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Original Research Article

Institutional Opportunities and Constraints Shaping Agroecological Transition in Extension Systems: Evidence from Babati District, Manyara Region, Tanzania

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Abstract: Agroecology is seen as a promising approach to creating sustainable, resilient food systems, but it is not yet widely adopted in agricultural extension services in many developing countries. This study examined how institutional arrangements within Tanzania's agricultural extension system shape agroecological transition, using Babati District as a qualitative case study. Guided by Scott's Institutional Theory, data were collected through key informant interviews, focus group discussions, in-depth interviews and documentary review, and analysed using reflexive thematic analysis. The findings indicate that supportive national policies, indigenous knowledge systems and collaborative networks involving government agencies, non-governmental organisations and other extension actors strengthen the regulative and cultural–cognitive dimensions of agroecological transition. Nevertheless, the normative dimension remains only partially aligned with these institutional advances. Persistent shortages of extension personnel, inadequate operational financing, weak coordination and monitoring systems, project-dependent knowledge dissemination, limited market incentives for ecologically diverse products and high labour requirements continue to constrain the routine institutionalisation of agroecology within public extension services. Consequently, agroecology has achieved increasing policy legitimacy but has yet to become fully embedded within everyday extension planning, implementation and advisory practice. The study demonstrates that agroecological transition is fundamentally an institutional transformation process requiring alignment among the regulative, normative and cultural-cognitive pillars of agricultural extension. It concludes that the Ministry of Agriculture, the Prime Minister's Office-Regional Administration and Local Government (PMO-RALG), Local Government Authorities (LGAs), research institutions, development partners and other extension stakeholders should strengthen institutional capacity, integrate agroecology into extension mandates and performance management systems, harmonise coordination and monitoring mechanisms and promote market systems that reward agroecological production. These reforms are essential for embedding agroecology within mainstream extension governance in Tanzania and other countries with pluralistic agricultural extension systems.

Keywords: Institutional Framework, Agricultural Extension, Agroecological Transition, Institutional Theory, Pluralistic Extension System, Opportunities and Constraints, Tanzania.

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1. INTRODUCTION

Agriculture faces growing pressure to produce enough food while also dealing with climate change, biodiversity loss, environmental damage, decline soil fertility and concerns about the sustainability of current farming methods. These challenges have led to more interest in new ways to boost productivity while protecting the environment and supporting rural

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communities. Agroecology has become a key approach for transforming food systems by combining ecological principles with both local and scientific knowledge. This helps promote environmentally friendly, socially inclusive and economically practical farming. More people now see agroecology not just as a set of farming techniques, but as a scientific field, a practical method for sustainable agriculture and a movement that supports strong food systems and fair rural development (Wezel *et al.,* 2020; Gliessman, 2022; Rai & Chaudhary, 2023). Research shows that agroecological practices like crop diversification, agroforestry, integrated soil fertility management, biological pest control and conservation agriculture can improve biodiversity, help farms cope with climate change, reduce the need for outside input and make smallholder farming more sustainable when supported by good policies and institutions (Dittmer *et al.,* 2023).

Agricultural extension and advisory services are key to helping farmers access and use knowledge that supports sustainable farming and better livelihoods. In the shift toward agroecology, extension systems do more than just share technical information. They also create spaces for farmers, researchers, extension workers, civil society and private companies to learn together, try new ideas and share knowledge. Modern extension approaches view farmers as partners in innovation, not merely as recipients of new technologies. This means working together, learning by doing and combining scientific and local knowledge (Wezel & David, 2020). The success of agroecological extension depends not only on the skills of extension staff but also on the broader institutional setting. Policies, governance, organizational roles, coordination, incentives and how different groups interact all influence how agroecological knowledge is created, shared and used in everyday extension work (Zeng *et al.,* 2023). In this way, agricultural extension can either help or hinder agroecological innovation.

Even though agroecology is increasingly seen as a way to achieve sustainable food systems, it is not yet widely included in everyday agricultural extension services, especially in many low- and middle-income countries. Most extension organisations still use systems designed to boost productivity through high-input use, which makes switching to agroecological methods a challenge for both organisations and institutions. While many governments have incorporated sustainability into their agricultural policies, extension organisations often struggle to put these ideas into practice. This is due to limited capacity, weak governance, insufficient funding, poor coordination and lack of investment in agroecological skills and knowledge among extension staff (Landini *et al.,* 2021). Also, organisational goals and professional standards and prioritise short-term productivity over long-term sustainability, which keeps traditional advisory methods in place. These issues show that moving to agroecology requires not just new technologies, but also changes in extension systems so that policies, incentives, practices and governance all support agroecological goals.

To address these challenges, greater attention is being given to pluralistic, participatory agricultural extension systems to support the shift to agroecology. Instead of relying solely on public extension agencies, pluralistic systems bring together government, research groups, universities, civil society, private companies, farmer organisations and development partners. These groups combine their skills, resources and knowledge to drive agricultural innovation. In these systems, extension is seen as collaborative process focused on learning and innovation, not just passing on technology. Participatory methods encourage farmers to experiment, learn from one another and blend local and scientific knowledge, leading to agroecological solutions that meet local needs (Drexler, 2020; Sulekha *et al.,* 2025). However, the success of pluralistic extension depends on how well these groups coordinate, govern, share knowledge and hold each other accountable. When these relationships work well, pluralistic extension systems help speed and support agroecological practices in different farming settings.

Tanzania is a good example for studying the institutional side of agroecological transition because its agricultural extension system has undergone major decentralisation and policy change over the last 20 years. These changes have encouraged a pluralistic approach, involving government, private companies, NGOs, faith-based groups, farmer organisations, research institutions and development partners in providing advisory services. The hope was that more diverse institutions would improve services, boost innovation and help farmers get better access to knowledge and support. However, even with these policy improvements, implementing pluralistic remains difficult. Challenges include limited extension staff, insufficient funding and poor coordination among service providers, overlapping roles, weak accountability and unequal access to services, especially for smallholder farmers (Mosha & Daudi, 2024; Nzao *et al.,* 2025). As a result, Tanzania shows a key paradox: while policies have become more progressive, real world problems still make it hard to fully adopt agroecological approaches in everyday extension work. This situation raises important questions about how institutional setups in pluralistic extension systems affect the spread and scaling of agroecology.

