CANALLS

AGROECOLOGICAL PRACTICES FOR SUSTAINABLE TRANSITION

D3.2: Agroecology Living Labs: Plan and Achievements - Interim version

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Executive Summary

This deliverable report (D3.2) provides a midterm progress on planning activities and results of the Agroecology Living Labs (ALLs) of the CANALLS project. The report serves as an updated version of D3.1, highlighting the Plan and Achievements made from January 2024 to June 2025. A key objective of the CANALLS project is to promote agroecological transitions in the humid tropics of Central and Eastern Africa by establishing and operationalizing multi-actor transdisciplinary ALLs. These ALLs are being implemented under thematic work package (WP) 3 in collaboration with other WP/task leaders and supporters. WP3 is led by partner NIBIO, co-led by IITA, and supported by several project partners and multi-actor agroecology living lab stakeholders.

One of the objectives of WP3 is to establish and manage eight ALLs in Burundi, Cameroon, the Democratic Republic of Congo, and Rwanda in collaboration with multi-actor stakeholder communities and project partners. WP3 involves five main tasks and several subtasks/activities. Task 3.2, which involved the establishment of ALLs, has been completed with the delivery of the initial report (D3.1) detailing the successful establishment of the eight ALLs in the four case countries. Currently, there are about 180+ active members from various organizations and sectors within public-private-people partnerships. These include farmers/cooperatives, value chain actors, government institutions, research institutions, academic institutions, non-government organizations, and civil society. Approximately 30 percent of the members in the ALLs is composed of women.

This report outlines the planning activities, including the stakeholder engagement plan, and summarizes the results and achievements made in terms of:

(a) Planning activities in each ALL: To ensure the effective implementation of various activities within the ALL, NIBIO has organized monthly online meetings with each ALL coordinator and team members. These meetings were scheduled in the first week of every month and included a predefined agenda for discussion. Minutes of the meetings were carefully recorded. Additionally, other digital communication channels such as phone calls and emails were employed to maintain regular contact with ALL coordinators and team members. A WhatsApp group was established in each case study country to facilitate communication between partners and stakeholders of the ALL. The ALL coordinators and team members submit monthly reports on ALL work progress using a reporting template provided by NIBIO. This template detailed stakeholders' involvement, specific activities undertaken (including relevant photographs), challenges encountered, and measures taken. Each report was reviewed and approved by the respective ALL coordinator before submission to the WP3 leader. This systematic approach has aided in documenting the activities within the ALL (Chapter 2).

(b) Multi-stakeholder participation across the different WP tasks: Documentation for each stakeholder of the ALL was meticulously recorded using a template on stakeholder profiles in an Excel sheet. The template includes the goals, mission, and objectives of the organization, experiences, knowledge, skills related to agroecology, as well as stakeholders' major needs and constraints. Stakeholder mapping has enabled to get a comprehensive understanding of the stakeholders' potential, limitations, gaps, and requirements within the project. This process facilitated the development of a Stakeholder Engagement Plan (SEP) tailored to each stakeholder group. Each stakeholder group was engaged in various project activities at different levels (i.e., inform, consult, involve, cocreate/collaborate) and at varying stages of the project based on their merits. Detailed descriptions of the participation of the stakeholder groups in the different work packages of the CANALLS project are presented in this report (Chapter 3).

(c) Co-creation activities: Two co-creation workshops were held in six ALLs, identifying main challenges of the specific farming systems in each ALL. The common challenges were poor soil fertility, infestation of pests and diseases. To address these, specific combinations of agroecological practices (AEPs) were cocreated during the two workshops held in the ALLs. However, in the other two ALLs, i.e., in the Giheta ALL, organic products, like beans, are being certified using the Participatory Guarantee Systems (PGS) building on producer-consumer relations and transactions based on trust. In the Bunia ALL, project partners and stakeholders have been monitoring the existing AEPs in cocoa farming systems.

(d) Capacity building of partners and stakeholders in the first round: During the interim phase, various capacity-building activities were conducted to improve the knowledge and skills of local partners and stakeholders in the ALLs. These included training workshops, field days, exposure visits, and mutual learning. Additional various capacity-building activities are scheduled during Month 30 to Month 42 in each ALL. This encompasses farmer field schools, peer-to-peer instruction, mentorship programs, and the dissemination of educational materials in local languages through audio-visual techniques.

