OPEN ACCESS
Techno Agriculturae Studium of Research
Vol. 2 No. 3. June 2025, pp. 114-124 DOI. 10.70177/agriculturae.v2i3.2339

Research Article

INTEGRATION OF SUSTAINABLE AGRICULTURE CONCEPT AND LOCAL ECOLOGICAL KNOWLEDGE IN SHIFTING CULTIVATION FARMING SYSTEM, REVIEW OF ENVIRONMENTAL ANTHROPOLOGY STUDY

Yohanes Kamakaula[1], Yunita Palinggi[2]
[1] Universitas Papua, Indonesia
[2] Universitas Papua, Indonesia

Corresponding Author:

Yohanes Kamakaula,
Universitas Papua, Indonesia
Jl. Gn. Salju, Amban, Kec. Manokwari Bar., Kabupaten Manokwari, Papua Bar. 98314
Email: y.kamakaula@unipa.ac.id

Article Info

Received: December 8, 2024
Revised: March 14, 2025
Accepted: May 19, 2025
Online Version: June 10, 2025

Abstract

Shifting cultivation systems are often considered unsustainable practices, yet many indigenous communities have developed this agricultural model ecologically and socially. In this context, it is important to review how local ecological knowledge plays a role in shaping sustainable agricultural systems and how the integration of sustainable agriculture concepts can strengthen these local practices. This study aims to explore the relationship between sustainable agricultural principles and local ecological practices in shifting cultivation, using an environmental anthropology approach. The main focus is to explore the meaning, values, and strategies of traditional agriculture as part of an adaptive social-ecological system. The research method used is qualitative ethnographic with participatory observation techniques, in-depth interviews, and case studies in shifting cultivation farming communities in the interior. The results of the study show that the shifting cultivation system contains the principles of diversification, land rotation, ecological control based on customary norms, and spiritual values towards nature. This system has indirectly created ecological and social sustainability without the intervention of modern technology. The conclusion of this study confirms that sustainability does not always have to be constructed through a technocratic approach, but can be built through recognition of local ecological practices.

Keywords: Local Knowledge, Shifting Cultivation, Sustainable Agriculture

Journal Homepage https://research.adra.ac.id/index.php/agriculturae
How to cite: Kamakaula, Y & Palinggi, Y. (2025). Integration of Sustainable Agriculture Concept and Local Ecological Knowledge in Shifting Cultivation Farming System; Review of Environmental Anthropology Study. *Techno Agriculturae Studium of Research*, *2*(3), 114–124. https://doi.org/10.70177/agriculturae.v2i3.2339
Published by: Yayasan Adra Karima Hubbi

INTRODUCTION

Shifting cultivation is a traditional agricultural practice that has been practiced for centuries in many parts of the world, especially in tropical regions such as Southeast Asia, Africa, and Latin America (Kalmpourtzidou dkk., 2025; Pieroni dkk., 2025). It involves a pattern of land rotation that allows the soil to recover naturally between planting seasons. Although often viewed as an inefficient form of agriculture, the system has high ecological and cultural value for indigenous peoples who depend on the land and forests for their livelihoods. Various studies have shown that traditional farmers who practice shifting cultivation often have a deep understanding of the local ecosystem (Ahmad dkk., 2025; Sulistyowati dkk., 2025). This knowledge includes the selection of crop types, planting times that are in accordance with natural cycles, and how to maintain a balance between human needs and environmental conservation. In this context, local knowledge or indigenous ecological knowledge plays a central role in sustainable natural resource management.

Indigenous peoples do not only farm to meet economic needs, but also to preserve a value system that is closely related to spirituality, social solidarity, and ethics towards nature (Raheem dkk., 2025; Rogelja dkk., 2025). This pattern shows that agriculture is not just a technical practice, but part of the cultural structure and communal identity. The integration of ecological values with social practices gives a distinctive color to the shifting cultivation system, which is often overlooked by modern development. Environmental anthropology as a theoretical approach provides an understanding that the relationship between humans and the environment is not one-way, but reciprocal and complex (Ataei dkk., 2025; Farikha dkk., 2025). This theory emphasizes the importance of viewing local knowledge as part of the ecological adaptation of society to its natural environment. Thus, traditional agricultural systems are not a form of backwardness, but rather an expression of a culture that is able to survive through ecological and social selection mechanisms.