While there is more research on how farmers adopt agroecological practices, the impact on their livelihoods and social and economic factors involved, less attention has been given to the institutional processes that help or hinder agroecological transition through extension systems. In Tanzania, most studies focus on farmers' awareness, adoption and use of agroecological methods, as well as the factors that influence their choices (Constantine *et al.,* 2021; Kanjanja *et al.,* 2022;

Magesa *et al.,* 2025). These studies help us understand farm-level decisions, but they do not explain much about how governance, organisational roles, coordination, professional standards and pluralistic extension systems affect the spread and acceptance of agroecological knowledge. As a result, we still do not fully understand the institutional factors that determine whether agroecology becomes part of regula extension services. This gap limits both theory and policy efforts to make agroecology a standard part of decentralised extension systems. To address this, we need and institutional perspective that explains how policies, organisational norms and shares knowledge work together to shape agroecological transition.

Given this context, this study examines how Tanzania's pluralistic agricultural extension system supports or limits the spread of agroecology, focusing on Babati District as a case study. Using Institutional Theory (Scott, 2005), the research examines how policies and guidelines, organisational roles and norms and shared beliefs and knowledge all interact to shape the promotion and adoption of agroecology in extension services. By focusing on institutional factors rather than just farm-level adoption, this study adds to the literature on agricultural extension, institutional change and sustainable food systems. The results aim to guide policy reforms, improve coordination in pluralistic extension systems and help develop extension methods that better support sustainable agroecological transitions in Tanzania and similar countries.

2. THEORETICAL FRAMEWORK

This study is guided by Scott's Institutional Theory (Scott, 2005), which explains how institutions shape organisational behavior through formal rules, organisational norms and shared systems of meaning. The theory argues that organisational change depends not only on policy reforms or technical innovations but also on institutional environment that determines whether new ideas become accepted, implemented and sustained. Because agroecological transition requires changes in policies, extension practices, organisational priorities and stakeholder perceptions, Scott's Institutional Theory provides and appropriate analytical framework for examining how agricultural extension systems enables or constrain its institutionalisation. Scott (2005) conceptualises institutions as comprising three interrelated pillars: the regulative, normative and cultural-cognitive pillars. These dimensions operate interactively and institutional change is more likely to be sustained when they reinforce one another. The regulative pillar refers to the formal rules, policies, legislation, organisational mandates and governance mechanisms that guide institutional behavior. Within agricultural extension, these include national agricultural policy, extension strategies, planning frameworks, financing arrangements and accountability systems that shape how extension services are organised and implemented. While supportive policies establish institutional legitimacy for agroecology, their effectiveness depends on their translation into organisational planning, resource allocation, implementation and monitoring. The normative pillar encompasses the organisational values, professional standards and institutional expectations that influence how extension personnel perform their responsibilities. It includes organisational priorities, advisory approaches, performance management systems and professional norms that determine which agricultural practices are promoted and rewarded. Institutionalising agroecology therefore requires organisational cultures and incentive systems that support participatory learning, ecological sustainability, and long-term farmer engagement alongside productivity objectives. The cultural–cognitive pillar comprises the shared beliefs, knowledge systems and social understandings that shape how individuals and organisations interpret agricultural development. In agricultural extension, this includes indigenous knowledge, farmers' experiential learning, scientific knowledge and collaborative learning processes through which innovations are generated and adapted. Because agroecology is knowledge-intensive and context-specific, its institutionalisation depends on extension systems that recognise multiple sources of knowledge and promote continuous learning among farmers and other stakeholders. Although each institutional pillar performs distinct functions, they are mutually reinforcing. Formal policies require supportive organisational practices to become operational, while both depend on shared understandings that encourage acceptance and long-term implementation. Consequently, institutional alignment across the three pillars provides the foundation for sustainable organisational change. In this study, Scott's Institutional Theory provides the analytical lens for examining how institutional arrangements influence agroecological transition within Tanzania's pluralistic agricultural extension system. The framework guides the interpretation of the empirical findings by analysing how formal institutional arrangements (regulative pillar), organisational values and extension practices (normative pillar), and shared knowledge systems and stakeholder perceptions (cultural–cognitive pillar) interact to create opportunities and constraints for agroecological transition. Through this perspective, the study identifies the institutional conditions necessary for embedding agroecology within routine agricultural extension governance and practice.

3. METHODOLOGY

3.1 Description of the Study Area

The study was conducted in Babati District Council, one of the seven administrative councils in Manyara Region. The district is situated between latitude 3° and 5° South and longitudes 35° and 37° East. Babati District borders Monduli District to the north, Karatu District to the northwest, Mbulu District to the west, Hanang District the southwest, Kondoa District to the south and Simanjiro District to the east.

Field work focused on four purposively selected villages: Mamire, Endagile and Mwikantsi in Mamire Ward, and Kwaraa in Endakiso Ward. Villages were chosen based on their agricultural potential and active participation on agroecological interventions implemented through the Participatory Ecological Land Use Management (PELUM) project. The PELUM project provides farmers with training and technical support in agroecological practices.

3.2 Research Design

A qualitative case study design was selected due to its suitability for examining complex phenomena within natural context and considerable depth (Yin, 2018; Creswell & Creswell, 2023). This approach enabled a comprehensive understanding of institutional practices, stakeholder perceptions and lived experiences, providing detailed contextual insights into the study area.

3.2.1 Participants and Sampling Procedure

The study involved two primary participant groups: institutional actors and smallholder farmers. Institutional actors were designed as Key Informants (KIs) due to either, their professional expertise in extension governance and or agroecological programming. Nine KIs were purposively selected from national, regional, district, ward and organisational levels, as shown in Table 1. In alignment with reflexive thematic analysis principles, the sample size was determined by the depth of engagement and analytical completeness, rather than the conventional concept of saturation (Braun & Clarke, 2021). These nine KIs collectively represented the principal institutional levels within Tanzania's agricultural extension system.

Smallholder farmers with a minimum of five years of farming experience participated in Focus Group Discussions (FGDs) and In-Depth Interviews (IDIs). These participants were either involved directly in or had exposure to agroecological interventions, which allowed the study to document their experience in accessing extension services and adopting agroecological practices.