(e) Testing and identifying optimal agroecological practices: In the first-round cycle of co-creation, at least two AEPs and/or solutions were tested at the ALL sites through farmer-led trials supervised by project partners. In most of the ALL sites, they have tested different plant-based biopesticides and integrated organic and inorganic fertilizers (Table 1). Chapter 3 presents some of the preliminary results of the trials conducted in the six ALLs during the first-round cycle.

Table 1: Combination of agroecology practices and/or solutions tested across the ALLs.

Agroecology practices/solutions	*Biega & Kabare*	*Bujumbura*	*Bunia*	*Giheta*	*Kamonyi*	*Ntui*	*Uvira*
▪ *Plant based bio-pesticides/bio-fungicides applications**	*X*	*X*			*X*	*X*	*X*
▪ *Foliar fertilizer applications*						*X*	
▪ *Improved tree shade management in Cocoa farm*						*X*	
▪ *Sanitized human urine as soil fertilizer*		*X*					
▪ *Erosion control measures*	*X*				*X*		
▪ *Organic and inorganic fertilizers applications*	*X*	*X*			*X*		*X*
▪ *Intercropping with legumes or maize and/or planting cover crops*	*X*	*X*			*X*		
▪ *Participatory Guarantee systems*				X			
▪ *Monitoring existing Cocoa farming practices*			X				

To this end, the eight ALLs have outlined their action plans for the second-round cycle (M30 to M42) with common activities including:

- Analysing and interpreting first-round of trial results
- Organizing third co-creation workshops for gathering stakeholder feedback

- Conducting mutual learning events and cross-visits among the ALLs
- Planning and implementing second round of trials
- Actively engaging stakeholders in project activities
- Enhancing the capacity of stakeholders and partners within the ALLs
- Monitoring and evaluating the operation of multi-actor ALLs
- Preparing an exit strategy plan for ALLs (e.g., linking ALLs with CANoLL (Task 7.4) and other relevant ongoing national/regional projects).

Table of Contents

List of Figures

List of Tables

List of Terms and Definitions

Abbreviation	Definition
AEPs	Agroecological Practices
AFAAS	African Forum for Agricultural Advisory Services
ALLs	Agroecological Living Labs
APDIK	Association Paysanne Pour Le Développement Intégré Au Sud-Kivu
CAMFASS	Cameroon Forum for Agricultural Advisory Services
CANALLS	Central and east Africa through traNsdisciplinary Agroecology Living LabS
CANoLLs	Central and Eastern African Network of Agroecology Living Labs
CAPAD	Capad Shirukubute
CIRAD	Centre De Cooperation Internationale Enrecherche Agronomique Pour Ledeveloppement
COPED	Coped Ltd
DRC	Democratic Republic of Congo
DSTs	Decision Support Tools
ETHz	Eidgenoessische Technische Hochschule Zuerich
GASD	AGDD Services
IITA	International Institute of Tropical Agriculture
IRAD	Institute of Agricultural Research for Development
ISABU	Institut Des Sciences Agronomiques Du Burundi
LL	Living Lab
MFARM	Maggot Farm Production Ltd
NATUR	Verband Für Ökologischen Landbau E.V
NIBIO	Norwegian Institute of Bioeconomy Research
Q-PLAN	Q-Plan International Advisors Pc
RAB	Rwanda Agriculture and Animal Resources Development Board
RIK	Rikolto International Son
SCOOP	Societe Cooperative Avec Conseil Dadministration Pour Le Manioc
UCB	Université Catholique De Bukavu
UHOH	Universitaet Hohenheim
VC	Value Chain
WP	Work Package

1. Introduction

The CANALLS project employed a living lab approach (ENoLL, 2022, 2025) tailored to the case study countries of Burundi, Cameroon, DRC, and Rwanda. Its aim is to promote agroecological transitions through a multi-actor Agroecology Living Lab (ALL) approach (Figure 1). During the Month 01 to Month 30), the key activities implemented were:

- **co-creation** with multi-stakeholders by organising workshops in each ALL to identify, describe and prioritise key challenges of the existing farming systems; followed by
- **co-designing** multi-methods approach with combinations of agroecological practices/solutions to address the key challenges and then,
- **co-testing and co-evaluating** the identified agroecology practices/solutions in the field (real-life context of use); while making sure of
- **multi-stakeholder participations**, by preparing a stakeholder engagement plan and then by engaging them at different levels over the project period; with
- **active-user involvement** by empowering end-users through customized trainings, capacity building activities that included cross visits, knowledge exchange, etc.