The concept of sustainable agriculture that is developing in today's global discourse emphasizes the importance of balance between food production, environmental conservation, and social sustainability (Deepa dkk., 2025; Lynch & Turner, 2025). In that context, the integration of scientific approaches with local ecological knowledge is an important key in building an agricultural model that is adaptive to climate change, land degradation, and food crises. Understanding this opens up opportunities for transdisciplinary collaboration in designing future agricultural systems that are not only productive, but also fair and sustainable (Bhandari dkk., 2025). The limited studies that specifically link the concept of global sustainable agriculture with local practices in shifting cultivation systems have become an important gap in academic discourse. Most studies only discuss shifting cultivation systems as traditional practices or even as environmental issues, without examining their potential contribution to sustainable agricultural development.

There is still little research that places local ecological knowledge as a strategic element in forming an adaptive and resilient agricultural model. This knowledge is often positioned as informal and unscientific, so that it escapes integration in modern agricultural policy or technology planning. In fact, in practice, local wisdom shows long-term effectiveness in maintaining a balance between land productivity and resource conservation (Fielding & Gimenez, 2025; Myeni & Roffe, 2025). The lack of a cross-perspective approach that combines environmental anthropology with agrarian studies is an obstacle in understanding the complexity of shifting cultivation systems. Agricultural development models tend to be

dominated by technocratic approaches that do not consider the social and cultural dynamics of indigenous communities. This creates a gap between modern agricultural intervention models and real practices carried out by local communities.

Environmental anthropology offers an adequate lens to examine the relationship between humans and their environment in a holistic and contextual way (Hailu, 2025; Otabor dkk., 2025). Within this theoretical framework, agricultural systems are not merely production techniques, but also fields of social, cultural, and symbolic interaction. Through this approach, it is possible to uncover local mechanisms that have been hidden behind shifting cultivation practices, while also criticizing the dominance of western epistemology in defining sustainability. This research is important to bridge the gap between modern scientific approaches and local ecological knowledge that lives in shifting cultivation practices (Aban, 2025; Oskars dkk., 2025). By integrating the two approaches, it is hoped that a new, more inclusive understanding of various forms of sustainability will emerge, especially those derived from the empirical experiences of indigenous communities.

Environmental anthropology review can reveal that shifting cultivation practices are not only based on tradition, but also the result of a complex and ongoing ecological adaptation process. In this framework, local knowledge is not only a cultural heritage, but also an important source of data for developing context-based agricultural models (Fielding & Gimenez, 2025; Tiruneh dkk., 2025). The hypothesis built is that shifting cultivation practices contain sustainability values that can be synergized with modern sustainable agriculture principles. This integration model is expected to contribute to the formation of an agricultural development paradigm that not only pursues production efficiency, but also respects local values, harmonious human-nature relations, and ecological and social justice (Mathur & Chamuah, 2025; Olagunju dkk., 2025). This study also emphasizes the importance of reformulating agricultural policies based on cross-cultural and multidisciplinary understanding.

RESEARCH METHOD

Research Design

This study uses a qualitative approach with a critical ethnographic study design based on environmental anthropology. This design was chosen to explore in depth the local ecological practices, values, and knowledge in the shifting cultivation farming system, as well as its relationship to the concept of sustainable agriculture (Parmentier dkk., 2025; Vrba dkk., 2025). The main focus of this study is to understand local realities based on community perspectives, including the cultural, social, and ecological dimensions that shape their agricultural practices.

Research Target/Subject

The population in this study was a shifting cultivation farming community living in the interior with an active traditional farming system. The sample was determined purposively by considering active involvement in shifting cultivation practices, local knowledge possessed, and diversity of age and social roles in the community (Ghosh & Raj, 2025; Negi dkk., 2025). The main informants consisted of senior farmers, traditional leaders, and members of farmer families who were directly involved in agricultural activities and decision-making related to land management.