Table 1: Distribution of Key Informants at Different Institutions

Institution/Level	Role	No. of KIs
Ministry of Agriculture	Senior extension official	1
Regional Secretariat (Manyara)	Regional agricultural officer	1
Babati District Council	District agricultural officer	1
Ward level (Mamire)	Ward Agricultural Extension Officer (WAEO)	1
Ward level (Endakiso)	Ward Agricultural Extension Officer (WAEO)	1
PELUM Tanzania	Programme staff	1
COSITA	Programme staff	1
Farm Africa	Programme staff	1
Crop Buyer	Maize crop buyer	1
Total		**9**

Ten focus group discussions (FGDs) were conducted across four study villages, with each group comprising 6 to 8 participants. In Mamire, Endagile and Mwikantsi Villages, three FGDs were help per village: one woman-only, one youth-only and one mixed group. This approach enabled open expression by addressing sociocultural hierarchies that may restrict women's participation in mixed groups and generational dynamics that may limit youth contributions (Hennink *et al.,* 2020). In Kwaraa village, a single mixed FGD was conducted because analytical adequacy had already been achieved for all participant categories in other sites. Fourteen in-depth interviews (IDIs) were also conducted with individual smallholder farmers. Participants were selected using gender-sensitive purposive sampling to ensure balance representation of women, men and youth. For all methods, inclusion criteria required direct experience with extension service or agroecological interventions within the study area.

3.2.2 Data Collection Methods

Three complementary approaches were used for primary data collection. Nine key informant interviews (KIIs) explored governance structures, coordination mechanisms and institutional constraints affecting extension service delivery at national, regional and districy levels. Ten focus group discussions (FGDs) were held in the study villages, as previously described. Fourteen in-depth interviews (IDIs) captured farmers' experiences with agroecological interventions and extension services. Semi-structured interview guides tailored to each respondent category were used throughout the data collection process.

Secondary data were obtained through a review of relevant policy and strategic documents, such as the National Agricultural Policy (2013) and the National Ecological Organic Agriculture Strategy (NEOAS, 2023–2030). These documents offered contextual information and facilitated triangulation of findings from primary data sources. All KIIs and FGDs were conducted in Kiswahili, audio-recorded, and later transcribed and translated into English by the lead researcher. To ensure translation accuracy, 20% of transcripts underwent independent backtranslation by a bilingual research assistant.

3.2.3 Data Analysis

Reflexive thematic analysis, as described by Braun and Clarke (2021), was utilised to analyse the data through six structured phases: (1) familiarisation with the data through repeated transcript readings; (2) systematic coding of meaningful data segments across key informant interviews (KIIs), focus group discussions (FGDs), and in-depth interviews (IDIs); (3) generation of initial themes by clustering related codes; (4) review of themes for coherence and alignment with the dataset; (5) definition and naming of themes; and (6) production of the final narrative supported by empirical evidence. All audio recordings were transcribed verbatim and integrated with documentary data. Institutional Theory was applied as the analytical framework for the second-level interpretation, wherein codes were mapped onto Scott's (2005) three institutional pillars: regulative, normative and cultural–cognitive. This methodology facilitated the identification of cross-cutting institutional patterns and tensions that influence the policy–practice gap in agroecology.

3.2.4 Trustworthiness of the Study

Trustworthiness was ensured through methodological triangulation, which incorporated key informant interviews (KIIs), focus group discussions (FGDs), in-depth interviews (IDIs) and documentary review. Additional strategies included peer debriefing with academic supervisors and continuous comparison of emerging themes across data sources (Lincoln & Guba, 1985). Member checking was performed with four selected KII participants representing national, district and NGO, and ward levels. Feedback primarily led to minor clarifications, especially concerning distinctions between formal and informal agroecological activities conducted by ward-level extension officers.

3.2.5 Ethical Considerations

Ethical clearance was granted by Sokoine University of Agriculture (Approval No. SUA/ADM/R.1/8/1498). All participation was voluntary and informed consent was obtained prior to each interview and discussion. Participants were assured of confidentiality and of their right to withdraw at any point without consequence.

4. RESULTS AND DISCUSSION

This section analyses the institutional conditions influencing the agroecological transition within Tanzania's agricultural extension system. The findings were structured around two main themes. The first theme covers institutional conditions that facilitate agroecological transition, emphasising policy support, indigenous knowledge systems and the roles of diverse extension actors. The second theme examines institutional and structural barriers, such as limited organisational capacity, reliance on projects, coordination difficulties and institutional pressures at the farm level. The discussion interprets these findings through Scott's Institutional Theory and situates them within the broader empirical literature.

4.1 Institutional Conditions Enabling Agroecological Transition

The findings first address the institutional conditions that foster a supportive environment for agroecological transition. These enabling factors operate at policy, organisational and community levels. Together, they reinforce the institutional foundations needed to integrate agroecological principles into agricultural extension. The analysis identified three interrelated dimensions: policy recognition and institutional legitimacy, indigenous knowledge and knowledge co-production and involvement of non-state actors within pluralistic extension networks.

4.1.1 Policy Recognition and Institutional Legitimacy for Agroecology

The findings demonstrate that agroecological principles have received increasing recognition within Tanzania's agricultural policy and strategic framework, thereby establishing a robust institutional foundation for agroecological transition. Documentary evidence indicates that the National Agricultural Policy (NAP) promotes environmental sustainability, organic agriculture and sustainable land management as strategic to enhance agricultural productivity, household incomes and food quality. Additionally, the National Ecological Organic Agriculture Strategy (NEOAS) explicitly incorporates ecological and organic agriculture into national development priorities and encourages multi-stakeholder collaboration through public-private partnerships. Collectively, these policy commitments formally recognise agroecology within Tanzania's agricultural policy architecture and establish a supportive institutional environment for its promotion through agricultural extension.

From the perspective of Scott's Institutional Theory (Scott, 2005), these policy developments strengthen the regulative pillar by providing formal rules, strategic direction and institutional mandates that legitimise agroecology within the agricultural extension system. Such institutional legitimacy shapes organisational priorities, resource allocation, stakeholder engagement and the long-term sustainability of policy implementation. Thus, the formal recognition of agroecology extends beyond symbolic endorsement by establishing legitimate institutional space for government agencies, non-governmental organisations, farmer organisations, development partners and private extension providers to integrate agroecological principles into agricultural development programs.

Key informant interviews conducted at the Ministry of Agriculture supported this interpretation by confirming that current national policy frameworks formally authorise the promotion of agroecology. As one Agricultural Officer stated:

> *"Organic, sustainable and ecological farming practices are formally recognised in both the National Agricultural Policy and the National Ecological Organic Agriculture Strategy, providing a strong foundation for advancing agroecology."* (KII – Agricultural Officer, Ministry of Agriculture, December 2025).

