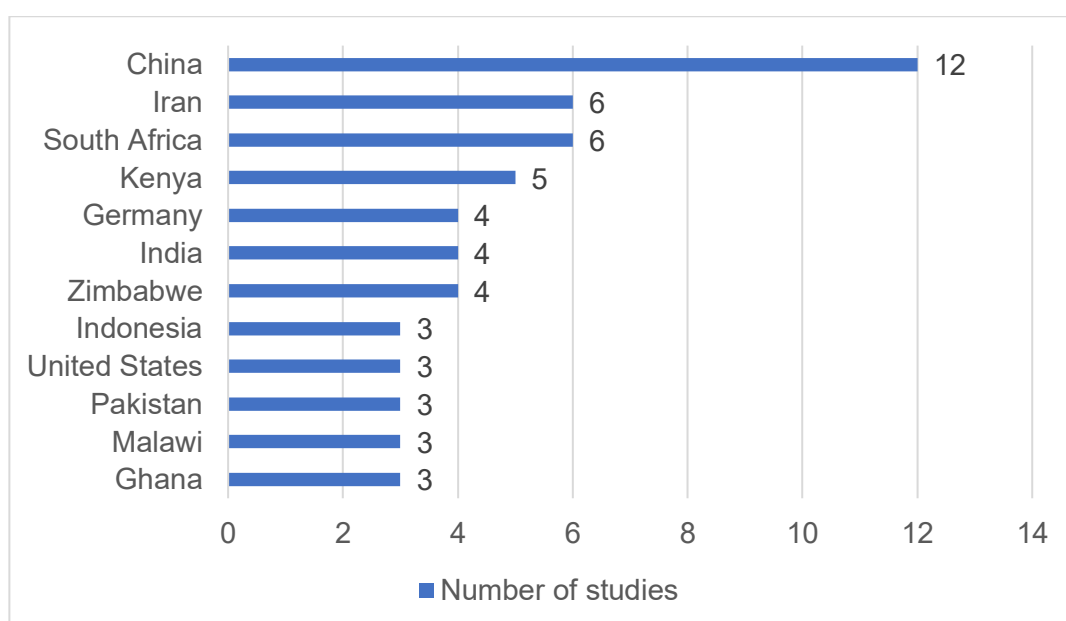


Figure 4. Top contributing countries.

Source: Processed data (2026)

Consistent with the broad geographic coverage, farming systems and units of analysis were highly diverse, spanning organic agriculture, conservation agriculture, climate-smart agriculture, sustainable land management, green production, and related technologies and practices. Sample sizes and measurement strategies varied substantially, ranging from in-depth qualitative studies to large-scale surveys.

Thematic Results Across Research Question

Thematic coding organized the included studies into five socio-cultural themes: community social norms, cultural values and traditions, gender relations, knowledge and trust, and the institutional environment. Coding applied consistent analytic boundaries to strengthen the transparency and reproducibility of the classification (Braun & Clarke, 2006). Most studies mapped to multiple themes. Specifically, 9 studies mapped to one theme only, 35 mapped to two themes, 37 mapped to three themes, 5 mapped to four themes, and 1 study mapped to all five themes. On average, each study covered approximately 2.47 themes. Across the 87 included studies, Knowledge and trust was the most prevalent theme ($n = 68$; 78%), followed by the Institutional environment ($n = 57$; 66%) and Community social norms ($n = 45$; 52%). Cultural values and traditions appeared in 32 studies (37%), whereas Gender relations was least frequently coded ($n = 13$; 15%). Because studies could map onto multiple themes, theme counts are not mutually exclusive and percentages sum to more than 100%. This pattern indicates that SAP adoption is typically shaped by interacting social, cultural, and institutional mechanisms rather than a single factor. Figure 5 shows the number of studies coded to each theme; studies could be coded to multiple themes.