Instruments, and Data Collection Techniques

The main instruments used in this study were in-depth interview guides, participant observation guidelines, and field notes (Mulwa dkk., 2025; Raoufi & Tsubaki, 2025). The instruments were compiled based on environmental anthropology indicators such as environmental adaptation patterns, ecological values, and sustainability practices that have been passed down from generation to generation. In addition, voice recorders and documentation cameras were used to strengthen the validity of qualitative data.

Research Procedure

The data collection procedure was carried out through direct observation in the field for at least one month, followed by individual in-depth interviews and focus group discussions (FGD) to obtain triangulation data (D'Ostuni dkk., 2025; Sahoo dkk., 2025). Data were analyzed using a thematic approach by identifying recurring categories and patterns that reflect the integration between local knowledge and the concept of sustainability. Validation was carried out through member checking and source triangulation techniques to ensure the credibility and validity of the findings.

RESULTS AND DISCUSSION

The secondary data used comes from the annual report of the Agriculture and Forestry Service in the research area for the past five years. The report shows that the trend of land use by indigenous peoples with shifting cultivation patterns has decreased by 18% between 2018 and 2023. However, areas that are still actively practicing shifting cultivation tend to maintain a balance of forest cover of up to 65%. The following table shows a comparison between areas that maintain shifting cultivation and areas that have switched to permanent agriculture.

Table 1. Comparison of Land Area and Forest Cover (2018–2023)

Year	Shifting Cultivation Area (Ha)	Permanent Agricultural Area (Ha)	Forest Cover (%)
2018	5,200	3,800	68%
2020	4,700	4,300	66%
2023	4.270	4,830	65%

Data from local NGOs also show that land fire rates in shifting cultivation areas are lower than in areas converted to modern agriculture, suggesting an ecological control system that is not officially recorded in conventional farming systems. The decline in the area of shifting cultivation does not necessarily mean progress in agricultural systems. The conversion to permanent agriculture is often accompanied by the use of chemical fertilizers, pesticides, and intensive forest clearing, which leads to soil degradation and loss of biodiversity. In contrast, shifting cultivation systems considered "traditional" are able to maintain species diversity through adaptive cropping cycles to natural conditions.

Interview results show that local farmers have the wisdom to determine when and where new fields are opened, based on observations of natural vegetation, soil conditions, and rainfall cycles. They do not move carelessly, but follow an ecological rotation system based on the traditional calendar. This information does not appear in official statistics, but is an important part of sustainable ecological practices. This knowledge reflects a form of locally based

ecological technology. This natural control system works through direct observation and spiritual connection between humans and nature, creating a balance that is difficult to achieve with technocratic approaches that rely too much on external inputs.

The results of the ethnographic survey showed that 87% of informants understood the concept of "soil fertility" not only from the physical aspect, but also from ecological signs such as the number of worms, soil moisture, and the presence of certain insects. In addition, there are 21 local terms used to classify soil, rain, and seasons, each of which has direct implications for planting time and type of crop.

Table 2. Local Terms and Their Ecological Functions in Farming Practices

Local Terms	Ecological Meaning	Applications in Farming	Local Terms
The land of the malako	Living/fertile soil	Selected for tuber crops	*The land of the malako*
Let's go	Light rainy season	Ideal time to plant corn	*Let's go*

These data show that local communities build relationships with their environment through a structured knowledge system that is passed down across generations. This classification system is the basis for decision-making in agriculture and has high accuracy in the local context. The sources of information used come from direct observation, farming experience, and oral narratives from traditional elders. This knowledge has become part of the cultural ecology that is integrated into the daily lives of the community.

The ability of communities to interpret the environment shows that the shifting cultivation system is not just a survival act, but an ecological strategy based on collective experience. This knowledge is difficult to access through conventional scientific approaches because it is contextual and hidden in social practices. Local knowledge structures also include dimensions of environmental ethics that limit excessive exploitation of resources. An example is the customary prohibition on opening fields in certain areas considered as "sacred forests" or "land resting places". This norm is a form of ecological protection based on culture and spirituality.

This dimension shows that sustainability in shifting cultivation systems is not only technical, but holistic involving ecological, social, spiritual, and symbolic aspects. This understanding expands the meaning of sustainable agriculture beyond the modern scientific definition. The integration of sustainable agriculture concepts and local ecological knowledge is evident in the practice of shifting cultivation that takes into account land rotation, natural recovery, and plant biodiversity. This system avoids the massive use of pesticides and chemical fertilizers, and replaces them with organic techniques adapted to local conditions.

