

# CANALLS

AGROECOLOGICAL PRACTICES  
FOR SUSTAINABLE TRANSITION



## *D4.3 Social changes induced by agroecological practices – initial version*



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## Executive Summary

This literature review presents a conceptual and methodological foundation for analyzing social and behavioral change in agroecological transitions, developed within the framework of the European Union-funded CANALLS project. Implemented across eight Agroecological Living Labs (ALLs) in Burundi, Cameroon, the Democratic Republic of the Congo, and Rwanda, the initiative seeks to investigate how agroecological practices catalyze shifts in behaviors, mindsets, institutions, and collective agency.

To this end, the authors undertake a comprehensive literature review of behavior change frameworks relevant to agri-food systems—namely COM-B, the Theory of Planned Behavior (TPB), and the Diffusion of Innovation theory. Emphasis is placed on the integration of two complementary models: the **Behavioral Drivers Model (BDM)**, which maps psychological, social, and structural influences on behavior; and the **ACT Framework** (Agency and Change for Transforming Agri-Food Systems), which highlights the role of opportunity spaces and power dynamics.

The report outlines a participatory, multi-level methodology for assessing behavior change across individual, household, and institutional scales, informed by FAO's Tool for Agroecology Performance Evaluation (TAPE) and embedded in a constructivist, system-aware paradigm. At this stage, no empirical data has yet been collected; the research remains in a preparatory phase, with pilot testing, training, and protocol validation scheduled. The insights presented here serve as a critical foundation for the forthcoming field study and aim to inform future research, policy formulation, and implementation strategies targeting inclusive, resilient, and people-centered agroecological transformation.

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## List of Terms and Definitions

Abbreviation	Definition
ACT	Agency and Change for Transforming Agri-Food Systems
ALL	Agroecology living lab
BC	Behavior change
BDM	Behavioral Drivers Model
CANALLS	Driving agroecological transitions in the humid tropics of Central and Eastern Africa through transdisciplinary Agroecology Living Labs
CGIAR	Consultative Group on International Agricultural Research (or global research partnership for a food-secure future dedicated to transforming food, land, and water systems in a climate crisis)
COM-B	Capability, Opportunity, Motivation—Behavior
DRC	Democratic Republic of the Congo
FAO	Food and Agriculture Organization
FFS	Farmer Field Schools
FGD	Focus Group Discussions
KAP	Self-reported knowledge, attitudes, and practices
ODK	Open Data Kit
PRA	Participatory Rural Appraisal
PTD	Participatory Technology Development
SEM	Socio-Ecological Model
SSA	sub-Saharan Africa
TAPE	Tool for Agroecology Performance Evaluation
TPB	Theory of Planned Behavior
UNICEF	United Nations agency for children

# 1. Introduction

The global food system faces persistent shortcomings in delivering adequate nutrition while simultaneously contributing to environmental degradation and biodiversity loss. These intertwined challenges, compounded by escalating climate-related disruptions (Wezel et al., 2020), geopolitical instability, and rising food prices (FAO et al., 2022), highlight the urgent need for a profound transformation of how food is produced, distributed, and consumed.

Despite its abundant natural resources, sub-Saharan Africa (SSA) continues to experience higher levels of hunger and poverty compared to other developing regions. The region's high population growth rate further intensifies food insecurity, especially as rural poverty worsens (Dixon et al., 2001). Agricultural systems across SSA are under increasing pressure from climate variability (e.g., droughts, floods, temperature shifts), degradation of land and water resources, loss of biodiversity, nutrient-depleted soils, and limited access to essential agricultural inputs such as fertilizers, organic matter, irrigation, and crop protection products. These conditions call for transformative approaches to food production that can simultaneously restore ecosystems and meet the nutritional and economic needs of a growing population (Dixon et al., 2001).

Agroecology offers one such pathway by aligning agricultural practices with ecological processes and social equity. It aims to optimize the interactions between plants, animals, humans, and the environment to achieve sustainable and resilient food systems. In countries like Burundi, Cameroon, the Democratic Republic of Congo (DRC), and Rwanda, agroecology addresses critical issues such as food insecurity, environmental degradation, and socioeconomic inequality. Beyond improving yields, agroecological practices also promote social transformation empowering farmers, advancing gender equity, and strengthening community resilience. The agroecological approach prioritizes not only environmental sustainability but also cultural relevance and economic viability, making it especially promising for sub-Saharan Africa.

In recent years, researchers have increasingly sought to understand how agroecological interventions influence social and behavioral dynamics in various sociocultural and ecological contexts. Yet, the link between behavior change and agriculture remains conceptually underdeveloped. Although numerous studies have explored behavioral aspects in agriculture, the underlying mechanisms and multidimensional drivers of change are often insufficiently examined (Ofosu-Ampong et al., 2025; Hidrobo et al., 2021). As a result, the integration of behavior change (BC) frameworks in agriculture is now gaining traction among scholars, policymakers, and development partners (FAO, 2022).

Behavior change is generally understood as the process through which individuals or groups adopt new practices or modify existing ones (Darnton & Evans, 2013; Ofosu-Ampong et al., 2025). In the agricultural context, BC strategies seek to encourage the adoption of beneficial practices that improve productivity and sustainability. However, traditional research on BC has often focused on descriptive or surface-level observations, without delving into the complex, interdisciplinary factors that influence behavioral shifts.

Within the CANALLS project, a range of agroecological practices are being implemented across eight Agroecological Living Labs (ALLs) located in Burundi, Cameroon, the DRC, and Rwanda. To assess the social and behavioral transformations resulting from these interventions, there is a clear need for comparative analysis across these eight contexts. Accordingly, this task has two main objectives: (i) to review existing frameworks and tools for evaluating social and behavioral change among farmers,

value chain actors, and other stakeholders, and (ii) to identify and describe the most appropriate methodological approach for assessing the behavioral outcomes of agroecological practices within the eight ALLs of the CANALLS project.

The delivery report is organized as follows: (1) an introduction to the topic and context, (2) a literature review of behavior changes models applied to agrifood systems, (3) a rationale for integrating the ACT framework and the TAPE tool as the recommended method for CANALLS, and (4) concluding observations.

## **2. Typologies and Determinants of Behavior Change**

This chapter explores the typologies and determinants of behavior change (BC) in the context of agriculture and agroecology. Understanding how behaviors are categorized and what influences them is essential for designing effective interventions to promote sustainable farming practices. Drawing from Ofofu-Ampong et al. (2025), Alston & Pardey (2021), Pan et al. (2024), and other contributors, we examine three major typologies of behavior change in agriculture and the various factors that drive them.

### **2.1. Typologies of Behavior Change in Agriculture**

The literature identifies three principal typologies of behavior change in agriculture, which correspond to farmers' primary motivations and contextual realities.