The respondent also highlighted the role of the NEOAS Coordination and Steering Committees, which regularly bring together representatives from government institutions, development partners, civil society organisations and other stakeholders to review implementation progress and harmonise agroecological interventions. Beyond their administrative role, these coordination platforms strengthen the normative pillar by fostering shared professional expectations, collective accountability and collaborative planning among diverse extension actors, thereby reducing institutional fragmentation and enhancing coherence in agroecological governance.

Despite this strengthening regulative environment, the findings demonstrate that policy legitimacy alone has not resulted in routine institutionalisation of agroecology within Tanzania's agricultural extension system. Agroecological principles remain only partially integrated into extension planning, staff training, budgeting and performance monitoring and routine advisory services. This suggests that while formal regulatory support has advanced considerably, complementary changes in organisational routines, professional norms and institutional practices have not progressed at the same pace.

Further evidence suggests that consultations facilitated by the NEOAS Committees have contributed to the initial stage of formal recognition of farmer-managed seed systems (though not for business) by Tanzania Official Seed Certification Institute (TOSCI) and the establishment of a national coordination mechanism for agroecology. These developments constitute significant institutional advances that extend beyond policy reform by progressively strengthening organisational coordination and redefining shared institutional practices across multiple extension actors.

Despite these positive developments, the findings indicate that institutional capacity at the implementation level remains limited. Insufficient financial support, restricted operational resources, entrenched organisational routines and competing priorities within conventional productivity-oriented extension systems continue to hinder the effective institutionalisation of agroecology. This institutional configuration reflects a persistent misalignment between formal policy commitments and organisational capacities required for effective implementation. As a result, agroecology has attained policy legitimacy without being fully integrated into routine extension practice.

This interpretation aligns with broader evidence from Sub-Saharan Africa, where agroecology's holistic, ecologically grounded approach has yet to gain significant traction in food system policy arenas, even when individual agroecological elements are present within national agricultural policies (Ouko *et al.,* 2025). A similar pattern is observed in Tanzania, where agroecology remains only weakly represented within the country's broader agricultural and allied science policy frameworks despite increasing formal recognition (Mosha *et al.,* 2024). Furthermore, multi-stakeholder coordination mechanisms have been shown to enhance policy translation by clarifying stakeholder roles, strengthening collaboration and building organisational capacity for implementation, as demonstrated in a stakeholder analysis of conservation agriculture innovation systems elsewhere in the region (Chinseu *et al.,* 2021).

4.1.2 Indigenous Knowledge Systems and Knowledge Co-production in Agroecology

The findings indicate that indigenous farming practices and farmer-managed seed systems serve as a critical institutional foundation for agroecological transition (AET) in the study area. Evidence from in-depth interviews (IDIs) and focus group discussions (FGDs) demonstrates that these practices are deeply embedded in local farming systems, particularly in seed selection, seed preservation, the application of organic soil amendments and adaptive crop management. These findings demonstrate the agroecological transition build upon established local knowledge systems rather than emerging independently of them. Indigenous farming practices therefore provide an important institutional foundation for integrating agroecological principles into contemporary agricultural extension and farming practice.

When analysed through Scott's (2005) cultural-cognitive pillar, these indigenous practices represent more than inherited farming techniques; they constitute shared systems of meaning, collective experience and socially accepted understandings that guide farmers' decisions regarding resource management and agricultural production. This knowledge has become institutionalised through continuous intergenerational learning and repeated application under local agroecological conditions. As a result, agroecological transition is strengthened when extension systems recognise and build upon these established cognitive institutions rather than attempting to replace them with externally prescribed technologies. Institutional change is therefore more likely to be sustained when new knowledge complements, rather than replaces existing cultural-cognitive institutions.

Evidence from farmers who participated in agroecological training further demonstrates that extension interventions primarily strengthened and refined existing indigenous knowledge rather than introducing entirely unfamiliar farming practices. Participants reported that training enhanced traditional practices by incorporating scientifically informed approaches to crop spacing, field management, soil fertility improvement and ecological crop management, while preserving locally valued farming knowledge. As one respondent explained:

> *"Our forefathers practice these ways of selecting and preserving crop seeds for next season. What is new in this training is the modern approach to planting, such as proper spacing, which improves plant population."* (IDI – Female farmer, Endagile Village, November 2025).

These findings indicate that agroecological learning is driven by knowledge integration rather than knowledge replacement. Scientific knowledge and indigenous experience interact to generate locally adapted innovations that strengthen farmers' capacity to manage complex agroecosystems. This collaborative learning process reflects one of the defining characteristics of agroecology, where innovation emerges through continuous interaction between scientific and local knowledge systems rather than through conventional linear technology transfer (Gliessman, 2022; FAO, 2021; HLPE, 2023).

Farmer-managed seed systems represent one of the most tangible expressions of indigenous knowledge within the study area, illustrating how locally accumulated knowledge is translated into practical resource management, seed conservation and adaptive farming strategies. Further evidence from FDGs confirmed the continued reliance on farmer-managed seed systems for crops such as beans, millet, pigeon peas, sunflower and some domestic vegetables including pumkins. Participants described these practices as an important strategy for maintaining locally adapted varieties and reducing dependence on purchased seeds. As one male participant explained:

> *"These are seeds we know and trust. We save them after harvest and sometimes exchange them with other farmers because they grow well under local conditions."* (Male participant, FGD Mixed Group, Mamire Village, November 2025.

Participants associated locally saved seed varieties with greater adaptability to local environmental conditions, reduced production costs, improved resilience to climatic variability and reduced dependence on external input markets. In addition to their practical benefits, these seed systems strengthen agrobiodiversity and preserve valuable genetic resources that enhance the adaptive capacity of farming systems. Institutionally, farmer-managed seed systems function as enduring cultural-cognitive institutions that conserve agricultural biodiversity reinforce local innovation and enhance the long-term resilience of agroecological production systems.

Furthermore, many participants expressed reservations regarding the intensive use of synthetic fertilisers, often associating them with declining soil quality, environmental degradation and potential health risks when misapplied. These perceptions, together with increasing consumer demand for organically produced food, particularly among women engaged in household vegetable production, suggest a gradual shift toward farming practices perceived as safer, healthier and more environmentally sustainable. One participant explained:

> *"Growing vegetables organically attracts local customers, as people are increasingly concerned about produce grown with chemical inputs, which pose health risks when not properly managed."* (IDI – Female Farmer, Mamire Village, November 2025).