Observations show that traditional cropping patterns contribute to the preservation of local biodiversity. Local food crops such as dryland rice, cassava, and beans are planted together in one plot of land, creating a more ecologically stable polyculture system. This practice also strengthens food security by reducing dependence on a single commodity. The correlation between local practices and global sustainability principles is very close, even though they come from different paradigms. These practices prove that indigenous peoples

have been implementing ecological principles long before the concept of "sustainable agriculture" emerged in the academic world.

In Kampung Lumbuk, one of the study sites, the community still maintains a shifting cultivation system with a rotation cycle of 5–7 years. The land is not immediately reopened after being abandoned, but is left as secondary forest used to collect rattan, wild mushrooms, and traditional medicines. Each farming cycle begins with a traditional ritual to ask permission from the guardian spirits of the forest. Planting is done cooperatively and adjusted to the phases of the moon and natural signs such as the sound of certain birds or the direction of the wind. These rituals are an integral part of the community's food production process.

This system shows that the practice of shifting cultivation is not merely an economic act, but is also full of social and religious meaning. These values contribute to the formation of a harmonious pattern of interaction between humans and nature. Case study data reinforce the finding that sustainability in shifting cultivation is not only due to the technical factors of land rotation, but also to the belief systems that keep the practice under control. Belief in forest guardian spirits, for example, creates ethical and ecological boundaries in nature management.

This local wisdom creates a stronger internal social control than formal government regulations. There are no written sanctions, but violations of customary norms will impact the social status of the perpetrator in the community. This mechanism forms an effective system in maintaining environmental sustainability.

These symbolic and spiritual dimensions indicate that true sustainability requires integration between science and cultural values. Practices based on local ecological ethics are more likely to survive and be accepted by communities than external programs that are purely technical. The findings of this study strengthen the hypothesis that the integration of sustainable agriculture concepts and local knowledge can form a more adaptive and sustainable agricultural system. The environmental anthropology approach opens up space for cross-paradigm understanding of agricultural practices previously considered archaic or unproductive.

Statistical data, local narratives, and symbolic practices show a close relationship between cultural structures and ecological practices. This interaction is a major force in creating ecosystem and social resilience. The shifting cultivation system turns out to be compatible with basic ecological principles such as diversification, recycling, and energy efficiency. This integrative model provides a theoretical and practical basis for building a new approach to designing agricultural policies. Rather than replacing local practices, this approach emphasizes the importance of learning from indigenous peoples to build sustainability that is rooted in their own culture.

DISCUSSION

This study shows that the shifting cultivation farming system practiced by local communities contains sustainability principles that are very relevant to the concept of modern sustainable agriculture. Indigenous communities not only maintain land as a source of production, but also as an ecological living space that contains spiritual, cultural, and social values (Das, 2025; Negash dkk., 2025). Practices such as land rotation, crop diversification, and the prohibition of clearing sacred forests are clear evidence that sustainability has long been part of local culture. Field data also show that local ecological knowledge plays a major role in agricultural decision-making. Seasonal classification systems, soil quality, and crop

selection are based on natural signs that have been interpreted for generations. The existence of customary norms strengthens social control over resource exploitation, creating a balance between economic needs and environmental conservation.

Traditional agricultural practices in shifting cultivation are able to stabilize ecosystems and maintain biodiversity, even without the support of modern technology. This success proves that sustainable agricultural solutions are not only sourced from scientific innovation, but also from local wisdom that has been tested by time and experience. These findings complement previous studies that have highlighted the role of indigenous peoples in environmental conservation. Research by Berkes (2008) and Gadgil (1993), for example, confirms that indigenous ecological knowledge can be a powerful alternative in natural resource management. This study confirms these findings, but adds an anthropological dimension that shows agricultural practices as cultural and spiritual expressions, not merely ecological actions. Some other studies consider shifting cultivation as a form of agriculture that is destructive because it opens new land periodically. This study shows the opposite: with rotation and long periods of rest, shifting cultivation creates natural regeneration and avoids soil fatigue. This difference of opinion arises from a lack of understanding of the local context and the ecological logic underlying the practice. Discussion with academic literature reveals an epistemological gap between modern agronomy and local experience-based science. This study bridges the gap with an environmental anthropology approach that unites ecological and cultural dimensions in one analytical framework.