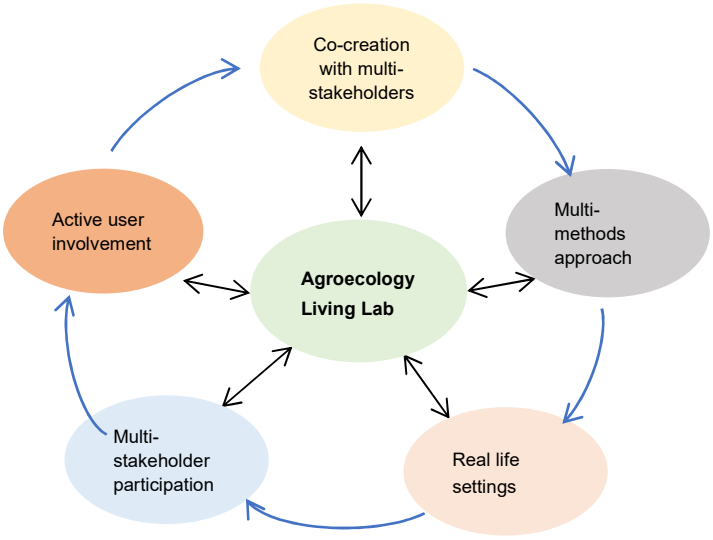

Figure 1: Key elements of Agroecology Living labs approach under CANALLS project.

To establish and operationalize our multi-actor transdisciplinary ALLs, we developed three consecutive steps of activities: **Exploration & Planning, Implementation & Monitoring, and Evaluation of ALLs** (Figure 2). These activities are executed in three phases over a period of 42 months. Phase 1 (Exploration & Planning) commenced at Month 01 and completed at Month 12 with the delivery of the D3.1 report (initial version), which provided baseline information for the establishment, operation, and monitoring of ALLs within the project. Subsequently, Phase 2 (Implementation and Monitoring of the ALL) began in Month 13 and ended in Month 30 with the delivery of the D3.2 report - a midterm version (i.e., updated version of D3.1).

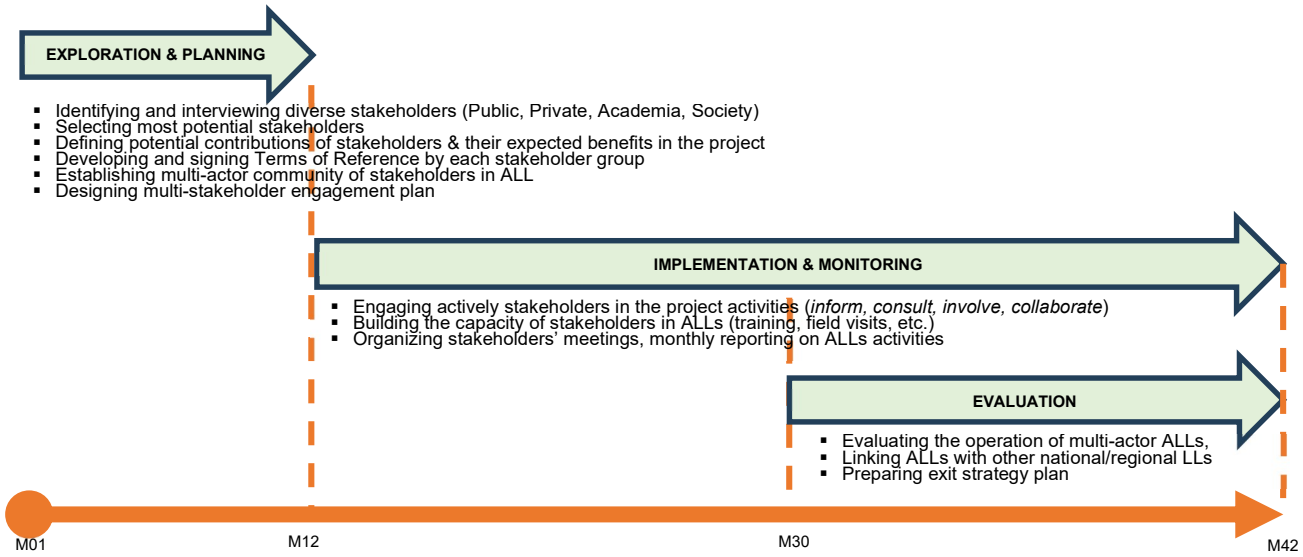

Figure 2: The three phases of ALLs in the CANALLS project.