These findings indicate an emerging convergence between farmers' ecological knowledge, consumer preferences and market demand, thereby strengthening the cognitive legitimacy of agroecological production systems. As agroecological practices become increasingly aligned with locally shared values concerning environmental stewardship, food safety and sustainable livelihoods, they become more socially accepted and more likely to be sustained within everyday farming practices. The interpretation is consistent with Sulekha *et al.,* (2025), who demonstrate that integrating indigenous knowledge into agricultural extension strengthens locally adapted innovation; enhances resilience and supports long-term agroecological transition through collaborative learning and context-specific problem solving.

4.1.3 Role of Non-State Actors and Pluralistic Extension Networks

The findings indicate that non-state actors, especially non-governmental organisations (NGOs) and civil society organisations are instrumental in advancing agroecological transition by enhancing agricultural advisory services, facilitating farmer learning and increasing access to agroecological knowledge. Organisations such as Participatory Ecological Land Use Management (PELUM) Tanzania and Community Support Initiative Tanzania (COSITA) work in close collaboration with ward-level agricultural extension officers to deliver farmer training, establish demo plots and support community-based learning initiatives. These joint efforts extend the reach of agricultural extension services, particularly in conditions where public extension systems encounter financial, logistical and human resource limitations. These findings indicate that agroecological transition increasingly depends on complementary partnerships that combine the

institutional authority of public extension services with the technical expertise, innovation capacity and community engagement of non-state organisations.

Applying Scott's Institutional Theory (Scott, 2005), these findings demonstrate the existence of a pluralistic institutional field in which government agencies, NGOs, research organisations, farmer organisations and development partners collectively shape agricultural extension. Instead of operating as isolated service providers, these organisations contribute unique institutional roles, resources and professional norms that collectively influence the governance of agroecological transition. NGOs strengthen the normative pillar by promoting participatory learning, ecological stewardship, farmer empowerment and knowledge co-production, thereby broadening the traditional objectives of agricultural extension beyond technology dissemination and productivity enhancement. The increasing involvement of NGOs indicates that agroecological extension is now governed through collaborative institutional arrangements rather than solely through centralised public-sector mechanisms.

Key informant interviews further substantiate this interpretation by showing that non-state organisations advance agroecological promotion through structured capacity-building programs, farmer field schools, demonstration-based learning and ongoing technical support. These interventions enhance farmers' knowledge and adaptive capacity, promote increased utilisation of locally available resources and decrease reliance on externally sourced hybrid seed and synthetic agrochemicals. As articulated by programme field officer from COSITA:

> *"The permits we obtain from government institutions and linkages facilitated by local extension officers provide an important entry point for implementing planned agroecological interventions."* (KII – COSITA Programme Field Officer, November 2025).

This statement demonstrates that effective agroecological interventions depend on the interaction between formal institutional support and collaborative implementation. Government authorisation provides the institutional legitimacy required for programme implementation, while partnerships among extension officers, NGOs and farming communities translate this legitimacy into practical action through shared responsibilities, coordinated planning and collective learning. Together, these institutional arrangements strengthen the capacity of the pluralistic extension systems to promote agroecological transition.

Within this pluralistic institutional landscape, public extension officers play a pivotal coordinating role by connecting the diverse actors involved in agroecological promotion. Their effectiveness therefore depends not only on delivering advisory services but also on facilitating collaboration across institutional boundaries. The findings indicate that public extension officers serve as institutional brokers within the pluralistic extension network, linking farmers with NGOs, research institutions, development programs and other knowledge providers. This brokerage function strengthens institutional connections and broadens farmers' access to training, technical advice and innovation platforms, while fostering opportunities for dialogue, experiential learning and integration among multiple stakeholders rather than from unidirectional technology transfer (Isgren *et al.,* 2023). Consequently, extension officers perform roles that extend beyond information dissemination by facilitating knowledge co-production, institutional coordination and continuous learning among diverse actors within the extension system.

The findings further suggest that the effectiveness of pluralistic agricultural extension depends less on the number of organisations involved than on the quality of institutional coordination among them. Collaborative planning, complementary roles, information sharing, and mutual accountability enable extension actors to function as an integrated system that supports co-learning, innovation and adaptive problem-solving. Conversely, weak coordination contributes to fragmented interventions, inconsistent advisory messages, duplication of effort and inefficient use of institutional resources. These findings highlight that institutional coherence, rather than organisational diversity alone, is essential for sustaining agroecological transition.

These findings align with recent evidence demonstrating that pluralistic agricultural extension systems promote innovation, resilience, and sustainability when underpinned by robust institutional coordination, collaborative governance and effective multi-actor partnerships (Isgren *et al.,* 2023; Macamba *et al.,* 2021). These studies collectively reinforce the present findings by demonstrating that agroecological transition is most effective where pluralistic extension system facilitate stakeholder participation, collaborative learning and continuous knowledge exchange rather than relying solely on conventional technology-transfer approaches (Isgren *et al.,* 2023).

4.2 Systemic Constraints to Agroecological Transition

Although the findings identified several institutional conditions that facilitate agroecological transition, they also revealed persistent systemic constraints hindering the translation of policy recognition into routine practice. These constraints appear at the organisational, institutional and farm levels and collectively reduce the agricultural extension system's capacity to sustain agroecological transition.

The following sections examine these interrelated constraints.

4.2.1 Institutional Capacity Constraints and Organisational Misalignment

The findings demonstrate that limited institutional capacity within the public agricultural extension system represents a major barrier to agroecological transition (AET) in the study area. Evidence from key informant interviews (KIIs) identifies persistent shortages of Village Agricultural Extension Officers, often resulting in a single Ward Agricultural Extension Officer serving multiple villages. These staffing shortages substantially reduce the frequency, continuity and quality of farmer engagement, thereby constraining agroecological extension, which depends on sustained interaction, participatory learning and adaptive problem-solving and long-term advisory support.

These findings reveal a clear institutional misalignment between formal policy commitments and the organisational capacity required for implementation. Although national policies and institutional mandates increasingly support agroecology, persistent shortages of personnel, operational funding and logistical resources limit their translation into routine extension practice. Consequently, organisational priorities become increasingly shaped by resource availability rather than by strategic institutional objectives, reducing the capacity of the extension system to sustain agroecological transition.

The findings indicate that the primary challenge extends beyond personnel shortages to encompass the inability of institutional arrangements to provide the organizational conditions required for knowledge-intensive agroecological extension. In contrast to conventional technology transfer approaches, agroecology necessitates the continuous farmer engagement, iterative experimentation, locally adapted advisory support and sustained social learning process. Institutional capacity should therefore be understood not merely as the availability of personnel but as organisational ability to facilitate continuous learning, coordinate multiple actors and sustain long-term agroecological innovation.