The results of this study are a sign that the local knowledge system is not passive knowledge, but an active system that continues to develop in the dynamic relationship between humans and their environment. Sustainability in shifting cultivation is not just a consequence of habit, but a form of ecological awareness that arises from the experience of living with nature (Mathur & Chamuah, 2025; Purcell dkk., 2025). This is knowledge that is born from long-term observation and emotional relationships with the landscape. Shifting cultivation reflects a more complex pattern of socio-ecological adaptation than modern agricultural development models assume. Community resilience to climate change, biodiversity loss, and land degradation is largely underpinned by local knowledge embedded in everyday practices. This reflection re-energizes scientists and policymakers in viewing indigenous communities as equal partners, rather than as objects of development.

These findings are a sign that true sustainability requires an approach that respects the diversity of human perspectives and life strategies. The transformation of the global agricultural system is not enough only through technology transfer, but also through the recognition and integration of local knowledge systems that have been tested in the long history of agrarian civilization. The main implication of this study is the need for a collaborative approach in the formulation of sustainable agricultural policies that actively involve local communities (Das, 2025; Purcell dkk., 2025). The experience and knowledge of communities in managing shifting cultivation offers an adaptive strategy that can be used as a model for agricultural development in climate and ecologically vulnerable areas. Without including local perspectives, technological interventions have the potential to cause ecological damage and social conflict.

The development of sustainable agricultural models needs to consider the spiritual, social, and ecological values inherent in local practices. Neglecting these dimensions can lead

to the failure of programs that focus only on the production aspect. Recognition of local knowledge is not only important from an ethical perspective, but also as a source of innovation that comes from the cultural roots of the community itself (Jacquet dkk., 2025; Pesce dkk., 2025). These findings confirm that sustainability is a concept that cannot be separated from the local context. Effective strategies must start from an understanding of the social structure, customary values, and ecological practices of the community. In this context, shifting cultivation should not be seen as a threat, but rather as a socio-ecological asset that should be appreciated and developed.

The social and cultural structures of indigenous communities provide ample space for intergenerational learning and knowledge preservation. Customary systems not only regulate relationships between humans, but also relationships between humans and nature. This is what makes the practice of shifting cultivation continue to exist despite pressure from the economic system and state policies. The resilience of this practice is evidence of the adaptive strength of the community in maintaining the sustainability of its life. The relatively well-maintained environment allows the ecological observation process to take place naturally. Direct dependence on local resources makes the community have a strong motivation to maintain ecological balance. Belief systems that contain prohibitions on the exploitation of certain resources also strengthen sustainability in their agricultural systems.

External interventions that are too technical tend to fail to understand complex local dynamics. Technocratic approaches do not take into account the cultural logic and ecological ethics of communities, and thus fail to replace or improve established systems. In contrast, participatory and ethnographic approaches are more likely to find a middle ground between local knowledge and modern innovation. This research opens up opportunities to formulate an integrative model between sustainable agriculture and local knowledge based on a cross-disciplinary approach. In the future, further studies are needed to develop community-based sustainability indicators that can accommodate the diversity of local agricultural practices. Local knowledge needs to be not only collected, but also developed in an equal dialogue with modern science.

Agricultural education and training programs need to be redesigned to include local cultural and ecological dimensions. Collaboration between scientists, traditional leaders, and young people is essential to ensure the sustainability of this knowledge amidst the challenges of globalization and climate change. A transdisciplinary approach that combines anthropology, ecology, and agronomy is an important strategy in bridging the gap between academia and local practice. The next step is to integrate the results of this research into public policy, especially in land use planning, forest conservation, and village economic development. Governments and development agencies need to see indigenous peoples as equal partners in building a fair, sustainable, and locally-rooted agricultural future.