Phase 1 (Exploration and Planning of ALL): Eight Multi-actor ALLs have been established in four case countries of the CANALLS project: DRC (Bunia, Kabare, Biega, Uvira), Burundi (Bujumbura, Giheta), Cameroon (Ntui), and Rwanda (Kamonyi). The 8 ALLs have over 180 members from farmer groups, value chain actors, government, research, academia, NGOs, and civil society. Women represent about 25-30% of the membership (Figure 3). By working together with diverse stakeholders, we ensure that agroecological solutions are practical, scalable, and responsive to the needs of local communities.

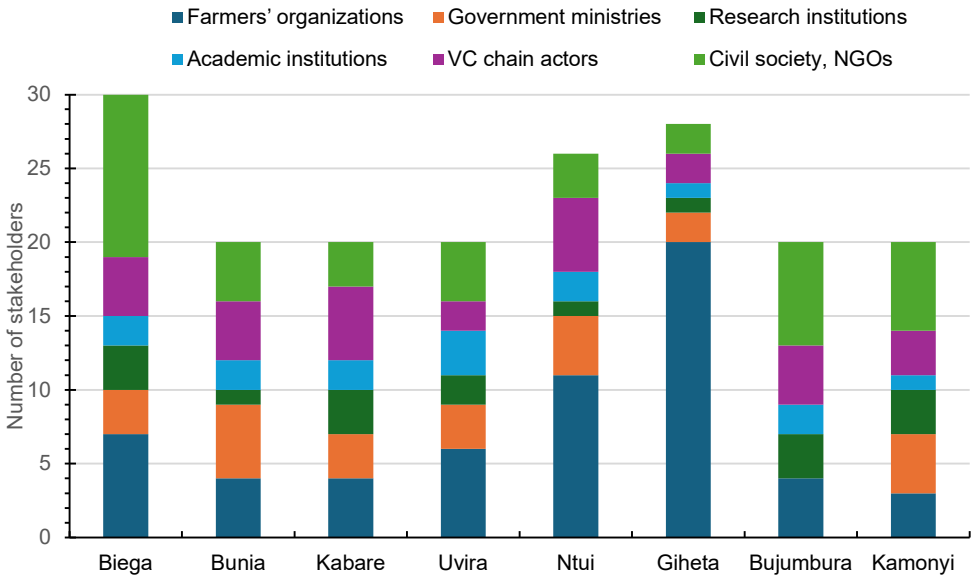

Figure 3: Typology of stakeholders' memberships in the ALL of CANALLS project.

Phase 2 (Implementation and Monitoring of the ALL): The aim was to execute and oversee activities in the 8 ALLs. These living lab activities are inter-connected with tasks across various work packages of the CANALLS project.

This report presents an updated version of D3.1 (Tesfai et al., 2024) with specific reference to the Plan and Achievements made from January 2024 to June 2025. The report is organized along four main chapters, which are divided into several sections. Chapter 1 provides background information on the initial phase of ALLs (D3.1 initial version) and outlines the objectives of the midterm phase of the ALL. Chapter 2 details the various planning activities implemented, including the methodology and process of developing the Stakeholder Engagement Plan (SEP) and monitoring stakeholder participation in the project's different WP tasks/activities. Following this, in chapter 3, key results and achievements regarding stakeholder participation in various project activities, cocreation activities, the first round of capacity building for partners and stakeholders, and the first round of testing and identifying optimal AEPs/solutions are presented and described per ALL. Finally, chapter 4 summarizes the main conclusions and presents the way forward to the final phase of the ALL.

In this report, the terms "actors" and "stakeholders" are used interchangeably. Similarly, "agroecology strategies/solutions" and "agroecology practices/tools" are used synonymously.

2. Planning activities

This chapter details the midterm planning activities, including developing a stakeholder engagement plan and monitoring stakeholder participation in various Work Packages (WPs) and tasks related to ALLs activities.