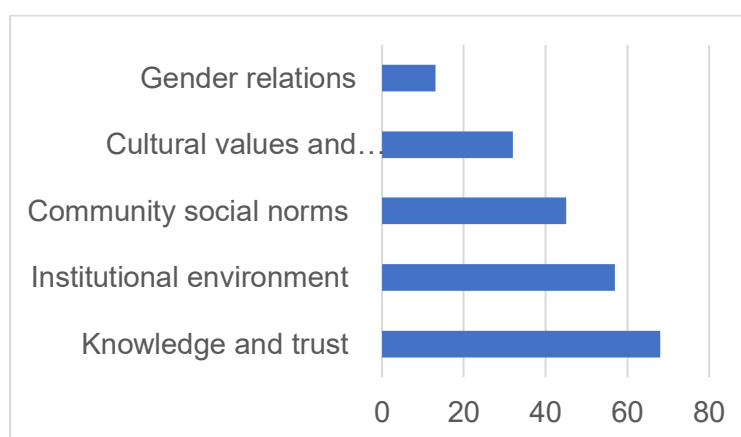


Figure 5. Prevalence of socio-cultural themes across included studies (N = 87).

Source: Processed data (2026).

Table 3 defines the operational boundaries of the five socio-cultural themes used in the synthesis, while Figure 6 provides a visual summary of how these themes co-occur and

interact across the evidence base to shape farmers' adoption of sustainable agricultural practices.

Table 3. Theme definitions and analytic boundaries

Theme	Operational definition
Community social norms	Community-level norms, expectations, social influence, and social learning that shape adoption tendencies
Cultural values and traditions	Values, identity, symbols, traditions, and customary practices shaping acceptance or rejection of SAPs
Gender relations	Gendered roles, resource access, bargaining power, and gender norms shaping information access and adoption decisions
Knowledge and trust	Knowledge acquisition and credibility judgements regarding information sources and institutions shaping adoption; cognitive elements (perceived risks/benefits, self-efficacy) were coded here only when explicitly linked to socially mediated learning, source credibility, or institutional relationships.
Institutional environment	Institutional conditions shaping incentives, service access, and support for SAP implementation

Source: Developed by the author (2026)

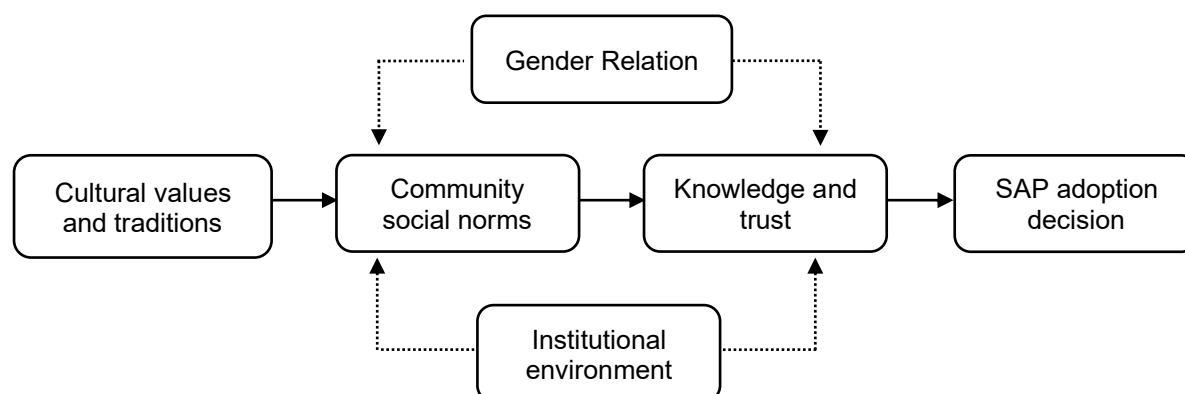


Figure 6. Socio-cultural configuration influencing farmers' adoption of SAPs.