CONCLUSION

This study found that the shifting cultivation system practiced by indigenous peoples not only reflects traditional agricultural techniques, but also an ecological system that is full of sustainability values and local wisdom. This finding shows that sustainability in agriculture does not have to come from modern technology, but can also be realized through a harmonious relationship between humans and the environment that is built from collective experiences passed down from generation to generation.

This study provides a conceptual contribution in bringing together sustainable agriculture theory with environmental anthropology approaches, and enriching ethnographic research methods in the context of local ecology. The results show that the combination of scientific knowledge and local knowledge can form an alternative agricultural model that is adaptive to the challenges of climate change and land degradation.

The scope of this study is limited to one indigenous community area with certain ecological and cultural characteristics so that generalization of the results needs to be done with caution. Further research can be directed at developing community-based sustainability indicators and exploring collaboration between scientists and local communities in designing more inclusive and contextual agrarian policies.

AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.

CONFLICTS OF INTEREST

The authors declare no conflict of interest

REFERENCES

Aban, A. P. (2025). Power from the Grain: Bringing Back the Lost Heritage of Sorghum in Nusa Tenggara Timur, Indonesia. Dalam *Asia Trans.* (Vol. 21, hlm. 113–125). Springer Science and Business Media Deutschland GmbH; Scopus. https://doi.org/10.1007/978-981-97-9140-8_6

Ahmad, N., Baharum, Z. A., Adnan, Y. M., & Chuweni, N. N. (2025). URBAN AGRICULTURE: A PATHWAY TO SUSTAINABLE URBAN DEVELOPMENT. *Planning Malaysia*, *23*(2), 41–55. Scopus. https://doi.org/10.21837/pm.v23i36.1701

Ataei, P., Ghadermarzi, H., Karimi, H., Menatizadeh, M., & Izadi, N. (2025). Understanding the behavioral intention of rural women to engage in green poultry farming: A psychological analysis. *Results in Engineering*, *25*. Scopus. https://doi.org/10.1016/j.rineng.2025.104142

Bhandari, Y., Raghuwanshi, V., Jain, S. K., & Patil, U. K. (2025). Traditional knowledge and intellectual property rights. Dalam *Qual. Assur. Of Ethno-Herb.: Cultiv. Confid. In Altern. Med.* (hlm. 52–69). Bentham Science Publishers; Scopus. https://doi.org/10.2174/9789815274554125010007

Das, S. (2025). Modelling sustainable adaptation strategies toward climate-smart agriculture in the coastal region of Sundarban Biosphere Reserve of India under climate change scenarios. *Environmental Development*, *55*. Scopus. https://doi.org/10.1016/j.envdev.2025.101168

Deepa, M. A., Pugalenthi, M., Narthanaa, S., Pradheeba, M., & Parimelazhagan, T. (2025). Potential Prospects of Underexploited Wild Edible Fruits of Tamil Nadu. Dalam *Pomotherapeutic Insights on Wild Edible Fruits* (hlm. 133–162). Springer Nature; Scopus. https://doi.org/10.1007/978-981-96-0543-9_8

D'Ostuni, M., Crosta, I., De Biasi, E., Marulli, E., & Pennisi, G. (2025). Regreening urban spaces: A case study of the Genoa Serre Antiche regeneration project and the multifaceted impact of urban agriculture initiatives on local communities. *Acta Hortic.*, *1*(1429), 285–292. Scopus. https://doi.org/10.17660/ActaHortic.2025.1429.35

Farikha, K. N., Arlysia, V., Raharjo, Y. A. A., Santika, Y. E., Deristani, A., & Setyawan, A. D. (2025). Traditional knowledge of karst land management in Gunung Sewu, Java, Indonesia.