Beyond shortage of extension personnel, the findings reveal that limited operational resources further constrain the implementation of agroecological extension by influencing how advisory activities are prioritised and delivered. Empirical evidence further demonstrates that staffing shortages are compounded by significant logistical constraints, which directly affect the behavior of extension personnel. Interviews indicate the extension officers frequently adjust their work schedules and field activities to align with interventions supported by development partners and non-state organisations, as these initiatives often supply fuel, transport and operational resources not available through routine government budget. As one Ward Agricultural Extension Officer explained:

> *"Our work plans are sometimes influenced by emerging activities from private actors, mainly because we lack fuel support. Although we have motorcycle, the fuel and input support we receive tends to shape our work priorities in their favour."* (KII – Ward Agricultural Extension Officer, Mamire Ward, November 2025).

This finding illustrates a form of institutional decoupling in which formal organisational plans become progressively disconnected from implementation because of persistent resource constraints. Under such conditions, extension officers rationally prioritise externally supported activities that are operationally feasible, even when these differ from officially planned extension priorities. Similar patterns have been documented in pluralistic extension environment, where reliance on external resource flows shapes institutional autonomy and priority-setting (Isgren *et al.,* 2023). This finding does not indicate institutional failure; rather, it demonstrates how organisational behavior adapts to resource-constrained environments. Nevertheless, such adaptive responses may inadvertently diminish institutional autonomy, weaken strategic planning and fragment the delivery of agroecological advisory services.

Focus group discussion (FGDs) further revealed that many farmers perceive extension services as irregular, project-dependent and primarily limited to village meetings or externally funded interventions. This discontinuity disrupts the sustained learning processes essential for successful agroecological transition. Since agroecology depends in experimentation, observation, reflection and continuous adaptation to local environmental conditions, sporadic extension contact restricts farmers' opportunities to build confidence, refine management practices and exchange experiential knowledge with extension personnel and peers. These findings underscore that continuity of advisory support constitutes a fundamental institutional resource for sustaining agroecological learning and long-term behavioral change.

This interpretation is supported by in-depth interviews (IDIs), in which farmers consistently ephasised the necessity of maintaining a permanent extension presence within their communities. As one participant explained:

> *"For us to receive regular support, it would be better for the government to assign an agricultural extension officer at the village level who is committed to promoting agroecology."* (IDI – Male Farmer, Endagile Village, November 2025)

This observation highlights that proximity; continuity and long-term engagement are not merely operational considerations but institutional conditions that enable sustained agroecological learning and behavioural change among farming households (Drexler, 2020). It further demonstrates that farmers regard extension services not only as sources of technical advice but also as long-term institutional partners in agricultural innovation.

These findings are consistent with recent evidence showing that agroecological transition is constrained where public extension systems lack sufficient staffing, operational resources and institutional capacity to sustain participatory learning and adaptive advisory services (Mosha & Daudi, 2024). Contemporary studies similarly contend that successful agroecological extension depends on stable organisational investment, decentralised advisory capacity and institutional environment that facilitate continuous interaction between extension personnel and farming communities, rather than relying solely on short-term project implementation (Isgren *et al.,* 2023; Drexler, 2020).

4.2.2 Project-Based Agroecological Extension and Institutional Fragmentation

The findings indicate that agroecological knowledge dissemination in the study area is primarily driven by externally funded, time-limited projects implemented by non-governmental organisations (NGOs) and development partners. While these initiatives have significantly increased farmers' access to agroecological knowledge through training programs, demonstration plots and community learning activities, their implementation is closely tied to the duration of project cycles. When project funding concludes, technical support, follow-up training and advisory services often diminish because public extension institutions lack formal mechanisms to absorb, sustain and institutionalise these interventions. Consequently, agroecological extension remains heavily dependent on externally financed initiatives, with limited integration into routine public agricultural extension systems.

These findings reveal that although agroecology has gained increasing institutional recognition, its organisational embedding within the public extension system remains limited. Externally funded projects have expanded farmers' access to agroecological knowledge and innovation, but these initiatives frequently operate alongside rather than within established extension structures. Consequently, agroecological activities remain only weakly integrated into routine extension planning, budgeting, staff deployment; performance monitoring and advisory services, limiting their continuity once project funding ends.

Although many agroecological projects are implemented by NGOs and development partners, the institutional challenge identified in this study relates primarily to the temporary project mode of implementation rather than to the organisations themselves. Evidence from in-depth interviews (IDIs) further demonstrates that farmers value agroecological practices but express concerns regarding their long-term sustainability. Participants consistently recognised improvements in soil health, food safety and environmental sustainability resulting from agroecological training, yet questioned whether these benefits could be sustained beyond the duration of NGO-supported programs. As one female farmer stated:

> *"We mostly receive awareness on the use of farmer-based seeds and locally prepared pesticides from leaves of certain indigenous trees through NGO-based projects. After the end of NGO projects, how will this awareness be sustained?"* (IDI – Female Farmer, Endagile Village, November 2025)

This statement reflects not only concern about project completion but also highlights uncertainty regarding the institutional continuity of agroecological support. Farmers perceive that agroecological knowledge is introduced through externally funded initiatives but is not consistently reinforced by permanent public extension structures. As a result, learning processes are vulnerable to funding cycles rather than being supported by stable institutional arrangements. Institutionally, these findings suggest that sustainable agroecological transition depends not only on effective knowledge dissemination but also on organisational arrangements capable of maintaining continuous farmer engagement beyond externally funded projects.

The findings also indicate that limited village-level extension capacity reinforces this institutional dependency. Ward Agricultural Extension Officers often serve large geographical areas and manage multiple administrative and technical responsibilities, which reduces their ability to provide sustained agroecological advisory services. Routine extension programmes continue to prioritise conventional productivity-oriented activities, leaving limited institutional space for sustained agroecological follow-up. These organisational conditions diminish opportunities for repeated farmer interaction, adaptive learning and long-term technical support, all of which are essential for agroecological transition.

These findings do not merely represent isolated implementation challenges but instead illustrate a broader process of institutional fragmentation, where agroecological knowledge circulates through temporary project structures without full integration into permanent public extension institutions (Rigourd & Dugue, 2022). Such fragmentation weakens organisational ownership;

limits learning across extension institutions and increases dependence on external funding to sustain advisory services. As a result, the achievements of individual projects often remain localised and difficult to scale, since institutional mechanisms for knowledge retention, organisational learning and program continuity are insufficiently developed (Ouko *et al.,* 2024).