#### **2.1.1. Production-oriented Behavior Change**

Production-oriented behavior change emphasizes improving agricultural productivity and efficiency. It includes the adoption of climate-smart practices, improved seeds, fertilizer use, irrigation techniques, and mechanization. Such changes often occur when farmers are full-time producers, engaged in commercial farming, and have access to extension services and markets. These behaviors aim to stabilize yields, reduce climate risks, and optimize input use. They are particularly encouraged under programs targeting increased food security and adaptation to climate change (Ofofu-Ampong et al., 2025; Giller et al., 2021).

#### **2.1.2. Conservation-oriented Behavior Change**

This typology focuses on the sustainable use and conservation of natural resources. It includes practices such as agroforestry, soil and water conservation, organic farming, integrated pest management, and biodiversity preservation. Farmers adopting these behaviors are often motivated by ecological awareness or long-term productivity concerns. Their decisions are influenced by environmental education, community norms, and perceived responsibility toward nature (Pan et al., 2024; Giua et al., 2022).

#### **2.1.3. Socioeconomic-oriented Behavior Change**

Socioeconomic-oriented behaviors seek to improve farmers' livelihoods by enhancing access to markets, financial services, cooperatives, and social support networks. They involve the adoption of new marketing strategies, joining producer groups, or participating in saving and credit schemes.

Such behaviors are influenced by enabling institutions and policy incentives, as well as social identity and community support (McNamara et al., 2021; Alston & Pardey, 2021).

## 2.2. Determinants of Behavior Change

Behavioral change is driven by a set of interrelated factors that influence individual and collective decision-making processes in agriculture. Following Alston & Pardey (2021) and Pan et al. (2024), the key determinants of BC can be grouped into three broad categories: economic/regulatory, socio-technical, and psychological.

### 2.2.1. Economic and Regulatory Determinants

These include access to subsidies, credit, input and output markets, pricing policies, land tenure security, and agricultural regulations. Government interventions and international donor programs often provide incentives or disincentives that shape farmer behavior. Regulatory environments that promote agroecological practices (e.g., banning hazardous pesticides) can also play a pivotal role (Cheng, 2021; FAO, 2022).

### 2.2.2. Socio-technical Determinants

These refer to the influence of community norms, extension networks, peer behavior, technology availability, and institutional arrangements. Farmer-to-farmer exchanges, local leadership, and collective experiences help disseminate innovations. Social networks act as catalysts for trust-building and risk-sharing in decision-making (Moghfeli et al., 2023; Lambe et al., 2020).

### 2.2.3. Psychological Determinants

Individual beliefs, attitudes, motivation, past experiences, self-efficacy, risk perception, and knowledge acquisition fall under this category. Resistance to change may stem from deeply held traditions or cognitive biases such as status quo bias. The perception of behavior benefits, moral norms, and intention to act are central in this dimension (Tama et al., 2021; Li et al., 2024).

## 3. Levels of Change and Conceptual Frameworks

This section explores the multi-level nature of behavior change (BC) in agroecological transitions and presents the main conceptual frameworks used to understand and influence behavior. Understanding the levels at which behavior change occurs and the theoretical foundations that guide behavior change is critical to designing effective and ethical interventions.

### 3.1. Levels of Behavior Change

Behavior change in agriculture takes place across three main levels of analysis: micro, meso, and macro each offering distinct insights and intervention points (Pan et al., 2024; Giller et al., 2021).

#### 3.1.1. Micro Level (Individual)

At the individual level, behavior change is driven by personal motivation, knowledge, attitudes, skills, and perceived self-efficacy. Individual decisions are also influenced by psychological traits, habits,

and exposure to information. This level is central to most BC theories and is where change is most often measured (Li et al., 2024; Ajzen, 1991).

### 3.1.2. Meso Level (Household/Group)

The meso level includes household dynamics, gender roles, intra-family decision-making, and group influence. Decisions around resource allocation, labor division, and investment are typically collective within farming households. Household-level analysis also reveals how social learning and group norms shape individual actions (Tama et al., 2021; Pan et al., 2024).

### 3.1.3. Macro Level (Community and Institutions)

The macro level includes village leaders, institutions, cooperatives, policies, and broader social norms. Community expectations, legal frameworks, extension services, and institutional incentives shape what behaviors are considered acceptable or desirable. Collective behaviors are formed and reinforced at this level (Giller et al., 2021; Cheng, 2021).

## 3.2. Conceptual Frameworks for Understanding Behavior Change

Several theoretical frameworks are commonly used to understand and promote BC in agroecological systems. These models provide insight into what influences behavior and how it evolves over time.

### 3.2.1. COM-B Framework

The COM-B model (Capability, Opportunity, Motivation Behavior) suggests that behavior results from the interaction of three components including:

- Capability: Psychological and physical ability to enact the behavior;
- Opportunity: Social and physical factors that enable the behavior;
- Motivation: Automatic and reflective mechanisms that drive behavior.

This model underpins the behavior change wheel and is useful for diagnosing barriers and enablers to BC (Michie et al., 2011).

### 3.2.2. Theory of Planned Behavior (TPB)

TPB asserts that behavior is predicted by intentions, which in turn are shaped by attitudes toward the behavior, perceived behavioral control, and subjective norms (Ajzen, 1991). In agriculture, TPB helps explain why farmers adopt or reject practices based on expected outcomes, peer influence, and perceived control over resources or risks (Li et al., 2024).

### 3.2.3. Diffusion of Innovation Theory

Developed by Everett Rogers, this theory describes how new practices, technologies, or ideas spread through a population over time. It categorizes adopters into innovators, early adopters, early majority, late majority, and laggards. Key elements influencing diffusion include relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003). The theory is widely used to design agricultural extension and adoption strategies.

## 3.3. Ethical Considerations in Behavior Change Interventions

Ethical issues are integral to behavior change interventions in agriculture, particularly when working with vulnerable populations. Five key ethical principles must be addressed (Coskun et al., 2015): informed consent; privacy and confidentiality; power dynamics; economic impacts and; protection of vulnerable groups. Ethically sound BC interventions not only ensure compliance with international standards but also increase the trust and sustainability of change efforts.

## 4. Behavior Change and Sustainable Agriculture

### 4.1. Bridging the knowledge–action Gap

While awareness of sustainable agricultural practices has increased globally, actual adoption rates remain low in many regions. Behavior change (BC) serves as a bridge between knowing what should be done and doing it. In agroecology, this gap is often reinforced by deep-rooted social, psychological, and institutional barriers.

According to Barnes et al. (2013), even informed farmers frequently fail to adopt recommended agroecological practices due to fears of economic loss, perceived risk, or lack of community support. Giua et al. (2022) further indicated that successful transitions rely not only on information dissemination but also on trust-building and participatory methods that reflect local realities.

### 4.2. Factors Influencing the Adoption of Agroecological Practices

Behavioral adoption is shaped by multiple, intersecting factors such as:

#### 4.2.1. Socioeconomic characteristics

Income level, education, labor availability, and land size directly influence whether a farmer adopts sustainable practices. Wealthier farmers typically have greater capacity to experiment and bear risk (Huber et al., 2024).