2.1 Developing Multi-Stakeholder Engagement Plan

A Multi-Stakeholder Engagement Plan template (refer Annex Table A.1) was created for each ALL with relevant WPs. Its aim is to monitor and follow up stakeholder participation in activities/tasks coordinated by WP/task leaders. The framework plan is available in the CANALLS Repository on Google Drive link (https://drive.google.com/drive/folders/0AM4RVGmp7P1vUk9PVA). The designated WP/task leader was requested to enlist the activities/tasks to be completed, specify the implementation timeline (month) for each activity/task, identify the type of stakeholder group to be involved in each activity/task, and indicate the expected level of stakeholder engagement for each activity/task.

Moreover, the ALL coordinator in collaboration with their team members, submits a concise monthly report to the WP3 leader using a standard reporting template. The monthly report includes a description of the work done with good quality photos, key outputs/results achieved by engaging the different stakeholders at different levels (inform, consult, involve and cocreate/collaborate (Durham et al., 2014) and describing the challenges/risks encountered, and measure taken.

The common mode of stakeholder engagement was informing the stakeholders particularly the civil society group about completed and ongoing activities in the ALL. This included up to date communication and dissemination of information through printing and/or digital tools. Farmers, public extension workers and researchers were mostly involved in monitoring and testing of the different

AEPs in the ALL sites. Value chain actors and academic institutions were consulted to gather feedback (for e.g., regarding inputs supplies and developing training materials) thereby incorporate their considerations. Co-creation was a key mode of engagement when organising workshops for new initiatives/ideas/innovations and collaborations with some stakeholders on specific issues using the decision support tool developed by partner UHOH.

2.2 Monitoring ALL Stakeholders' Participation in the CANALLS project

All stakeholder groups in the 8 ALLs contributed to various work packages of the CANALLS project by participating in interviews, Focus Group Discussions (FGDs), workshops and other activities. Table 2 summarizes their participation from WP1 to WP7. Detailed information on stakeholder involvement in each ALL is provided in the next chapter.

Table 2: Overall engagement of ALL stakeholders in the different work package tasks and/or activities.

Work package title	Type of stakeholders	Type of activity participated by stakeholders
WP1: *Analysis of current situation and forest transition landscapes*	– Farmers, value chain actors, policy makers, local project partners	• Interviews and FGDs
WP2: *Co-development of methodologies, means & tools to support agroecological transitions*	– Farmers, value chain actors and other stakeholders	• Interviews (TAPE), FGDs
	– Agricultural advisors and farmers	• Online workshop (Decision Support Tools)
	– Farmers, advisors, value chain and policy actors	• Cocreation workshops to enhance demand for products
WP3: *Set up and operation of multi-actor agroecology living labs*	– Farmers, value chain actors and other stakeholders (incl. policy makers, advisors, etc.)	• Interviews & meetings to identify ALL stakeholders • Co-creation workshop that was organised in each ALL.
	– Stakeholders of the ALL	• Testing selected AEPs in the farmers' field context
	– ALL stakeholders in Ntui, ALL coordinators at the time of 5th project consortium meeting.	• Cross visit, knowledge exchange and stakeholder meeting
WP4: *Monitoring & evaluation of performance & impact of agroecological practices*	– farmers, value chain actors and project partners	• Longitudinal studies of farm activities • Gender sensitive survey:
	– farmers, advisors, researchers, civil society representatives, policy makers	• Interviews (women empowerment, youth employment, social inclusion):

	– farmers (adopters and non-adopters), women and youth, researchers, policy makers, advisors and local leaders.	• Multi-actor workshops: assess adoption likelihood
WP5: *Design fair, inclusive and sustainable business models*	– Farmers and consumers	• Market segmentation survey
	– Farmers, value chain actors, women groups, experts, policy makers, NGOs, advisors,	• Value propositions workshops:
	– Farmers and other stakeholders	• Multi-actor FGDs (agroecological business model innovation)
	– Farmers and value chain actors	• Support to markets
WP6: *Scaling innovations for agroecological transitions*	– Farm advisories, extensions services	• Training of Trainers workshops Organizational Qualitative Assessment Tool for Innovations:
	– Farm advisors, local partners	• Online introductory workshop & hands-on training on use of Decision Support Tools (DSTs)
	– Farmers, policy makers and value chain actors, etc.	• Collect feedback on the Practice Abstracts /Practical Replication Guid
WP7 : *Multi-actor dissemination, exploitation & communication*	– All stakeholders of the ALL	• Multi-actor dissemination and communication • Reporting on clustering activities • Initial network design • Digital workshop with key members of our ALLs: • Knowledge exchange amongst CANoLL members

3. Results and Achievements

This chapter provides a detailed description of stakeholder engagement in various work package activities, the results of co-creation activities, capacity building of partners and stakeholders, and results of the first round on AEPs tested in the ALLs sites.