Recent literature also demonstrates that project-based approaches can foster significant local innovation but often fail to achieve long-term institutional transformation when governments lack mechanisms to integrate successful interventions into routine extension systems (Rigourd & Dugue, 2022). These studies collectively suggest that lasting agroecological transition requires successful project innovations to become embedded within routine public extension systems through sustained organizational commitment, stable financing and continuous farmer engagement beyond donor-funded interventions.

4.2.3 Weak Coordination and Monitoring Systems

The findings indicate that coordination and monitoring systems supporting agroecological extension remain insufficiently integrated despite formal institutional requirements for collaboration between public extension services and non-state actors. NGOs and other development partners routinely implement agroecological activities within the study area; however, these interventions are not systematically captured within official agricultural monitoring frameworks because existing reporting systems lack indicators specifically designed to monitor agroecological practices and outcome. As a result, agroecological interventions remain only partially visible within government planning, performance monitoring and policy evaluation processes, thereby limiting institutional learning, coordinated decision-making and evidence-informed policy development.

These findings suggest that existing monitoring and evaluation systems reinforce conventional agricultural priorities because organisational performance continues to be assessed using indicators that inadequately capture agroecological processes and outcomes. Consequently, agroecological interventions receive limited institutional visibility within routine planning, accountability and resource allocation processes. This institutional configuration reinforces existing extension priorities despite increasing policy support for agroecology.

Key informant interviews (KIIs) revealed that coordination among multiple extension actors is constrained by fragmented reporting arrangements. A Regional Agricultural Officer noted that, although district and regional authorities compile quarterly reports covering agricultural interventions implemented by public institutions and non-state actors, the information submitted by development partners is often incomplete and consistent due to the absence of a harmonised reporting framework across implementing organisations. The respondent also observed that the transition from the basket-funding arrangement under the Agricultural Sector Development Programme Phase I (ASDP I) to more decentralised implementation under ASDP II increased the diversity of development partners while simultaneously reducing centralised coordination and standardization of reporting procedures. As one respondent explained:

> *"We normally compile quarterly reports showing interventions carried out by district councils and private actors. However, the mechanisms used to generate these reports are not comprehensive and sometimes depend on the information that private partners choose to disclose."* (KII – Regional Agricultural Officer, November 2025)

This evidence demonstrates that existing monitoring systems rely in part on voluntary disclosure by implementing partners, which creates inconsistencies in data completeness, comparability, and reliability. Such fragmentation limits the availability of comprehensive evidence required to assess agroecological progress, coordinate institutional activities and support adaptive planning. Institutionally, fragmented reporting systems constrain organisational learning because knowledge generated through local agroecological initiatives is not consistently incorporated into planning, coordination and policy decision-making.

Beyond the challenges of coordinating and documenting agroecological interventions, the findings indicate that existing organisational performance systems also provide limited incentives for extension personnel to prioritise agroecological advisory services. The findings further indicate that agroecology has not yet been incorporated into the key performance indicators used to evaluate public agricultural extension officers. According to a District Agricultural Officer, extension performance continues to be assessed primarily using conventional productivity-oriented targets, such as farmer registration for agricultural input support programmes and other production-related indicators. Although policy frameworks such as the National Ecological Organic Agriculture Strategy (NEOAS) provide formal recognition of agroecology, these priorities have not been translated into organisational performance management systems. Consequently, extension personnel have limited institutional incentives to integrate agroecological advisory services into their routine responsibilities.

These findings demonstrate that organisational behavior is shaped as much by institutional incentives as by formal policy directives. When performance indicators continue to emphasise conventional production objectives, extension personnel are encouraged to prioritise activities that contribute directly

those indicators, even where national policy increasingly promotes agroecological approaches. This creates a persistent institutional misalignment between policy aspirations and organisational practice.

This finding is consistent with studies demonstrating that extension systems often struggle to translate policy commitments into practice when accountability mechanisms, performance metrics and organisational incentives remain aligned with conventional agricultural paradigms (Rigourd & Dugue, 2022). Recent evidence also shows that pluralistic agricultural extension systems frequently experience coordination challenges when multiple actors operate under fragmented accountability mechanisms and inconsistent reporting frameworks (IFAD, 2022). Contemporary research further suggest that sustainable agricultural transitions require harmonized monitoring systems capable of integrating information from public insitutions, NGOs, research organisations and private-sector actors to strengthen coordination, organizational learning and evidence-based decision-making (Isgren *et al.,* 2023; IFAD, 2022).

Collectively, these studies reinforce the present findings by demonstrating that harmonised coordination, monitoring, and reporting systems are essential for embedding agroecology within routine extension governance, strengthening institutional learning, and supporting evidence-based adaptation of extension strategies.

4.2.4 Farm-Level Production Constraints and External Institutional Pressures

The findings indicate that the adoption and scaling of agroecological practices at farm level are determined by complex interactions among market conditions, household labour availability and access to natural resources. While farmers generally recognise agroecological practices as environmentally sustainable, economically accessible and well suited to local production conditions; their expansion beyond subsistence production is constrained by broader structural influences operating beyond the farm itself, namely market structures and procurement arrangements, labour availability and access to natural resources. Consequently, farmers may recognise the ecological and economic benefits of agroecology while simultaneously responding to institutional conditions that favour conventional production systems. These findings suggest that agroecological transition is shaped not only by farmers' knowledge and technical capacity but also by the broader institutional environment within which production decisions are made.

The study presents strong evidence that market structures serve as a significant barrier to scaling agroecological production. Farmers reported that indigenous maize varieties, locally known as *Mehh*, mixed-kernel maize with black, brown, red and white grains, are highly valued for their resilience, adaptability to local environmental conditions and superior cooking qualities, particularly their higher water-absorption capacity. Despite these agronomic and household-consumption advantages, opportunities for commercialisation remain limited, as farmers experience substantial uncertainty when marketing surplus production, which limits incentives to expand cultivation beyond household consumption.

One farmer explained:

> *"Though these indigenous seeds are of good quality because their flour absorbs water well, expanding production is a challenge because selling surplus is difficult, as byuyers prefer white maize."* (IDI – Male Farmer, Mamire Village, November 2025)

This evidence shows that farmers' production decisions are primarily influenced by downstream market incentives rather than agronomic performance alone. This pattern is consistent with findings elsewhere in Sub-Saharan African smallholder maize markets, where buyers and other value-chain actors have been shown to consistently rank white, uniform grain colour above mottled or mixed-colour grain in their purchasing decisions (Adu *et al.,* 2021). The principal constraint therefore lies not in the agronomic performance of indigenous varieties but in the misalignment between agroecological diversity and prevailing market institutions.