#### 4.2.2. Gender and social roles

Women in agriculture often face restricted access to land, credit, extension services, and leadership roles. These disparities limit their ability to participate in agroecological innovations unless interventions are specifically designed to empower them (Tama et al., 2021; FAO, 2022).

#### 4.2.3. Land tenure and ownership

Secure land tenure encourages long-term investments in agroecological practices, such as composting or agroforestry. Conversely, land insecurity discourages innovation and promotes short-term exploitation (Giua et al., 2022; Cheng, 2021).

#### **4.2.4. Age and generational shifts**

Younger farmers may be more receptive to innovation and environmentally conscious techniques, while older generations often rely on traditional methods. Intergenerational dialogue can serve both as a barrier and an opportunity for transition (Lambe et al., 2020).

#### **4.2.5. Market access and information**

Farmers with better access to local markets and reliable sources of information are more likely to adopt new methods. Isolation, weak extension systems, or misinformation can inhibit behavior change (Li et al., 2024; Moghfeli et al., 2023).

### **4.3. Barriers to Behavior Change**

Adoption of sustainable agricultural practices can be obstructed by the following barriers:

#### **4.3.1. Emotional barriers**

Farmers may fear losing income, reputational damage, or failure. Emotional resistance, especially in uncertain environments, can inhibit rational decision-making (Li et al., 2024).

#### **4.3.2. Institutional barriers**

Weak governance, inconsistent policies, and limited extension services make it difficult for farmers to access support. Institutional fragmentation often leads to confusion and low engagement (Cheng, 2021).

#### **4.3.3. Financial barriers**

The high upfront cost of certain technologies or inputs (e.g., composting infrastructure, drought-resistant seeds) and limited access to microfinance services deter adoption among smallholders (McNamara et al., 2021).

### **4.4. Behavior Change as a Lever for Agroecology**

Behaviour change extends beyond technical solutions; it is inherently a social and political process. For agroecological transformation to be effective, interventions must: i) be farmer-centered and collaboratively co-developed; ii) employ participatory approaches; iii) provide long-term, flexible support; and iv) address local norms, identities, and institutional contexts. As noted by Giua et al. (2022), “Sustainability is achieved not by transferring knowledge but by transforming relationships.” BC enables a transition that is inclusive, just, and rooted in local realities.

## **5. Approaches to Behavior Change in Agroecology**

Behavior change (BC) in agroecology requires more than awareness or technical training. It demands holistic, culturally embedded, and systems-oriented strategies. Based on emerging literature and field-based insights, this section presents four key approaches that guide behavior change in

agroecological transitions. While distinct in emphasis, these approaches are not mutually exclusive; they are often combined in successful interventions.

## 5.1. Innovation-led Approach

This approach promotes behavior change through practical experimentation, demonstration, and training focused on technical innovations. Key mechanisms include: Farmer Field Schools (FFS), Demonstration plots, Peer-to-peer exchanges and, Participatory Technology Development (PTD). It aligns with the concept of learning-by-doing, where farmers engage directly in piloting agroecological techniques such as composting, intercropping, or pest control thereby increasing their confidence, knowledge, and willingness to adopt.

As strengths of this approach, one may cite:

- Building of skills and confidence
- Encourages rapid diffusion of innovation
- Promotes evidence-based decision-making

As limitations, we underline the fact that this may favor better-resourced farmers and it requires sustained support and facilitation. Ofosu-Ampong et al. (2025) identify this approach as most effective where innovation is socially accepted and markets are responsive to new practices. Giua et al. (2022) emphasize its success when combined with participatory learning.

## 5.2. Historical and Knowledge Co-creation Approach

This approach recognizes that knowledge is not solely generated through scientific research but also through traditional, local, and experimental systems. Co-creation involves: i) bridging local and scientific knowledge, ii) collective experimentation and, iii) long-term dialogue between farmers, researchers, and institutions. It draws from agroecological epistemology, where diversity, history, and territory shape how behavior and innovation emerge. This approach often works best in long-standing farming communities with rich cultural identities.

His strengths include i) respect of farmer expertise, ii) enhancement of trust and legitimacy, iii) the strengthening of collective identity and autonomy while his limitations are i) time- and resource-intensive and ii) requires high-quality facilitation and mutual respect (Van Ewijk & Ros-Tonen, 2021).

## 5.3. Empowerment Approach

This strategy focuses on increasing the agency of marginalized groups especially women, youth, and indigenous populations who often face structural exclusion from decision-making processes. It aims at: i) strengthening leadership skills, ii) promoting access to resources (land, credit, and training), iii) challenge unequal power dynamics and, iv) support collective action and movement building. Empowerment is not only a goal but also a means for lasting behavioral change, as those who feel capable and valued are more likely to adopt and sustain agroecological practices.

The strengths of the approach are: i) promotion of equity and justice, ii) creation of more inclusive governance and iii) improvement of sustainability and resilience.

The limitations lie on the fact that the approach: i) can face resistance from entrenched power holders and, ii) requires cultural sensitivity and long-term engagement. Anderson et al. (2021) describe

empowerment as the missing piece in many sustainability programs. Gender-transformative approaches have been especially effective in East and West Africa (FAO, 2022).

## 5.4. Structural and Systemic Approach

This approach addresses the deep structured laws, institutions, market forces, and cultural norms that constrain or enable behavior. It operates at multiple levels to: i) reform agricultural and land policies, ii) incentivize sustainable markets and value chains, iii) build inclusive institutions and, iv) transform food systems governance. Rather than focusing only on the individual, this strategy seeks to reshape the context in which behavior occurs. It is most impactful when used in conjunction with other approaches that target knowledge and agency.

As strengths, the approach: i) targets root causes of harmful behaviors, i) creates enabling environments for change and, ii) aligns with national and global sustainability goals.

As limitations, the approach: i) requires political will and intersectoral collaboration and, ii) may be slow and complex to implement.

## 5.5. Complementarity of the Four Approaches

In practice, these four approaches are not in isolation. However, they are interconnected for successful agroecological transitions as:

- Innovation-led learning can be paired with empowerment for women.
- Co-creation processes may trigger institutional reforms.
- Systemic policy changes can reinforce local experimentation.

As noted by Ofosu-Ampong et al. (2025), a hybrid strategy tailored to local realities and actors tends to yield the most resilient and inclusive results.

## 6. Behavior Change Frameworks: BDM and ACT

As the complexity of agroecological transitions increases, behavior change (BC) interventions require more than intuition or ad hoc practices. Effective behavior change programming depends on conceptual frameworks that integrate multidisciplinary insights and translate them into actionable strategies. This section introduces two frameworks widely referenced in development and agroecological contexts: the Behavioral Drivers Model (BDM) and the ACT Framework (Agency and Change for Transforming Agri-Food Systems).

### 6.1. The Behavioral Drivers Model (BDM)

#### 6.1.1. Origin and purpose

The Behavioral Drivers Model (BDM) was developed by UNICEF to provide a comprehensive and practical tool for analyzing and influencing human behavior in diverse cultural, social, and economic contexts. Though initially focused on health and education, it is increasingly relevant to agriculture and agroecology due to its multi-level, systemic perspective.