3.1 Biega and Kabare ALLs: Coffee-based agroecological farming systems

Biega ALL is located in the tropical montane forest of Kahuzi-Biega National Park in South Kivu province of the Eastern DRC in Kalehe territory. Kabare ALL is also situated in South Kivu province in Kabare territory (Figure 4). The main objective of Biega and Kabare ALLs is to enhance the coffee-based farming systems by redesigning the systems according to ecological principles (Gliessman (2016). To accomplish this, potential combinations of agroecological practices (such as use of plant-based biopesticides, integrated application of organic and inorganic fertilizers, and intercropping with legumes and cover crops) are being tested in real-life conditions by involving multiple stakeholders.

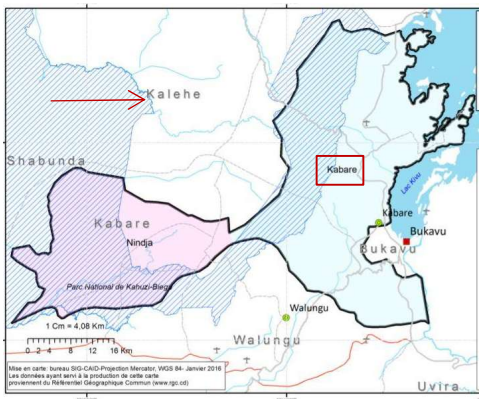

Figure 4: Location map of Biega and Kabare ALLs.

3.1.1 Stakeholder engagement in Work Package tasks

(i) Analysis of current situation and forest transition landscapes (WP1): Stakeholders in the Biega and Kabare ALLs participated in various activities of WP1 that includes surveys, interviews and FGDs. These stakeholders comprised of coffee farmers/cooperatives, research & academic institutions, media, local traders, processing company, exporters, government officials, and civil society. Additionally, policymakers were interviewed and participated in FGDs under Task 1.4 (i.e. investigation of policies for agroecological transitions).

(ii) Co-development of methodologies, means & tools to support agroecological transitions (WP2): Under this WP interviews were conducted on the design of the Tool for Agroecology Performance Evaluation (TAPE) developed by FAO (2019) with around 60 respondents. Coffee farmers, researchers, teachers, NGOs, cooperatives, policymakers, vendors, and civil society participated in these activities.

(iii) Set up and operation of multi-actor agroecology living labs (WP3): WP3 aims to develop ALLs by engaging multi-actor stakeholder communities in transdisciplinary agroecological research. The Biega and Kabare ALLs were established following interviews, meetings, and workshops with diverse stakeholders. In each living lab, there are now 20 members that represent different sectors from the

public, private, NGOs, civil society, and farmer organization including women. , Two cocreation workshops were held with 57 participants, The local partners collaborating on activities in both Biega and Kabare ALLs are GASD, APDIK, INERA, IITA-DRC, and UCB.

(iv) Monitoring and evaluation of performance and impact of agroecological practices (WP4): In collaboration with farmers, composite soil samples and biopesticide samples were collected at the field trial sites in Biega and Kabare ALLs for baseline information which was coordinated by partner ETHz team.

(v) Design fair, inclusive and sustainable business models (WP5): All stakeholders, including coffee farmers/cooperatives, research & academic institutions, media, local traders, processing company, exporters, government officials, and civil society participated in the market segmentation survey, in two value propositions workshops and Business Model Canvas in *Katana* and *Kabamba* sites of the ALLs.

(vi) Scaling innovations for agroecological transitions (WP6): The ALL coordinators attended a 5-day Training of Trainers workshop (‘*Participatory methods for advisory services in support of agroecological innovations’*) and cross visits organized by partner UHOH in Yaoundé, Cameroon. The ALLs team participated in the preparation of practice abstracts on the characterization of ALLs in Biega and Kabare. An online introductory workshop and hands-on training on the use of DSTs was conducted in the ALLs, where multiple stakeholders were attended.

(vii) Multi-actor dissemination, exploitation and communication (WP7): CANALLS project activities were broadcasted monthly via the local radio 'Maendeleo Radio' and published in local newspapers. We organized stakeholder meetings, created agroecology banners, provided photos, and facilitated meetings between farmer organization representatives and their members.