Additional evidence from key informant interviews with major grain buyers supplying institutional markets further illustrates how procurement requirements shape farmers' production choices. Respondents consistently identified grain uniformity as a key quality requirement influencing procurement decisions. As one buyer explained:

> *"Our customers prefer white maize. Beyond factors like moisture content, they are particularly sensitive to grain colour."* (KII – Major Crop Buyer, November 2025)

Taken together, the farmer and buyer accounts indicate that procurement standards unintentionally favour standardised crop variety and grain uniformity while offering limited commercial incentives for locally adapted indigenous varieties and other ecologically diverse crops. Consequently, market institutions discourage the commercialisation of agrobiodiversity even where farmers recognise its agronomic, ecological and livelihood benefits. Although agroecological programmes promote household food security and resilience, existing market institutions provide limited incentives for the commercialisation of agroecologically produced crops. As a result, agroecological innovations remain concentrated within subsistence-oriented production systems rather than expanding into commercially competitive value chains.

Beyond market-related constrains, farmers' ability to implement agroecological practices is also shaped by household production resources, particularly the availability of labour required for knowledge-intensive ecological management practices. Labour availability emerged as a second major institutional constraint affecting agroecological adoption. Farmers consistently reported that preparing compost, producing botanical pesticides and implementing other ecological management practices require significant labour and time, especially for households with limited family labour or insufficient financial resources to hire additional workers. Although respondents recognised the environmental, health and soil fertility benefits of these practices, many indicated that labour requirements limited their broader application. One female farmer stated:

> *"We have been trained on how to prepare local pesticides from specific plants and how to make compost. These practices are beneficial for health and soil conservation; however, they require time and labour, making them difficult to apply on a large scale."* (IDI – Female Farmer, Mamire Village, November 2025).

These findings indicate that awareness of agroecological practices alone is insufficient for widespread adoption; implementation also depends on adequate household labour and access to productive resources. Previous studies in Tanzania and across Sub-Saharan Africa similarly show that labour demands, resource limitations and overall household capacity often constrain the uptake of sustainable agricultural practices, even when farmers recognise their potential benefits (Sithole & Olorunfemi, 2024; Thobane *et al.,* 2025). The findings further reveal that the sustainability of agroecological production depends on reliable access to natural resources used as ecological inputs. Farmers reported preparing botanical pesticides from plant species collected from surrounding natural forests, although some species can be cultivated locally. Continued reliance on wild plant resources raises concerns about long-term resource availability and potential ecological pressures from increased harvesting. These observations indicate that agroecological transition requires effective stewardship of natural resources in addition to farmer knowledge and technical capacity. The sustainable governance of biodiversity therefore becomes an important institutional condition for maintaining agroecological production over time.

Taken together, these findings demonstrate that farmer-level agroecological transition is shaped by the interaction of ecological knowledge, market institutions, household labour capacity and natural resource governance rather than by technical considerations alone. Farmers make production decisions within broader institutional environments where market expectations, resource constraints and ecological conditions collectively influence the feasibility of adopting and expanding agroecological practices. These findings therefore reinforce the argument that successful agroecological transition requires institutional reforms extending beyond agricultural extension to include market development, value-chain innovation, labour-support mechanisms and sustainable natural resource governance.

Recent literature also demonstrates that agroecological transition is shaped by interactions among institutional, economic and ecological factors operating across multiple scales (Sithole & Olorunfemi, 2024). Collectively, these studies reinforce the present findings, show that agroecological transition becomes more viable when market reward ecological diversity (Milheiras *et al.,* 2022), procurement systems accommodate locally adapted products, labour constraints are addressed through appropriate innovations (Sithole & Olorunfemi, 2024) and natural resource governance supports long-term environmental sustainability.

4.3 CONCLUSION

This study examined how the institutional framework of agricultural extension influences agroecological transition within Tanzania's pluralistic agricultural extension system, using Babati District as a case study. Overall, the findings demonstrate that the pace and sustainability of agroecological transition depend less on the existence of supportive policies or agroecological practices than on the extent to which agroecology is institutionalised within routine agricultural extension governance and practice. While supportive policies, indigenous knowledge systems, and pluralistic extension actors provide a favourable foundation for agroecological transition, these enabling conditions alone are insufficient to sustain long-term transformation unless they are supported by institutional structures that integrate agroecology into mainstream extension functions.

This study extends Institutional Theory by demonstrating that agroecological transition is fundamentally an institutional transformation process requiring alignment among the regulative, normative and cultural–cognitive dimensions of agricultural extension. While policy reforms have strengthened the formal legitimacy of agroecology and indigenous knowledge systems provide a strong cognitive foundation, organisational mandates, performance systems, coordination mechanisms and resource allocation remain insufficiently aligned to embed agroecology within routine extension practice. The principal barrier to agroecological transition is therefore not the absence of knowledge or supportive policies, but the incomplete institutionalisation of agroecology within the extension system.

The findings further suggest that advancing agroecological transition requires coordinated

institutional reforms led by the Ministry of Agriculture, in collaboration with the Prime Minister's Office – Regional Administration and Local Government (PMO-RALG), Local Government Authorities (LGAs), research and higher learning institutions, non-state actors, development partners and private-sector stakeholders. Institutional reforms should therefore prioritise embedding agroecology within routine extension mandated, strengthening organisational incentives, monitoring systems, extension capacity, institutional coordination and market arrangements that reward agroecological production. Such coordinated institutional action would strengthen public ownership of agroecological transition, enhance accountability and continuity in agroecological advisory services, reduce dependence on externally funded projects and create enabling conditions for scaling agroecological practices beyond localised initiatives.

Ultimately, this study demonstrates that the future of agroecology in Tanzania depends not only on expanding agroecological practices but also on transforming the institutional environment within which agricultural extension operates. Achieving lasting agroecological transition therefore requires agroecology to become embedded within routine extension governance rather than remaining dependent on temporary projects and isolated initiatives. By conceptualising agroecological transition as an institutional transformation process rather than simply the adoption of alternative farming practices, this study contributes to the growing literature on agricultural extension and agroecology while providing practical insights for policymakers and practitioners seeking to strengthen resilient, sustainable and inclusive food systems in Tanzania and other pluralistic agricultural extension systems.

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