### 6.1.2. Key components

BDM integrates over 25 behavioral science theories, drawing from disciplines including psychology, sociology, anthropology, economics, and political science. The framework identifies more than 130 behavioral factors, grouped under three broad domains:

1. Psychological drivers: i) Knowledge, beliefs and values; ii) motivation, self-efficacy and iii) cognitive biases, emotions
2. Social drivers: i) Social norms and networks; ii) Gender roles, group identity and iii) family and community dynamics
3. Environmental/Structural drivers: i) Institutional support; ii) accessibility of services and iii) legal and policy frameworks

### 6.1.3. Relationship with Socio-Ecological Model

BDM aligns with the Socio-Ecological Model (SEM), which organizes behavior into nested layers: i) individual (knowledge, attitudes), ii) interpersonal (family, peers), iii) organizational (institutions, services), iv) community (norms, culture) and v) policy/Environment (laws, economics).

BDM uses this layered logic to map intervention points and supports the design of multisectoral strategies.

### 6.1.4. Application in agroecology

The strength of BDM lies in its ability to capture the multidimensional nature of decision-making. For example, a farmer's choice to adopt composting is influenced not only by technical knowledge, but also by factors such as labor availability, social perceptions, and the security of land tenure. This capacity to reflect interrelated drivers makes BDM particularly suited to studying complex agroecological transitions. BDM helps shift focus from individual blame to systemic understanding (UNICEF, 2021).

The limitations are that BDM requires intensive data collection and contextual adaptation. Other limitations are: i) less guidance on sequencing or prioritizing interventions and ii) mostly used in large organizations or research settings.

## 6.2. The Agency and Change for Transforming Agri-Food Systems (ACT Framework)

The ACT Framework was developed by researchers at CGIAR and Wageningen University (Woltering et al., 2024) to specifically address the interplay of behavior, agency, and system-level transformation in agriculture. Unlike models focused solely on individual change, ACT embraces a structural lens.

### 6.2.1. Core dimensions

ACT structures its analysis around three interacting layers:

- 1) Individual Agency
  - Psychological and emotional factors
  - Aspirations, confidence, self-determination
- 2) Structural Conditions
  - Access to resources
  - Institutional and policy context
  - Market dynamics

### 3) Opportunity Spaces

- Interface where change is possible
- Shaped by timing, actors, technology, and power relations

ACT conceptualizes behavior change as emergent, occurring within overlapping subsystems (e.g., production, knowledge, marketing, governance).

Its' strengths are that the tool focuses on agency, especially among marginalized actors; encourages systems thinking and supports transformative, not just incremental, change.

### 6.2.2. Practical tools

ACT includes a variety of participatory and diagnostic tools to map actors and power dynamics, assess enabling/disabling environments and identify “windows of opportunity” for change. ACT is designed for complex adaptive systems, such as food systems in crisis-affected or rapidly evolving contexts.

## 6.3. Complementarity and Application in CANALLS

Literature on behavior change highlights the relevance of the Behavioral Drivers Model (BDM) and the ACT framework within agroecological contexts. These tools are particularly valuable in initiatives like CANALLS, which aim to catalyze systemic transitions through Agroecological Living Labs (ALLs), by fostering participatory innovation and addressing the underlying drivers of behavior. These conceptual models are not only theoretically robust but also offer practical tools for understanding and supporting the complex behavioral shifts required in agroecological systems.

The BDM framework serves as a powerful diagnostic tool that maps the wide spectrum of behavioral influences from individual-level cognitive and emotional drivers to broader social norms and structural barriers. It enables the CANALLS project to analyze behavior across multiple levels, ensuring that interventions are grounded in a deep understanding of local contexts.

The ACT framework, in turn, offers a complementary perspective by focusing on how change can be actively supported and sustained. It highlights three critical pillars of transformation – agency (the capacity of individuals and groups to act), structural change (shifts in rules, resources, and institutions), and network building (the development of connections and coalitions across actors). Through this lens, CANALLS is equipped to not only understand behavior but also to design and steer interventions that foster long-term systemic change.

Combined, BDM and ACT provide a synergistic foundation for a context-sensitive, evidence-based approach to behavior change tailored to the diverse regions and farming systems where the CANALLS project operates. The literature suggests that these frameworks are especially well-suited for agroecological initiatives, where behavior change is deeply intertwined with ecological, social, and institutional dimensions.

In operational terms, CANALLS integrates these frameworks across its eight Agroecological Living Labs (ALLs) in East and Central Africa. The project bridges theory and practice by embedding behavior change analysis directly into the implementation process. Rather than treating behavior change monitoring as a standalone component, CANALLS adopts a cross-cutting strategy that connects research, learning, and policy engagement.

Recognizing that behavior change is often subtle, dynamic, and context-dependent, CANALLS uses a mix of participatory tools and conceptual models to monitor and adapt interventions in real time. This approach ensures that data collection goes beyond conventional outcome metrics like yield or income, and instead captures meaningful shifts in practices, attitudes, and relationships.

Ultimately, the BDM and ACT frameworks not only guide the design and diagnosis of behavioral interventions, but also support ongoing monitoring, learning, and adaptation. Their combined application within CANALLS positions the project to generate actionable insights that can inform broader agroecological transformations in the region.

## ***7. Assessing social and behavioral changes induced by agroecological practices in Burundi, Cameroon, Democratic Republic of Congo, and Rwanda: methodology and approach***

### **7.1. Rationale**

#### **Background**

Agroecology is increasingly recognized as a multidimensional approach to sustainable agriculture, rooted in ecological principles and socio-cultural realities. It emphasizes not only the technical improvement of farming systems through diversification, recycling, and efficiency, but also human dignity, equity, inclusion, and resilience. Its implementation inherently challenges existing behavioral patterns, social norms, and institutional structures. Consequently, monitoring and evaluating agroecological transitions must go beyond conventional adoption metrics and encompass the deeper, often gradual processes of behavior change among farmers, communities, and stakeholders.

During the CANALLS project's baseline assessments, conducted via the FAO's TAPE Step 1 and 2, it became evident that the readiness and actual level of agroecological transition vary widely between territories and social groups. Factors such as household typology, age, gender, access to resources, and exposure to enabling policies influence this variation. Additionally, market access and value chain governance (e.g., certifications in coffee and cacao) act as both barriers and incentives for transformation. This complexity underscores the need for a methodological approach that captures individual, relational, and systemic change dynamics.

#### **Objectives:**

The study seeks to explore the nature and extent of behavioral changes resulting from agroecological practices implemented across the eight Living Labs (LLs) located in the project's four participating countries, specifically to:

- a) Identify the key drivers and barriers to agroecological adoption and transformation, disaggregated by agroecological dimension;
- b) Analyze the influence of household typology, gender, and youth agency on behavior and decision-making;
- c) Explore system-level improvements needed to support agroecological transitions, especially from a policy perspective;
- d) Define effective communication and engagement strategies that can foster inclusive and sustainable behavioral shifts.