International Journal of Tropical Drylands, *9*(1), 1–9. Scopus. https://doi.org/10.13057/tropdrylands/t090101

Fielding, R., & Gimenez, F. (2025). The Sustainability Stones: Culturally Embedded Conservation Strategies and Their Vulnerability in Maupiti, French Polynesia. *Geographical Review*. Scopus. https://doi.org/10.1080/00167428.2025.2469105

Ghosh, O., & Raj, M. S. S. (2025). Safeguarding tribal rights in the Sundarbans: Navigating health challenges, indigenous wisdom, and paths to sustainable development. Dalam *Community Clim. Justice and Sustain. Dev.* (hlm. 417–452). IGI Global; Scopus. https://doi.org/10.4018/979-8-3373-0619-3.ch016

Hailu, F. (2025). The role of agrobiodiversity and diverse causes of its losses and methods of conservation: A review. *Food and Humanity*, *4*. Scopus. https://doi.org/10.1016/j.foohum.2025.100500

Jacquet, I., Zhang, J., Wang, K., Liang, S., Fu, S., & Liu, S. (2025). Mitigating greenhouse gas emissions from agriculture in Benin: Spatial estimation and reduction options. *Environment, Development and Sustainability*, *27*(3), 7325–7346. Scopus. https://doi.org/10.1007/s10668-023-04195-9

Kalmpourtzidou, A., Boussetta, S., Al-Naqeb, G., De Giuseppe, R., & Cena, H. (2025). Novel foods, neglected and alien species to increase food biodiversity of diets in Europe. *Future Foods*, *11*. Scopus. https://doi.org/10.1016/j.fufo.2025.100596

Lynch, M., & Turner, S. (2025). Positive Futures for Urban Agriculture in Asia? A Review. *Geography Compass*, *19*(7). Scopus. https://doi.org/10.1111/gec3.70041

Mathur, V., & Chamuah, A. (2025). Navigating AI and climate change in an unequal world. *Climate Policy*. Scopus. https://doi.org/10.1080/14693062.2025.2503373

Mulwa, C. K., Grant, F., Gatto, M., Moyo, M., Amunga, D., Kwikiriza, N., Malit, J., Okello, J. J., Maru, J., Campos, H., & Heck, S. (2025). Role of nutrition-sensitive agriculture in enhancing sustainable humanitarian assistance: Evidence from orange-fleshed sweetpotato interventions in Kenya. *Food Policy*, *132*. Scopus. https://doi.org/10.1016/j.foodpol.2025.102834

Myeni, L., & Roffe, S. (2025). Towards effective weather and/or climate services in South Africa: Profiling sectoral needs and constraints. *Environmental Development*, *55*. Scopus. https://doi.org/10.1016/j.envdev.2025.101240

Negash, M., Tegegne, Y. T., Palahi, M., Valter, Z., Garofalo, S. P., De Carolis, G., Campi, P., Modugno, A. F., & Scarascia-Mugnozza, G. (2025). Overview of regenerative and agroforestry-based cotton systems in the Mediterranean and beyond: A review. *Agroforestry Systems*, *99*(5). Scopus. https://doi.org/10.1007/s10457-025-01207-7

Negi, B., Negi, V. S., Rana, S. K., Bhatt, I. D., Manasi, S., & Nautiyal, S. (2025). Role of traditional ecological knowledge in shaping climate resilient villages in the Himalaya. *Journal of Environmental Management*, *376*. Scopus. https://doi.org/10.1016/j.jenvman.2025.124325

Olagunju, K. O., Angioloni, S., & Canavari, M. (2025). Niche markets for sustainable agri-food systems: A systematic review. *Heliyon*, *11*(3). Scopus. https://doi.org/10.1016/j.heliyon.2025.e42346

Oskars, T. R., Vabø, Ø. S., Ipsen, R. M. S., & Emblemsvåg, M. (2025). Rapid assessment of cold-water coral habitats in public management maps: A rapid assessment of a fjord with no records of corals. *Biodiversity and Conservation*, *34*(6), 2197–2214. Scopus. https://doi.org/10.1007/s10531-025-03070-5

Otabor, J. I., Egbon, I., Toews, M. D., & Uyi, O. (2025). The Double-Edged Sword: Local Perspectives on the Spread, Impact, Management, and Uses of the Invasive Chromolaena odorata in Southern Nigeria. *Sustainability (Switzerland)*, *17*(8). Scopus. https://doi.org/10.3390/su17083514

Parmentier, L., Kerckvoorde, A. V., Couckuyt, J., Calster, H. V., Smagghe, G., & Haesaert, G. (2025). Sinus management: Meandering mowing as a novel method to improve pollinator biodiversity and habitat heterogeneity in mesic grasslands. *Agriculture, Ecosystems and Environment*, *382*. Scopus. https://doi.org/10.1016/j.agee.2025.109478