Source: Developed by the author (2026)

This conceptual summary synthesises the thematic findings by illustrating a recurring interaction pathway reported across the evidence base. Cultural values and traditions are frequently described as conditioning what is socially viewed as appropriate, and are therefore often discussed as influencing community social norms. In turn, norms and social learning processes are commonly reported to inform knowledge and trust formation, which is closely linked to SAP adoption decisions. Gender relations and the institutional environment are described as cross-cutting mechanisms that condition access to learning spaces and

networks, the credibility of information sources, and enabling conditions for implementation. Solid arrows depict the primary interpretive sequence used to summarise co-occurring mechanisms in the synthesis. Dashed arrows indicate cross-cutting influences and should not be interpreted as definitive causal effects.

Socio-cultural Factors as Barriers and Drivers of SAP Adoption

Across the synthesis, socio-cultural factors consistently operate as both drivers and barriers. Drivers tend to emerge when SAPs are socially legitimised, culturally resonant, supported by more inclusive decision processes, perceived as credible and useful, and enabled by responsive institutional support. Conversely, barriers intensify when community norms lock in established practices, when SAPs are framed as culturally misaligned, when gender norms restrict access and decision-making, when information is not trusted or conflicts with local knowledge, and when programs are poorly aligned with smallholder needs (Darkhani, 2024; Li et al., 2020; Mugari et al., 2025).

Community social norms appear as a central diffusion mechanism. Multiple studies show that perceived social expectations can encourage adoption when a practice is viewed as normal and validated through peer observation and peer learning (Bourne et al., 2021; Li et al., 2020). In such settings, the social risk of deviating from local routines decreases because credible role models make experimentation socially acceptable. However, the same theme becomes a barrier when dominant norms reinforce established routines, raise reputational risk, or legitimize resistance to practices perceived as inconsistent with local ways of farming (Bourne et al., 2021; Mvula & Dixon, 2021; Zollet & Maharjan, 2021).

Cultural values and traditions are more ambivalent. SAPs are more readily accepted when framed as compatible with local identity and moral narratives, for example when transitions are positioned as an extension of locally valued knowledge, religious or ideological commitments, or culturally meaningful food and farming practices (Albizua et al., 2021; Das, 2023; Deaconu et al., 2021; Drexler, 2021; Han et al., 2021; Han & Niles, 2023). Barriers arise when SAPs are perceived to threaten symbols, meanings, or normative orders embedded in traditions, or when they contradict culturally entrenched notions of good farming and identity, which can produce resistance that is better interpreted as protection of cultural coherence than opposition to innovation in itself (Mandipaza, 2025; Mdoda et al., 2023; Memarbashi et al., 2022).

Gender relations influence adoption through unequal access to information, resources, and decision-making spaces. The literature highlights how differences in land control, time burden, and participation in learning forums shape adoption opportunities, often disadvantaging

women in specific contexts (Birhan & Tekalign, 2022; Devkota et al., 2020; Kagotho et al., 2024). Gender also interacts strongly with knowledge and trust, because constrained network access weakens self-efficacy and learning opportunities, making sustained SAP adoption more difficult for particular groups (Mbunda, 2025; Sanogo et al., 2023).

Knowledge and trust constitute the most prevalent theme. The synthesis shows that adoption depends on perceived risks and benefits, understanding of practices, and trust in information sources. In many settings, farmers judge credibility through social proximity, which can make messages from peers, locally trusted actors, or community-based influencers more decisive than technically accurate but socially unanchored information (Hermans et al., 2021; Horgan & Kudavidanage, 2020; Mahama et al., 2020; Rust et al., 2022). Local knowledge also acts as an evaluative lens: practices are more likely to be rejected if they are perceived as implausible within local experience, and more likely to be adopted if they can be explained in ways consistent with local ways of knowing. (Aguilar et al., 2021; Horgan & Kudavidanage, 2020; Memarbashi et al., 2022).

The institutional environment shapes adoption when extension, incentives, and organizational support lower informational and practical constraints and strengthen community learning. Evidence suggests that institutional effectiveness increases when program design is responsive to smallholder realities and supports social learning and trust building within communities (Li et al., 2020; Mahama et al., 2020; Ochieng et al., 2022). Conversely, rigid or poorly targeted schemes can create entry barriers, weaken social acceptance, and reduce implementation quality over time (Darkhani, 2024; Mugari et al., 2025).