## Research Questions:

This study is anchored in two complementary conceptual models:

1. The Behavioral Drivers Model (BDM): asking “Why people do what they do?” and “How can behavior be influenced sustainably?”
2. The ACT Framework (Agency and Change for Transforming Agri-Food Systems): further inquiring “What do people and communities know, feel, and do about agroecology?” and “How do power, agency, and system structures shape behavior?”

## 7.2. Methodology

The methodological design for assessing behavioral and social changes induced by agroecological practices in the CANALLS project adopts a multi-level, mixed-method, and participatory approach, grounded in behavioral science frameworks and agroecological transition theory. This section outlines the conceptual approach, study area and sampling, data collection tools, and analytical techniques that will guide the study's implementation across the eight Agroecological Living Labs (ALLs) located in Burundi, Cameroon, DR Congo, and Rwanda.

### 7.2.1. Study design and philosophical orientation

This study is rooted in constructivist and transformative paradigms, which recognize behavioral change in agriculture as socially constructed, deeply contextual, and shaped by historical and institutional power dynamics. Thus, the research does not only aim to measure adoption but to understand transformation including changes in attitudes, social norms, roles, decision-making, and perceived capacities of individuals and communities in relation to agroecological principles.

The methodological approach integrates:

- Participatory Rural Appraisal (PRA) tool to ensure local ownership and rich qualitative insights.
- Behavioral Drivers Model (BDM) to explore internal motivations, knowledge, and attitudes.
- ACT Framework (Agency and Change in Agri-food Systems) to capture the interface between individuals, institutions, power, and systems.

This triangulation enhances data validity, inclusiveness, and interpretive richness by aligning farmer voices with structural factors and theoretical insights.

### 7.2.2. Study Area and Sampling Strategy

The research will be implemented in the eight CANALLS Agroecological Living Labs (ALLs), distributed across the four participating countries, all of which are agroecological experimentation zones characterized by different farming systems, institutional frameworks, and community dynamics.

To ensure comparability and inclusiveness, the sample will include:

- 60 households per ALL (30 direct CANALLS beneficiaries with priority to farmers hosting the experimental fields in each ALL and 30 non-beneficiaries from the same community), ensuring:
  - Gender parity (50% women, 50% men).
  - Inclusion of youth (aged 15–35) and older adults, if possible, disabilities are welcome
  - Representation of diverse household types (based on typologies defined in Step 1 and 2 of TAPE);
- 5 to 10 Key Informants (KIs) per ALL, selected for their knowledge of the local context (traditional leaders, extension officers, value chain actors, local administrators, women/youth leaders, and academic partners).

Sampling will be purposive and stratified, allowing both vertical analysis (within ALLs) and horizontal comparisons (across countries and socio-demographic profiles).

### 7.2.3. Data collection methods and tools

Data collection will be carried out using two complementary approaches focus group and individual survey. Guideline and questionnaire are provided in the annex 1 section of this document. An overview of the methods to be used is presented in Table 1.

**Table 1: Methods, purpose and variables**

Methodology	Purpose	Variables/topics include
Analysis of social aspects included in TAPE (analysis of information of data already collected)	Analyze the social and behavioral aspects already collected in TAPE. Objective: identify trends between different aspects of agroecology	Household characteristics Co-creation Fairness Participation Synergies
Individual interview to key informants (farmers, advisors?) (5 per Living Lab)	Identify the aspects according to theory of planned behavior, values and cultural aspects influencing the adoption of innovations. Identifying norms and the policies (local and global) influencing the adoption	Participation Social impact and behavior change: Attitudes Behavioral Changes and normative, social norms Challenges and Support Future Intentions and motivation
Survey (60 farmers per Living Lab)	Identify individual aspects influencing adoption of innovations. After analyze the results of available data and key informants, individual social aspects will be conducted.	Participant Information Household conditions Working conditions Participation in Household Decisions Knowledge, attitudes and practices Community's social capital
Focus groups (1 per ALL)	Discuss social and behavioral aspects. Identify environmental aspects influencing or affecting the adoption of agroecological innovations. Identify the agency and norms influencing the adoption of innovations.	Which practices did you implement? What made you choose this particular practice? How has this benefited you, your household or community? What challenges did you experience and how did you overcome them? Do you intend to continue implementing the project? For how long? Why/why not? Timeline of the adoption
Draw the social and resources map of the ALL	Identify the agency of actors and influence of assets and natural resources	What visible signs can identify a poor in the location? What pillars can agroecology mobilise to leave the status of poor? What are the barriers to overcome?

## A. Focus Group Discussions (FGDs)

FGDs will follow PRA principles to capture collective knowledge, consensus, and contested views on agroecological practices and behavior change. Groups will be disaggregated as shown in table 1.

**Table 2: Focus Group Discussions**

Group Category	Purpose/Focus
Community Leaders & Educated key actors	Governance, land access, local policies, conflict resolution, natural resource management, traditional norms; Institutional mapping, actor networks, resource accessibility, population typology, feedback on systemic barriers.
Youth (M/F)	Aspirations, perceptions of farming, equity issues, agency, employment, motivations, perceived constraints
Adult Men	Technical practices, changes in livelihood, decision-making, intra-household roles, benefit perception
Adult Women	Aspirations unpaid labour, gender equity, food sovereignty, access to resources, perceptions of farming, equity issues, agency, employment, motivations, perceived constraints

All FGDs will include visual tools (timelines, seasonal calendars, resource maps, influence diagrams).

## B. Individual Surveys (Semi-Structured Interviews)

Using Open Data Kit (ODK) or KoboCollect, semi-structured surveys will be administered to all 60 households per ALL to collect:

- Demographic and socioeconomic data
- Self-reported knowledge, attitudes, and practices (KAP)
- Behavioral determinants (motivation, risk perception, habit strength)
- Access to enabling services (e.g., extension, credit, markets)
- Perceived changes in household roles, productivity, well-being, and environmental outcomes.

This dual approach will provide quantitative breadth and qualitative depth, ensuring triangulated, context-sensitive understanding of behavior change.

### 7.2.4. Conceptual framework for analysis

The analysis will be guided by a combined ACT-BDM conceptual model (Table 3) that captures how internal, relational, and systemic factors shape behavior and transformation.

**Table 3: Conceptual Framework model**

Level	Framework Component	Operational Variables	Source of Data
Micro	<i>Individual behavior factors</i>	Knowledge, aspirations, skills, perceived risks, motivation	TAPE survey Individual survey
Meso	<i>Social-relational subsystem</i>	Norms, roles, community support, gender dynamics, youth inclusion	Interviews Focus group
Macro	<i>Governance &amp; economic subsystems</i>	Policy support, market access, certification schemes, institutional performance	Focus group
Cross-cutting	<i>Agency &amp; Opportunity Space</i>	Ability to choose and act, perceived options, decision-making power	Interviews Focus group

Outcome	Action Situations	Observed practices, social mobilization, changes in norms/roles	Interviews Focus group
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### 7.2.5. Thematic Focus: Agroecological Dimensions

The thematic areas of inquiry will be based on low-scoring dimensions from the TAPE Step 1 assessment. These may include for example biodiversity and synergy. The diversification score was low because of practice x and y? What to do for its improvement? Are you ready to adopt the change for improvement? This can also be done for efficiency and recycling, resilience, etc.

