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# Ecological Citizenship and Sustainable Agricultural Development: A Literature Review on the Role of Agricultural Extension Agents toward Achieving SDG 2 (Zero Hunger)

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Abstrak

Penelitian ini merupakan kajian pustaka yang membahas peran penyuluh pertanian dalam mengembangkan kewarganegaraan ekologis untuk mendukung pembangunan pertanian berkelanjutan dan pencapaian Tujuan Pembangunan Berkelanjutan (SDG) 2: Tanpa Kelaparan. Kajian ini menganalisis artikel ilmiah terindeks Scopus, Google Scholar, dan SINTA tahun 2015–2025 dengan kata kunci *ecological citizenship*, penyuluhan pertanian, dan kedaulatan pangan. Hasil telaah menunjukkan bahwa kewarganegaraan ekologis berperan sebagai landasan moral bagi petani dan masyarakat dalam mengelola sumber daya alam secara bertanggung jawab. Penyuluh pertanian berfungsi sebagai penggerak dan fasilitator yang menerapkan prinsip ekologis dalam praktik pertanian berkelanjutan serta menumbuhkan nilai tanggung jawab dan gotong royong sesuai etika Pancasila. Tantangan yang dihadapi meliputi keterbatasan kapasitas kelembagaan dan rendahnya literasi lingkungan di tingkat lokal. Kajian ini menyimpulkan bahwa penguatan pendidikan kewargaan ekologis dalam program penyuluhan pertanian penting untuk meningkatkan ketahanan pangan dan mewujudkan SDG 2.

Kata kunci: Kewarganegaraan ekologis, Penyuluhan pertanian, Pertanian berkelanjutan, Kedaulatan pangan, SDG 2

*Abstract*

*This literature review examines the role of agricultural extension agents in promoting ecological citizenship to support sustainable agricultural development and achieve Sustainable Development Goal 2 (Zero Hunger). The study analyzes scholarly works indexed in Scopus, Google Scholar, and SINTA from 2015 to 2025 using the keywords ecological citizenship, agricultural extension, and food sovereignty. The findings indicate that ecological citizenship serves as a moral and civic foundation for farmers and communities to manage natural resources responsibly. Agricultural extension agents act as facilitators who apply ecological principles in sustainable farming practices while fostering responsibility and cooperation in line with Pancasila ethics. Key challenges include limited institutional capacity and low environmental literacy in rural areas. The study concludes that strengthening ecological citizenship education within agricultural extension programs is essential to enhance food resilience and realize SDG 2.*

*Keywords: Ecological citizenship, Agricultural extension agents, Sustainable agricultural development, Civic values, Food sovereignty*

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## INTRODUCTION

Sustainable agricultural development is central to achieving SDG 2 because it links productivity with environmental stewardship and community resilience (Gordon, 2019). Contemporary debates increasingly emphasize that sustainability requires civic and ethical transformation, not only technological adoption, which shifts attention from yields to values, participation, and governance in food systems (Mungai et al., 2024; Xu et al., 2024). This turn resonates with scholarship on environmental and ecological citizenship that frames citizens as agents responsible for sustaining socio-ecological systems through informed action and collective care (van Harskamp et al., 2024; Silvast & Valkenburg, 2023).

Within agriculture, ecological citizenship invites farmers and rural communities to act as stewards whose practices shape local ecosystems and food security. Recent work on citizenship in environmental domains shows how everyday practices, social norms, and institutional contexts interact to produce varied forms of civic-ecological action, which provides a useful lens for agrarian settings (Zhan, 2024; Debourdeau et al., 2024; Laakso et al., 2023). These studies argue for participatory, context-sensitive frameworks that value co-designed solutions and collective responsibility, a stance that aligns well with community-based agriculture and locally governed food systems.

Agricultural extension is a logical arena to operationalize ecological citizenship because extension agents connect policy, science, and grassroots practice. Evidence from Indonesia and beyond indicates that when extension is treated as a socio-educational process, agents can facilitate dialogic learning, promote environmental ethics, and reinforce civic norms that support sustainable farming (Dewi et al., 2024; Rivera et al., 2024). Complementary research on practice adoption shows that behavioral change depends on social meanings, perceived benefits, and enabling institutions, which suggests that civic-ecological framing can strengthen adoption pathways for sustainability practices (Han & Niles, 2023; Gebremariam et al., 2021).

Food sovereignty scholarship deepens this argument by insisting that communities should have agency in defining how food is produced, distributed, and governed. Scoping and encyclopedic syntheses demonstrate that sovereignty approaches emphasize autonomy, justice, and ecological care, which reinforces the normative core of ecological citizenship in agrarian contexts (Farfán et al., 2023; Pimbert & Claeys, 2024). Positioning extension within this civic-ecological and sovereignty frame highlights its potential to move beyond

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information transfer toward facilitation of collective stewardship and local control over food systems that support SDG 2.