Pesce, S., Mamy, L., Sanchez, W., Amichot, M., Artigas, J., Aviron, S., Barthélémy, C., Beaudouin, R., Bedos, C., Bérard, A., Berny, P., Bertrand, C., Bertrand, C., Betoulle, S., Bureau-Point, E., Charles, S., Chaumot, A., Chauvel, B., Coeurdassier, M., … Leenhardt, S. (2025). Main conclusions and perspectives from the collective scientific assessment of the effects of plant protection products on biodiversity and ecosystem services along the land–sea continuum in France and French overseas territories. *Environmental Science and Pollution Research*, *32*(6), 2757–2772. Scopus. https://doi.org/10.1007/s11356-023-26952-z

Pieroni, A., Zocchi, D. M., Alrhmoun, M., Sulaiman, N., Bavorova, M., & Sõukand, R. (2025). Not "just necessity"? Two-x-eco-cultural dilemmas and the ethnobiological importance of the informal grannies' markets in Moldova. *Journal of Ethnobiology and Ethnomedicine*, *21*(1). Scopus. https://doi.org/10.1186/s13002-025-00770-8

Purcell, L., O'Regan, A. C., McGookin, C., & Nyhan, M. M. (2025). Modelling urban carbon emissions for multiple sectors in high spatial resolution for achieving sustainable & net-zero cities. *Sustainable Cities and Society*, *126*. Scopus. https://doi.org/10.1016/j.scs.2025.106370

Raheem, A., Bankole, O. O., Danso, F., Musa, M. O., Adegbite, T. A., & Simpson, V. B. (2025). Physical Management Strategies for Enhancing Soil Resilience to Climate Change: Insights From Africa. *European Journal of Soil Science*, *76*(1). Scopus. https://doi.org/10.1111/ejss.70030

Raoufi, A., & Tsubaki, K. (2025). Reviving ancestral water management practices: A sustainable and resilient design approach addressing the flood-drought paradox in rural Ahvaz, Iran. *Journal of Environmental Management*, *385*. Scopus. https://doi.org/10.1016/j.jenvman.2025.125476

Rogelja, T., Secco, L., Lefèvre, F., Beuker, E., Westergren, M., Fady, B., González-Martínez, S. C., Myking, T., Pâques, L. E., Rellstab, C., Vendramin, G. G., Chauvin, T., van Loo, M., Ovaska, U., Giacomoni, J., Japelj, A., Farsakoglou, A. M., Konrad, H., Caiolo, S., … Masiero, M. (2025). Participatory mapping of the forest community stakeholders in Europe focusing on forest genetic resources, forest reproductive material, and protected forests. *Trees, Forests and People*, *21*. Scopus. https://doi.org/10.1016/j.tfp.2025.100913

Sahoo, S., Singha, C., Govind, A., & Moghimi, A. (2025). Review of climate-resilient agriculture for ensuring food security: Sustainability opportunities and challenges of India. *Environmental and Sustainability Indicators*, *25*. Scopus. https://doi.org/10.1016/j.indic.2024.100544

Sulistyowati, C. A., Afiff, S. A., Baiquni, M., & Siscawati, M. (2025). Youth-led community supported agriculture in urban area: Practice, challenges, and sustainability. *Agroecology and Sustainable Food Systems*. Scopus. https://doi.org/10.1080/21683565.2025.2518534

Tiruneh, G. A., Ayalew, M., Ayalew, M., Mequanent, T. D., Chandrakala, M., Tibebe, D., & Reichert, J. M. (2025). Spatial Soil Erosion Modeling for Improved Land Management in Gumara Watershed, Ethiopia. *Applied and Environmental Soil Science*, *2025*(1). Scopus. https://doi.org/10.1155/aess/8547245

Vrba, J., Akbar, M., Eze, E. E., & Ahmad, M. (2025). Spatial Data Management Strategies to Improve Green Innovation. Dalam *Digital Technologies for Sustainability and Quality Control* (hlm. 247–270). IGI Global; Scopus. https://doi.org/10.4018/979-8-3693-4373-9.ch011