Each ALL will prioritize its critical dimensions, while cross-cutting topics like gender, youth, and equity will be addressed in all.

### 7.2.6. Data Quality Assurance

All tools will be pre-tested in the Biega ALL during the pilot study. Enumerators and facilitators will be trained on qualitative facilitation and digital data collection tools.

Ethical protocols (informed consent, confidentiality, cultural sensitivity) will be strictly followed.

Supervisors will monitor data collection through daily debriefings, spot-checks, and backups of digital records.

### 7.2.7. Data Analysis

We will distinguish quantitative and qualitative data during the analysis.

#### ❖ Quantitative Data:

Descriptive statistics (frequencies, means, cross-tabulations) will be computed, and disaggregation will be conducted by age, gender, project exposure, household type. Visualizations (bar charts, spider graphs, box plots)

#### ❖ Qualitative Data:

- Thematic content analysis using deductive (ACT-BDM components) and inductive coding
- Use of Excel or qualitative software (e.g., NVivo, Dedoose)
- Identification of narrative patterns, contradictions, and transformative pathways

Results will be synthesized by ALL and aggregated regionally to identify:

- Patterns of behavioral transformation
- Contextual enablers/barriers
- Gaps in support structures and policy interventions

### 7.2.8. Integration with Other Project Data

This behavioral assessment will be integrated with TAPE Step 1 and 2 findings, as well as with outcome data from agroecological experiments in each LL. The findings will be cross-referenced with:

- Agroecology performance scores (e.g., diversity, recycling, governance)
- Typology-based farmer profiles
- Co-creation session outputs

This integration will help identify causal linkages between observed behaviors, enabling environments, and agroecological outcomes.

## 7.3. Activities and time frame

Table 4 presents the main activities and timeframe for this task 4.3. The field activities are expected to be conducted during six months (July to December 2025) including the pilot study, training of partners and enumerators and data collection in the eight ALLs of the project. Data cleaning and analyses will simultaneously be carried out. Draft report summarizing the findings of this study will then be shared with all partners and an online presentation will be organized. Thereafter, a full manuscript will be written with the aim of submitting the draft paper by June 2026.

**Table 4: Detailed work plan outlining these activities.**

Type of work	June 2025	July 2025	August 2025	September 2025	October 2025	November 2025	December 2025	June 2026
Literature review	X	x						
Analysis of social data in TAPE survey		x	x					
Pilot phase survey		x	x					
Adaptions of the guides of discussion and Training design		x	x					
Online training of the teams			x					
Data collection and data cleaning					x	x	x	
Report writing							x	
Draft paper writing								x
Workshop							x	x
Paper submission								x

## 7.4. Dissemination

To spread out the results of this work, three activities are planned, scientific conferences, scientific publication and public conferences with different representative stakeholders (farmer's organizations, provincial government, university scholars, researchers, etc.) for each country. So, the project plans one conference and one seminar for respectively non-academic and academic stakeholders to assure the validation of the findings.

In term of outcome, this study will provide a scientific paper on social, and behavior change among farmers due to agroecological practices, combining all CANALIS value chains programs in Burundi, Cameroon, DRC, and Rwanda. Based on that, the document will contain information on socio economic characteristics, behavior changes dimensions (norms, attitudes, perception etc.). These outputs, strategies will be formulated for socioeconomic policies orientation to guide the agroecological practices adoptions focusing on the socioeconomic profile of farmers.

## 8. Conclusions

Although field activities have not yet been undertaken, this preliminary methodological review offers a solid operational framework for examining behavior change as a strategic driver of agroecological transformation. The synthesis of existing literature, combined with the conceptual integration of BDM and ACT, highlights that changes in farming practices cannot be considered independently of the social, cultural, institutional, and political contexts in which they are situated.

The proposed methodology is deliberately designed to capture not only the actions of the actors, but also their underlying motivations, the trajectory of their decision-making, and the structural factors that enable or restrict change. By integrating insights from existing literature, conceptual diagnostics, and practical tools tailored for fieldwork, the CANALLS research team is positioned to investigate behavior as an emergent, adaptive, and relational process.

This work consisted of a twofold approach: developing a theoretical synthesis of existing frameworks addressing behavior change within agri-food systems; applying these insights to analyze the behavioral transformations required for a successful transition to agroecology, as envisioned in the CANALLS project. Two core theoretical models emerged from this process: the BDM, a psychologically grounded framework, and the ACT, an adaptation of BDM tailored to the agroecological context. Ultimately, the integration of these models was proposed to guide behavior change analysis within the CANALLS project.

The literature highlights several foundational principles to guide the upcoming empirical work:

- Behavioral change is not linear: It should be analyzed as a dynamic, multi-scalar process shaped by values, opportunity structures, and collective imaginaries.
- Agency matters: Emphasizing the perspectives and lived experiences of women, youth, and marginalized groups is essential to understanding system change.
- Ethical engagement is central: The study's participatory orientation ensures that communities are not mere subjects of analysis but active co-producers of knowledge.
- Frameworks must be adaptive: BDM and ACT offer scaffolding, but their application must remain context-sensitive and responsive to community realities.
- Measurement must reflect transformation: Beyond tracking adoption or yield gains, the research will explore how agroecology fosters dignity, inclusivity, and resilience over time.

This work proposes an approach taking as a starting point the lowest scores of the 10 components of TAPE, the analysis tool for the transition to agroecology. It consists of identifying the most problematic sub-component and identifying the need and direction of behavior change necessary for a sustainably acceptable dimension score.

By anchoring the CANALLS inquiry in this preparatory phase with conceptual clarity and methodological rigor, the research team lays a robust foundation for collecting and interpreting data in a way that meaningfully contributes to theory, practice, and policy in agroecological transitions.

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# ANNEXE1. Questionnaire and discussion guide

## Assessment of social and behavioral changes induced by agroecological practices

### 1. General objective and consent information

This study assesses the Assessment of social and behavioral changes induced by agroecological practices under the CANALLS project. Would you like to participate in the interview? Yes/No

### 2. Section 0: Introduction

This section provides general information helping to identify the geographic location of the survey. It includes information regarding the survey date, Geographical localization, GPS coordinates, name of the respondent, treatment status of the respondent, etc.

N°	Question	Type of question
0.01	Survey date	Date
0.02	Starting time	Time
0.03	Country (Burundi, Cameroon, DRC, Rwanda)	Select one
0.04	Province	Text
0.05	District/Commune/Territory	Text
0.06	Living lab	Select one
0.07	Village	Text
0.08	Coordinate (GPS)	Coordinates
0.09	Main crop component	Select one
0.10	Household main activity	Text

### 3. Section 1: Socio-demographic characteristics

The household roster should include all the people that "live together and eat out of the same pot". Include the following people: someone who has temporarily gone for less than six months, students studying away from home, workers who have stayed for at least a month, and someone who lives away from home but is very involved in household economic decision-making. Members who live somewhere else and only come to visit and bring money are not household members. Note years of education should be for the complete level of education. If this household is part of a polygamous family, ask only about the household members at this household.