State-of-the-art reviews underscore two pressing needs for extension systems. First, scholarship on environmental and energy citizenship calls for integrative typologies and critical perspectives that recognize diverse citizen roles, institutional constraints, and the importance of co-design for system change, insights that translate directly to agriculture's sustainability transition (Debourdeau et al., 2024; Silvast & Valkenburg, 2023). Second, systematic reviews of digital extension services identify infrastructural, capability, and design barriers, while also outlining enabling conditions for more participatory and sustainable extension at scale, including inclusive access, trust, and iterative learning mechanisms (Thi Hoa Sen et al., 2024; Mungai et al., 2024). Together, these strands point to extension agents as civic mediators who can embed ecological values in practice while leveraging appropriate technologies and partnerships.

This review contributes novelty by explicitly connecting ecological citizenship, agricultural extension, and SDG 2 within a single analytical frame that is sensitive to Indonesia's philosophical foundation of Pancasila. Rather than treating values, pedagogy, and practice as separate, the synthesis positions extension agents as civic-ecological facilitators who translate environmental ethics into day-to-day farming decisions and local food governance. By integrating insights from citizenship theory, adoption frameworks, and digital extension research, the paper proposes that embedding ecological citizenship within extension curricula and institutional routines can enhance farmer agency, consolidate community resilience, and accelerate progress toward SDG 2 in Indonesia and comparable settings (Rivera et al., 2024; Han & Niles, 2023; Thi Hoa Sen et al., 2024).

## METHOD

This study applies a qualitative literature review design to synthesize conceptual and empirical scholarship on ecological citizenship, agricultural extension, and SDG 2. Adopting a literature-based approach enables theory building and critical integration across diverse studies without additional fieldwork, aligning with proceedings that emphasize conceptual contribution and policy relevance (Snyder, 2019). The review seeks to consolidate existing knowledge, identify gaps, and develop a civic-ecological framework for extension systems. Guided by PRISMA 2020 procedures, the review employed structured steps of identification, screening, eligibility, and inclusion, supported by the JBI

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Manual for Evidence Synthesis for protocol planning, eligibility criteria, and data extraction (Page et al., 2021; Aromataris & Munn, 2024).

The search strategy covered Scopus, Google Scholar, and SINTA databases within a 2015–2025 time frame to include recent and pre-COVID developments in sustainable agriculture. Searches were conducted in both English and Indonesian using Boolean combinations such as ("ecological citizenship" OR "environmental citizenship") AND ("agricultural extension" OR "extension services") AND ("sustainable agriculture" OR "agroecology" OR "food sovereignty") AND ("SDG 2" OR "Zero Hunger"), supplemented by Indonesian terms like penyuluhan pertanian and kedaulatan pangan. Eligible sources included peer-reviewed journal articles, scholarly book chapters, and credible conference proceedings addressing at least two of the three focal constructs. Screening proceeded through title and abstract checks followed by full-text review, with duplicates and screening logs maintained for transparency. Quality appraisal used the Mixed Methods Appraisal Tool for empirical work, and argument coherence and theoretical contribution criteria for conceptual pieces, as recommended by JBI guidance (Hong et al., 2018; Aromataris & Munn, 2024).

Data extraction followed a structured template capturing bibliographic details, constructs, mechanisms, outcomes tied to SDG 2, and implications for extension practices. Analytical coding employed reflexive thematic analysis built through iterative familiarization, coding, theme construction, and review to ensure conceptual fit across global, regional, and Indonesian contexts (Braun & Clarke, 2023). Narrative-thematic synthesis aggregated convergent findings and explained divergences across contexts. Sensitivity analyses compared results restricted to Scopus-indexed items versus the full corpus and tested the persistence of themes when non-Indonesian studies were excluded. This ensured robustness and transferability of synthesized insights to Indonesian agricultural extension and sustainability frameworks (Page et al., 2021; Snyder, 2019).

## RESULT AND DISCUSSION

### Civic–Ecological Framing of Sustainable Agriculture

Recent citizenship scholarship characterizes environmental action as a civic practice shaped by institutions, social norms, and everyday participation, not merely by individual attitudes. Studies show that citizens enact responsibility for shared socio-ecological systems through co-designed practices and collective stewardship, which maps neatly onto agrarian contexts where soil, water, and biodiversity are common concerns (van

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Harskamp et al., 2024; Silvast & Valkenburg, 2023; Debourdeau et al., 2024). This framing encourages farmers to see land care and resource governance as civic duties that contribute directly to food security, making ecological citizenship a normative anchor for SDG 2. It also clarifies why community participation and local knowledge are essential for resilient food systems that can withstand climate and market shocks (Zhan, 2024; Laakso et al., 2023).