How Social and Cultural Factors Interact to Shape Adoption Decisions

Cross-theme synthesis indicates that social and cultural dimensions rarely operate independently. Cultural values are commonly described as shaping what is socially viewed as appropriate, thereby strengthening or weakening community norms around particular practices. In turn, social norms and communication networks often serve as the main channel through which trust judgements are formed, because farmers evaluate information through the credibility of actors embedded in their social circles. A recurring interaction concerns norms and cognition: perceived social pressure can influence how farmers interpret SAPs by shaping expectations and legitimacy, consistent with discussions of subjective norm as perceived social pressure (Li et al., 2020; Mandipaza, 2025).

Interactions are also pronounced along the pathway from gender to knowledge to decision-making. Gender norms limit access to learning spaces and networks, which in turn affects self-efficacy and adoption opportunities. In this sense, gender effects frequently operate

through mediated mechanisms such as information access and bargaining power (Birhan & Tekalign, 2022; Devkota et al., 2020). Institutional arrangements can either amplify or mitigate these dynamics. Participatory and locally embedded approaches tend to strengthen networks and trust, whereas top-down and inflexible schemes can reinforce exclusion and culturally grounded resistance (Darkhani, 2024; Mbunda, 2025; Ochieng et al., 2022).

Strategies and Approaches to Address Barriers and Strengthen Socio-cultural Drivers

Approaches documented in the literature cluster into several recurring patterns across contexts. First, many studies describe efforts to strengthen social learning through farmer-to-farmer mechanisms (e.g., lead farmers, peer demonstration, and community role models). These approaches are commonly reported to reduce perceived social risk, support local legitimacy, and facilitate diffusion, particularly where adoption decisions are socially observable and reputationally consequential (Pérez-Marulanda et al., 2025; Rust et al., 2022). Relatedly, the literature frequently emphasizes working with credible community actors, for example by identifying farmer influencers because adoption messages are often reported as more persuasive when conveyed by trusted members of local social circles (Rust et al., 2022).

Second, participatory extension and co-design approaches are repeatedly described, including interventions developed with communities and adapted to local socio-ecological realities. Across the included studies, such approaches are typically framed as strengthening ownership and acceptability, while broadening learning reach to groups that are frequently underserved by conventional extension modalities (Carroll et al., 2025; Habanyati et al., 2025; Ochieng et al., 2022).

Third, trust-oriented approaches focus on source credibility and the alignment of messages with farmers' lived experience. Here, multiple studies characterize the constraint not only as information scarcity but also as low trust and perceived mismatch with local knowledge, suggesting that communication is more likely to resonate when it connects to experiential frames and socially legitimate networks (Habanyati et al., 2025; Mugari et al., 2025). Accordingly, communication is typically framed as more persuasive when it connects with farmers' experiential frames and locally legitimate ways of knowing. These approaches therefore emphasize socially embedded messengers and delivery channels that can strengthen credibility and reduce skepticism.

Fourth, a further cluster concerns institutional support combined with culturally resonant and gender-sensitive framing. The literature reports institutional measures such as improving program design, increasing service flexibility, and providing incentives that may help reduce informational and cost-related barriers (Darkhani, 2024; Qange et al., 2025). In parallel,

culturally resonant framing is commonly discussed as a way to mitigate identity-based resistance, while gender-sensitive approaches are described as expanding women's access to information, networks, and participation in decision-making processes, with potential implications for adoption capacity at household and community levels (Darkhani, 2024; Drexler, 2021; Mbunda, 2025).

Integrated Synthesis and Implications for SAP Adoption

Synthesizing 87 empirical studies published between 2020 and 2025 shows that farmers' adoption of sustainable agricultural practices is shaped by interdependent socio-cultural mechanisms rather than a single determinant. The increasing publication intensity toward the end of the review window signals a growing scholarly focus on social, cultural, and institutional dimensions of agricultural sustainability transitions. At the same time, the predominance of quantitative designs suggests that much of the current evidence relies on survey-based modelling of attitudes, norms, and adoption intentions, while deeper explanations of cultural meaning-making, community dynamics, and power relations often require qualitative inquiry and longitudinal designs.