N°	Question	Type of question
1.01	Id of the participant	Integer (automatic)
1.02	Name	Text
1.03	Sex	Select one
1.04	Participant phone number	integer
1.05	What is the civil status?	Select one
1.06	Highest level of education?	Select one
1.07	The main occupation of the respondent	Select one
1.08	Religion of the respondent	Select one
1.09	Is the respondent born in this village?	Select one
1.10	For how long you have living in this village?	Integer
1.11	Farming experience (years)?	Integer
1.12	Farming experience in (specific crop or livestock)	Integer
1.13	Including you how many are you in your household?	Integer
1.14	How many men?	Integer
1.15	Number of women in the household	Integer
1.16	How many are under 15?	Integer
1.17	How many are over 29?	Integer
1.18	How many women are between 15 and 29 years old?	Integer

1.19	How many men are between 15 and 29 years old?	Integer
1.20	Type of household management	Select one
1.21	How many people in your household have a formal or informal job and contribute regularly to the household income?	integer
1.22	How many women in the household	integer
1.23	Is the respondent a firm or household	Select one

#### 4. Social behavior changes question

Questions will be asked in all LLb for all TAPE components that received a "red" score, i.e., a low score. Questions such as: "It has been observed that diversity is the weak link in the agroecological transition, especially when it comes to the mixture of trees in the fields. So why don't you put trees in coffee fields when you know it's important? How do you view someone who has them in their field?"

So, in this section we will ask question related to the **weak level** (One most influencing aspect of a dimension) of the agroecological dimension with different groups on flip chart (men, women, girls and boys). Questions will be repeated in the sequence of What you know about x? What should be done? Why don't you or do? What should be changed to?

##### 1) Diversity:

- a. High number of crops and/or cultivars
- b. Mixed farming (crops and animals)
- c. Integration of trees and/or other perennials
- d. Diversifying activities for more income (association of several products and services produced on farm)

##### 2) Synergies:

- a. *Crop-livestock integration*: animals are fed feed produced on farms, crop residues and by-products and grazing, all their manure is recycled as fertilizer and they provide more than one service (food, products, traction, etc.).
- b. *Soil management system*: Soil coverage by crop residues or cover crops, or crop rotation and intercropping. Little or no soil disturbance, fallow regeneration practice. No use of agrochemicals.
- c. *Integration of trees (agroforestry, silvopastoralism, agrosilvopastoralism)*: Integration of trees and other perennials of different species provide several products and services. Integration of practices aiming the regeneration (fallows and forests).
- d. *Connectivity between elements of the agroecosystem and the landscape*: The agroecosystem presents a mosaic and diversified landscape, many elements such as trees, shrubs, fences or ponds can be found in between each plot of cropland or pasture, or several zones of ecological compensation.

##### 3) Recycling:

- a. *Recycling biomass and nutrients*: All the residues and by-products of crop and animal production are reused in other productive activities on farms. There is a comprehensive approach to recycling biomass and nutrients, with efficient systems in place for collecting, processing, and reintegrating organic materials into the agricultural system.
- b. *Waste production and management*: The farm produces minimal amounts of waste (including emissions) and recycles all of it. Advanced practices for waste reduction, reuse, and recycling are applied, ensuring comprehensive waste management and

minimizing environmental impacts. The farm actively promotes a circular economic approach.

- c. *Water recycling and saving*: Several water management and water-saving approaches are practiced. Various types of equipment for water harvesting or saving are utilized, along with multiple practices to limit water use. Comprehensive measures for evaporation control and moisture retention are implemented, maximizing water conservation and efficiency. The focus on water management is comprehensive and highly effective, leading to optimal water utilization and minimal water wastage, with special emphasis on evaporation control and soil moisture retention.
- d. *Energy reduction and renewable energy*: All the energy used is renewable (gravity irrigation, solar panel, biogas, animal and human workforce, etc.) and/or self-produced. Household is self-sufficient for energy supply, which is guaranteed at every time. Use of fossil fuels is negligible.

4) Efficiency:

- a. *Use of external inputs*: inputs are produced on farm/within the agroecosystem or exchanged with other members of the community, ensuring that producers have full access to enough inputs for their productive activities.
- b. *Management of soil fertility*: No synthetic fertilizers are used. Soil fertility and soil health are managed only through a variety of organic practices and biological processes.
- c. *Management of pests and diseases*: No chemical pesticides and drugs are used. Pests and diseases are managed through a variety of biological substances and prevention measures.

5) Culture and food traditions:

- a. *Appropriate diet and nutrition awareness*: Healthy, nutritious, diversified diet. Good nutritional practices are well known and enforced.
- b. *Food self-sufficiency*: food consumed by the family is self-produced on the farm or exchanged within the community, allowing for a diversity of healthy, balanced, and nutritious diets for all the members of the family.
- c. *Local and traditional food heritage*: Several local varieties and traditional seeds (and breeds) are produced and consumed. Traditional knowledge and practices for food preparation are identified, applied, and recognized in official frameworks and/or specific events. Local or traditional identity is strongly felt and protected, with high respect for traditional food heritage, contributing to a diverse, healthy, balanced, and nutritious diet for all the members of the family.
- d. *Management of seeds and breeds*: seeds/animal genetic resources are self-produced, exchanged with other farmers or managed collectively, ensuring enough renewal and diversity.

6) Co-Creation and Sharing of knowledge:

- a. *Access to agroecological knowledge and interest of producers in agroecology*: Widespread access to agroecological knowledge of both men and women: producers are aware of the principles of agroecology and eager to apply them, facilitating knowledge sharing within and between communities and involving younger generations.
- b. *Social mechanisms for the horizontal creation and transfer of knowledge and good practices*: Several well established and functioning platforms or mechanisms for the

co-creation and transfer of knowledge are available and widespread within the community, including women.

- c. *Participation of producers in networks and grassroots organizations*: Participation of producers in networks and grassroots organizations.

7) Human and Social values:

- a. *Women's empowerment*: Women are completely empowered in terms of decision making and access to resources. And/or women organizations exist, are functional and operational.
- b. *Labor (productive conditions, social inequalities)*: Agriculture is based on family farmers which have full access to capital and decision-making processes in gender equity. There is a social and economic proximity between farmers and employees.
- c. *Motivation in agricultural work and continuity of family farming*: Agricultural work is satisfying and rewarding, and young people are committed to becoming farmers.
- d. *Animal welfare (if applicable)*: Animals are well-cared for, experience minimal stress, and have access to proper nutrition and healthcare. Slaughter practices prioritize their well-being, ensuring a painless and respectful process. They are consistently treated with dignity in all aspects of their care and handling.