3.1.2 Co-creation activities result

Two co-creation workshops were organized in Biega and Kabare ALLs. All stakeholders attended the co-creation workshops where they identified three major challenges of the farming systems and selected combinations of AEPs for testing the trials. The trials for the Biega and Kabare ALLs were consolidated due to shared challenges, identical coffee-based farming systems, geographical proximity, and cost-efficiency considerations. A stepwise approach was used that consist of four steps (Figure 5).

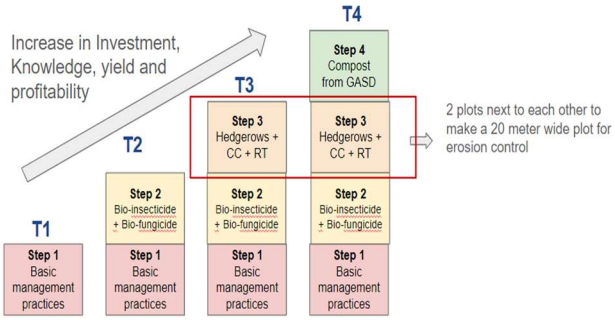

Figure 5: Stepwise research approach in Biega & Kabare ALL. CC: Cover Crop, RT: Reduce Tillage).

3.1.3 Capacity building of partners and stakeholders

Two training workshops on the value proposition and Business Model Canvas in Katana and Kabamba sites were organised by WP5 task leaders. The first workshop was held in June 2024 with 14 people (3 women and 11 men) and the second workshop in March 2025 with 11 people (3 women and 8 men).

In addition, a training workshop on agroecological practices was conducted in selected fields in Kabamba site.

Field trainings were conducted for partners and stakeholders of the LL on setting up agroecological experiments, coffee pruning and harvesting, field data collection, and producing low-cost local fertilizer and biopesticide. Capacity-building for farmer field schools is scheduled during Month 30 to Month 42. Meanwhile, several exposure visits, observations, and training workshops have been conducted.

3.1.4 Testing and identifying optimal agroecological practices

In Biega and Kabare ALLs, we conducted field trials at the first round of the experimentation using a step wise approach. These are plant-based bio-pesticides/bio-fungicides applications, erosion control measures using hedges, and organic fertilisers such as compost produced by partner GASD. The project areas in Kabare include six villages namely Katana (1 site); Kambamba (4 sites); Bushumba (2 sites); Luhihi (1 site); Mushweshwe (1 site); and Kajuchu (2 sites). In Biega, the four villages are Nyamukubi (4 sites); Rambira (1 site); Mwannda (2 sites); and Lushebere (2 sites).

(i) Bio-pesticides/ applications: Plant-based biopesticides (Tithonia spp.) were used to control insect pest infections in coffee plantations. The biopesticides are applied by spreading them on the leaves of coffee plants. Common insect pests include anthesis bugs and coffee berry borer. The percentage of plants attacked by pests and fungal growth is recorded through observation and leaf samples were analysed in the laboratory.

(ii) Erosion control measures*:* To reduce soil erosion, agroforestry trees with hedgerows (*Pennisetum purpureum*) and cover crops (*Mucuna pruriens)* were planted along the contour band.

(iii) Organic and inorganic fertilizers applications*:* For young coffee plant (1-2 years old), we applied 1-2 kg of compost per plant, while for coffee plant older than 3 years, we applied 2-3 kg of compost per plant per year combined with mineral fertilisers. The compost was distributed around the base of the coffee tree in prepared holes. The first application was done in March, with a second application in September. Additionally, banana leaves and grasses were added on top of the compost. Data collection included coffee growth, pest incidence, yield and soil analysis. Partner IITA-DRC is currently analysing the data collected from the Biega and Kabare ALL sites.

The main challenges in both ALLs are poor conditions of the road, heavy rainfall and conflict in Eastern DRC which have hindered access to field trial sites. The local facilitators used motorbikes to collect critical field data. The main planning activities till December 2025 include, among others:

i) analysing and interpreting the first round of trial results;

ii) organizing third co-creation workshop;

iii) implementation, and supervision of the second phase of trials;

iv) field data collection and analysis, and

v) writing and submission of progress reports (monthly and/or half yearly).