Geographically, the evidence covers multiple country and regional contexts with a visible concentration in a subset of major contributors. This concentration strengthens inference for specific settings but also raises external validity concerns, as socio-cultural drivers such as community legitimacy, cultural resonance, and gendered decision-making are highly context dependent. Therefore, the main contribution of this review is not only to list "which factors matter", but to clarify how those factors co-occur and interact as a local social ecology of adoption.

This review contributes theoretically by reframing SAP adoption as a configuration of co-occurring socio-cultural mechanisms rather than a set of independent determinants. The synthesis suggests that legitimacy, cultural meaning, and trust operate as relational pathways that condition how institutional supports and individual appraisals translate into practice. This helps explain why similar policy instruments can yield divergent outcomes across contexts, even when economic and biophysical constraints appear comparable. The proposed configuration offers a mechanism-oriented lens that complements variable-centred adoption models and supports more context-sensitive interpretation of how adoption barriers and drivers emerge.

1. Interpreting theme dominance and its implications

The thematic map indicates that knowledge and trust, together with the institutional environment, are the most prevalent themes. This pattern suggests that adoption is frequently

theorized along cognitive and institutional pathways: farmers adopt when (i) perceived benefits and risks are sufficiently convincing, (ii) information sources are considered credible, and (iii) programs and services reduce practical barriers and uncertainty. This aligns with behavioral frameworks that highlight attitudes, subjective norms, and perceived control, as well as social learning and self-efficacy perspectives that explain why information provision alone often fails without confidence-building and experiential learning.

Importantly, prevalence is not equivalent to substantive importance. Gender relations appear least frequently, yet available studies consistently portray gender as an “access-regulating mechanism” that shapes who participates in learning spaces, networks, and decision-making arenas. A key gap is that many studies treat sex as a control variable rather than examining gender as a relational structure involving norms, time burdens, asset control, and bargaining power. Future research should therefore approach gender not as an individual attribute but as a social relation that structures access and adoption capacity.

2. Explaining socio-cultural interactions

Findings for socio-cultural interactions show that social and cultural dimensions do not operate in parallel but mutually constitute each other. Cultural values and traditions can define what is socially appropriate, thereby amplifying, or constraining community norms around experimentation and change. In some contexts, conventional practices carry symbolic value tied to “good farming”, making sustainable innovations appear as threats to identity. Conversely, when SAPs are framed as culturally compatible, resistance tends to decrease because adoption gains moral and social legitimacy.

Interactions are also pronounced along the pathway from norms to trust. Information delivered by trusted actors within local networks can outweigh formal messages that do not resonate with farmers' lived experience. In this sense, trust is not merely a messenger attribute but a product of social proximity, reputation, and institutional track records. This is precisely where institutions and networks intersect, since program design and extension style can either strengthen trust or generate skepticism when farmers perceive support as inconsistent, unfair, or misaligned with their needs.

3. Implications for Intervention and Policy Design

Findings on strategies point to several convergent implications. First, social learning interventions, including farmer to farmer approaches, lead farmers, and community role models, are plausible because they reduce social risk and provide observable proof of practice. This is particularly relevant when the primary barrier is not lack of information but uncertainty and reputational concerns. Second, participatory extension and co-design help

prevent one-size-fits-all packages that do not fit smallholders' socio-ecological realities, and they can broaden learning access for groups that are typically less connected to knowledge networks. Third, trust-based strategies require attention to who delivers the message, not only what the message contains. Strengthening credibility through locally trusted messengers and improving service relationships can increase uptake. Fourth, culturally aligned framing and gender-sensitive design should be treated as core intervention components rather than communication add-ons. The evidence base indicates that sustained uptake beyond initial trial is more frequently reported when SAPs are linked to local values and when women's participation in information access and decision making is expanded through more inclusive household and community dynamics.