Linking this civic-ecological lens with food sovereignty deepens the rationale for local agency in food system governance. Sovereignty approaches emphasize autonomy, justice, and ecological care, which align with ecological citizenship's ethics of responsibility and solidarity (Farfán et al., 2023; Pimbert & Claeys, 2024). Adoption research indicates that sustained uptake of sustainable practices depends on social meanings, perceived benefits, and enabling institutions, suggesting that civic-ecological narratives can strengthen adoption pathways beyond purely technical incentives (Han & Niles, 2023). Empirical work on rural transitions shows that when sustainability is framed as a shared civic project, communities are more likely to maintain soil conservation, diversify systems, and invest in collective infrastructures that stabilize food availability and access, thereby contributing to SDG 2 outcomes (Gebremariam et al., 2021; Gordon, 2019).

**Extension as Moral and Educational Practice**

Treating extension as a socio-educational process positions agents as facilitators of dialogic learning who connect scientific knowledge, local wisdom, and ecological ethics. Evidence from Indonesia and other contexts shows that extension agents who foster reflective dialogue and participatory learning can translate ecological principles into practical routines, while also reinforcing civic norms of cooperation and responsibility that matter for food security (Dewi et al., 2024; Rivera et al., 2024). This approach reframes the agent's role from technology transfer to civic-ecological facilitation, where mentoring, peer exchange, and community problem-solving become vehicles for long-term sustainability rather than short-term yield gains (Mungai et al., 2024). It also provides a culturally coherent pathway in Indonesia, where Pancasila's ethical emphasis on social justice and mutual aid aligns with citizenship-oriented sustainability.

Mechanistically, extension can embed ecological citizenship through co-design of practices and rules, participatory monitoring, and recognition of farmers as knowledge holders. Research on citizenship practices highlights the importance of creating spaces where diverse actors negotiate responsibilities and experiment with low-carbon, nature-

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positive routines that are meaningful in daily life (Laakso et al., 2023; Debourdeau et al., 2024). When these processes are coupled with targeted support for adoption stages, they produce stronger behavioral persistence and social diffusion of innovations critical to SDG 2, such as diversified cropping, cover crops, and water stewardship (Han & Niles, 2023; Gebremariam et al., 2021). The result is extension that functions as moral education in practice, cultivating habits of care and cooperation that stabilize local food systems.

**Barriers and Opportunities for Implementation**

Persistent barriers limit the integration of ecological citizenship into extension programs. Systematic reviews and comparative studies report institutional fragmentation, capability gaps, and design weaknesses that keep many services focused on short-term productivity rather than participatory, ethical outcomes (Thi Hoa Sen et al., 2024; Mungai et al., 2024). Digital extension can widen access but also risks reproducing inequalities when connectivity, digital literacy, or trust are uneven. At the frontline, agents often lack training to facilitate civic-ecological dialogue, and incentive systems rarely reward time-intensive community facilitation, which constrains the translation of values into routines that matter for food security (Silvast & Valkenburg, 2023).

At the same time, the literature points to actionable levers. Strengthening partnerships among universities, government agencies, and farmer cooperatives enables joint curriculum development, participatory monitoring, and communities of practice that normalize ecological citizenship in daily farming decisions (Rivera et al., 2024; Dewi et al., 2024). Reviews of digital extension identify design principles that improve inclusion and learning, such as co-creation of content, trusted intermediaries, low-bandwidth solutions, and iterative feedback cycles (Thi Hoa Sen et al., 2024). When combined with adoption frameworks that acknowledge diverse motivations and capacities, these levers help extension align civic-ecological facilitation with measurable SDG 2 indicators, including dietary adequacy, reduced yield volatility, and resilience of local supply chains (Han & Niles, 2023; Gordon, 2019).

## CONCLUSION

This literature review concludes that embedding ecological citizenship within agricultural extension is a credible pathway to advance sustainable agricultural development and accelerate progress toward SDG 2. The synthesis shows that when extension agents act as civic educators who facilitate dialogic learning, co-design practices with farmers, and cultivate values of responsibility, cooperation, and ecological care

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aligned with Pancasila, communities strengthen food sovereignty, environmental stewardship, and resilience of local food systems. The practical implications are clear: ministries, universities, and farmer organizations should redesign extension curricula to include environmental ethics and participatory methods; invest in capacity building that equips agents to lead civic-ecological facilitation; adopt inclusive digital extension tools with co-created content and feedback loops; align incentives and monitoring with SDG 2 indicators such as dietary adequacy, yield stability, and supply-chain resilience; and institutionalize cross-sector partnerships and community-based governance. Future research should test these propositions through longitudinal and comparative studies across Indonesian regions, mixed-methods process tracing of behavior change and social learning, and design-based implementation evaluations that link adoption stages to measurable SDG 2 outcomes, while also examining equity in digital extension access and the organizational conditions that sustain civic-ecological practices over time.

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