8) Circular and solidarity economy:

- a. *Products and services marketed locally (or with fair trade)*: The farm produces an important quantity of agricultural products (and/or services) that are completely marketed locally (or in fair trade schemes) and contribute to local food security.
- b. *Networks of producers, relationship with consumers and presence of intermediaries*: Well-established and fully operational networks of empowered producers are in place, with inclusive participation from women. There are strong and stable relationships with consumers, and no intermediaries are needed as producers manage the entire marketing process directly.
- c. *Local sourcing and circularity*: The farm extensively sources inputs and materials locally, fostering the territory through circular economy. The community has a high level of exchange and trade of products and services between local producers, further enhancing circularity.

9) Responsible governance:

- a. *Producers' empowerment*: Producers are well empowered, with their rights fully recognized and respected, ensuring gender equity. They are well-organized, demonstrate strong capacity, and have the means to improve their livelihoods and actively pursue skill development opportunities.
- b. *Producers' organizations and associations*: More than one organization exists. They provide market access and other services, with equal access to men and women.
- c. *Inclusive decision-making processes*: Mechanisms promoting producer participation in decision-making processes are fully operational, emphasizing equitable access to resources, rights assurance, and sustainable practices. Both genders have the chance to influence decisions, fostering inclusive involvement in system governance and decision-making.

10) Resilience:

- a. *Existence of social mechanisms to reduce vulnerability*: Community is highly supportive for both men and women and can significantly help aftershocks. Customary

social safety net consistently functional. And/or access to credit is almost systematic and insurance covers most of production.

- b. *Environmental resilience and capacity to adapt to climate change*: Local environment has a strong natural capital base, climatic shocks are rare, and the system has a strong capacity to adapt to climate change.

#### 5. *Discussion regarding the baseline results Step 2 of TAPE*

This section concerns the sub-groups of leaders, and the answers should be triangulated in the open session putting together all the sub-groups. It will be specified answers by household typologies and agency. Que repeated questions remain the same and it is added the one on social norms change based on “what you know, what you feel and what you do”.

- 1) Land tenure:
  - a. *Legal recognition of land by sex*: Existence of formal document
- 2) Economic dimension:
  - a. *Calculation of productivity and profit / revenue*
  - b. *Income changes reporting*
  - c. *Added value productivity*
- 3) Health and nutrition dimension
  - a. *commitment to agroecology with minimal pesticide use*
  - b. *Access to good food security*
  - c. *Perception of dietary diversity*
- 4) Society and culture dimension:
  - a. *Need of women empowerment*
  - b. *More focus on youth engagement, employment, and conditions in agriculture.*
- 5) Environmental dimension:
  - a. *Diversification in agriculture*
  - b. *Attention on soil health – Soil erosion, chemical fertility, organic material rate*
6. *Discussion regarding Knowledge, availability, and affordability of agroecological technologies and practices as tested on experimental sites (Open discussion session)*

In this session, the promoted or tested technologies will be presented to the assembly, and discussion will be conducted regarding the perception of:

- 1) Participation
  - a. Can you confirm that you have been exposed to, participated in, or attended any CANALLS related agroecological technologies, practices, events disseminated or organized in your country
  - b. How did you first learn about agroecological practices?
  - c. Since when have you been exposed to this agroecological technology for the first time?
  - d. What technology or practice to which the participant has been exposed
  - e. To what extent are the technologies affordable
  - f. Which agroecological practices have you adopted?
  - g. What were the main reasons for adopting these practices
  - h. Rate your knowledge about agroecological practices after adopting them
- 2) Social impact and behavior change:
  - a. Have you observed any changes in community collaboration since adopting agroecological practices

- b. Has your participation in community events or groups related to agriculture changed
  - c. Have you noticed changes in your relationships with neighbors or local farmers?
  - d. Agroecological practices offer significant environmental benefits
  - e. I believe agroecological farming is economically sustainable
  - f. Agroecological practices are more effective than conventional farming methods.
  - g. I feel social pressure to adopt agroecological practices.
- 3) Attitudes
- a. I believe adopting agroecological practices will improve soil health.
  - b. Do you think it is very easy for farmers to adopt sustainable practices?
  - c. Do you think there is a higher risk of no usage of agroecological practices to your farming yield of sold fertility?
  - d. I feel positive about the idea of adopting agroecological practices
  - e. The thought of using fewer chemicals in farming makes me feel optimistic.
  - f. I am excited about the potential of agroecological practices.
  - g. Engaging in agroecological practices makes me feel more connected to nature.
  - h. I feel capable of implementing agroecological practices on my farm.
  - i. I have the resources needed to transition to agroecological methods.
  - j. I am confident in my ability to learn and apply agroecological techniques.
  - k. There are significant barriers preventing me from adopting agroecological practices.
- 4) Behavioral Changes and normative, social norms
- a. Have you made any changes to your daily routine or lifestyle because of adopting agroecological practices?
  - b. How has your perception of food production and sustainability changed?
  - c. How are you thinking and find yourself more inclined to engage in environmentally sustainable practices outside of agriculture (e.g., recycling, energy conservation)?
  - d. My community generally supports the use of agroecological practices.
  - e. The opinions of my peers influence my decision to use agroecological methods
  - f. There is a strong cultural or societal push towards agroecology in my area.
- 5) Challenges and Support
- a. What challenges have you faced in adopting agroecological practices?
  - b. Can Training and workshops resources help you to continue or expand your agroecological practices?
  - c. Can Financial subsidies resources help you to continue or expand your agroecological practices?
  - d. Can access to tools and technology resources help you to continue or expand your agroecological practices?
  - e. As the Cost Perceived as a main barrier preventing you from adopting agroecological practices?
  - f. As the Lack of knowledge, perceived as a main barrier preventing you from adopting agroecological practices?
  - g. As the Lack of resources, perceived as a main barrier preventing you from adopting agroecological practices?
  - h. As the Social pressure, perceived as a main barrier preventing you from adopting agroecological practices?
- 6) Future Intentions and motivation
- a. I intend to adopt more agroecological practices in the future
  - b. Are you likely to recommend agroecological practices to others?
  - c. I am motivated to adopt agroecological practices in the next growing season.

- d. Are you implementing often agroecological practices on your farm?
- e. Are you always intending to use agroecological practices in your farm?
- f. I have adopted at least one agroecological practice in my farming activities.
- g. I have taken steps to educate myself about agroecology.

#### 7. *Household off-farm income*

In the section individual discussion will be conducted to determine the revenue using an indirect method based on the main and regular expenses and after the household income outside the farm. A triangulation process will be conducted based on social charts established by the sub-group 2.

- 1) Does your household have any sources of income apart from selling what you produce on the farm during the last 12 months?
- 2) In total, what proportion (%) of the household's total income is from off-farm sources?
- 3) What are those sources of off-farm income?
- 4) About how much money did you make from those sources in total during the last 12 months?
- 5) What level of off-farm income would you like to achieve in the future (next 12 months)?
- 6) How will you assess the change in the level of income of your household in the last 12 months?