Methodological Gaps and Future Research Directions

The study-design profile underscores the need for broader methodological approaches. First, more longitudinal studies and robust intervention evaluations are needed to separate correlation from program-induced behavioral change. Second, measurement of social norms should become more precise, including distinctions between descriptive and injunctive norms and tests of mediating mechanisms such as trust, self-efficacy, and institutional support. Third, stronger mixed-methods and in-depth qualitative work is needed to explain how cultural meanings and power relations shape what sustainability signifies for farmers, including how value conflicts are negotiated within households and communities.

Review Limitations

This review was restricted to English-language empirical journal articles published between 2020 and 2025 and indexed in Scopus, which may underrepresent relevant evidence published in non-English outlets, regional journals, or grey literature. While these design choices supported a transparent and reproducible search process within a defined scope, they may bias the evidence base toward studies aligned with dominant indexing and publication norms. In addition, although the thematic framework improves interpretability and consistency, theme assignment inevitably involves researcher judgement, particularly when studies span multiple themes. These limitations do not negate the findings, but they suggest that the theme map should be interpreted as a portrait of emphases within the Scopus-indexed literature rather than a causal ranking of theme importance.

CONCLUSION

This systematic literature review synthesized evidence from 87 empirical studies published between 2020 and 2025 on farmers' adoption of sustainable agricultural practices (SAPs). Overall, the literature indicates that adoption is shaped by interdependent socio-cultural

mechanisms rather than a single dominant determinant. Socio-cultural conditions function as both drivers and barriers. Across the included studies, adoption is associated with SAPs being socially legitimized through community influence, aligned with local values and traditions, supported by inclusive decision-making processes, perceived as credible, and reinforced by responsive institutional support. Conversely, resistance tends to persist when established norms lock in conventional routines, practices are framed as culturally misaligned, gendered constraints restrict access to resources and learning spaces, information is not trusted or conflicts with experiential knowledge, and institutional programs are poorly aligned with smallholder realities.

The thematic synthesis also suggests that knowledge and trust and the institutional environment are among the most frequently examined strands in recent evidence, reflecting a strong emphasis on credibility, advisory relationships, and enabling conditions. However, prevalence should not be interpreted as a causal ranking. Gender relations, even when less explicitly foregrounded, consistently appear as a structural factor shaping who participates in networks, who accesses information and inputs, and whose preferences influence household and community decisions. Taken together, the review contributes not only by listing socio-cultural factors, but by clarifying how community norms, cultural meanings, trust, gendered relations, and institutions co-occur and interact to form a local socio-ecology of adoption.

Several practical implications follow. Adoption-oriented interventions are more likely to be sustained when they (i) strengthen social learning and peer diffusion through credible local role models, (ii) adopt participatory co-design that fits local socio-ecological and cultural realities, (iii) treat trust-building and messenger credibility as core mechanisms rather than communication add-ons, and (iv) integrate gender-sensitive and culturally aligned approaches to broaden access and reduce exclusion from training, networks, and resources.

This review has limitations. The focus on English-language empirical journal articles within 2020–2025 may omit relevant evidence from non-English scholarship and grey literature. In addition, thematic synthesis involves analytic judgement, particularly where studies legitimately map onto multiple themes. Future research would benefit from more longitudinal designs and rigorous evaluations of interventions, clearer operationalization of social norms (including distinctions between descriptive and injunctive norms), and mixed methods work that better explains how cultural meanings, power relations, and institutional arrangements jointly shape sustained adoption across contexts.

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Muthia Tri Fadhila: Conceptualization, methodology, investigation, data curation, formal analysis, writing-original draft preparation, writing-review and editing. **Edi Dwi Cahyono:** Supervision, validation, writing-review and editing. **Mas Ayu Ambayoen:** Supervision, validation, writing-review and editing. **Pipit Tunjungsari:** Supervision, validation, writing-review and editing.

CONFLICT OF INTEREST STATEMENT

The author declares no conflict of interest.

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