3.2: Bujumbura ALL: Maize-based agroecological farming systems

Bujumbura ALL is located in rural Bujumbura province and includes 20 stakeholders from various sectors. The aim is to transform maize-based agroecosystems by improving input efficiency and replacing conventional practices with agroecological alternatives such as sanitized human urine, plant-based biopesticides.

3.2.1: Stakeholder engagement in Work Package tasks

(i) Analysis of current situation and forest transition landscapes (WP1): Stakeholders of the ALL were engaged in household surveys and FGDs, organized by the task leaders. A total of three FGDs were conducted, with participation from 36 individuals. Additionally, a household survey was carried out involving 30 individuals, with over 50 percent of the respondents being women.

(ii) Co-development of methodologies & tools to support agroecological transitions (WP2): Farmers' cooperatives, researchers, extension services, administration, agro-dealers, and local partners participated in the TAPE online training organized by partner UCB. Interviews and FGDs included 62 respondents such as semi-commercial producers, subsistence producers affiliated and not affiliated with farmers' cooperatives. Partner UHOH conducted an online workshop on Decision Support Tools, and three living lab team members attended the training in person.

(iii) Set up and operation of multi-actor agroecology living labs (WP3): WP3 aims to create ALLs through multi-actor stakeholder communities in transdisciplinary research for agroecological transitions. The Bujumbura ALL was formed following interviews, meetings, and workshops with various stakeholders. It has 20 members representing different sectors from the public sector, private sector, NGOs, civil society, and farmer organizations. Among them are 7 women representatives. The project partners collaborating within the ALL include ISABU, IITA-Burundi, CAPAD, NATURLAND, University of Burundi, and NIBIO.

An initial stakeholder performance (including partners) was evaluated by attendance in meetings, advice/services provided, resource sharing, and field activity involvement. Most stakeholders showed medium to high participation in the project (refer Annex). To boost their engagement, maintain close communication, keep them updated on project progress, and actively involve them based on their capacity in a bottom-up approach.

(iv) Monitoring and evaluation of agroecological practices (WP4): Local partners, farmer cooperatives, and extension service providers participated in soil sample collection and field monitoring. Both male and female farmers, local administration, service providers, and traders assessed the potential adoption of the AEPs that are being tested in the ALL sites.

(v) Design fair, inclusive, and sustainable business models (WP5): A value proposition workshop was organized by partner Q-Plan, which included 11 stakeholders such as farmers' cooperatives and value chain actors like the Burundi Seed Producers Organization. The participants are engaged in activities such as the production of farmyard manures, biopesticides, and planting of agroforestry trees.

Additionally, a two-day workshop was conducted on sustainable business models for agroecological transition. In this workshop, there were 18 participants representing various organizations, including small farmers and cooperatives.

(vi) Scaling innovations for agroecological transitions (WP6): The ALL coordinator attended a 5-day Training of Trainers workshop on "*Participatory methods for advisory services in support of agroecological innovations*" and cross visits/mutual learning organized by partner UHOH in Yaoundé, Cameroon. The training used interactive methods, adult learning principles, a client-centred extension approach, and the AGRECO app developed by partner UHOH. Trainees received certificates of participation after evaluation. Apart from this, the ALL team contributed to the preparation of Practice Abstracts on the characterization of ALLs in Bujumbura. An online introductory workshop and hands-on training on the use of DSTs were conducted in the ALL, with multiple stakeholders present.

(vii) Multi-actor dissemination, exploitation and communication (WP7): Under WP7, the ALL stakeholders and local partners facilitate meetings between farmer organization representatives and their members.

3.2.2: Co-creation activities result

During the two co-creation workshops held in Bujumbura, three main challenges of maize-based farming systems were identified and described. These are low soil fertility; pest and diseases and limited access to quality seeds. To address these challenges, combinations of AEPs were proposed that include:

- Use of sanitised human urine and farmyard manure to improve soil fertility by integrating livestock into the farming system.
- Apply plant-based biopesticides such as Neem leaves (*Azadirachta indica*) to control disease and pests such as Fall Army Worm.
- Use of improved quality seeds of maize (variety PAN 53) and improved soybeans (variety PEKA 6).

3.2.3: Capacity building of partners and stakeholders

A farmer field day was held at the experimental site in *Maramvya* in Bujumbura ALL. Twenty-nine participants from farmers, local officials, extension providers, researchers, and partner CAPAD attended the field day event. In addition, a 2-day field visit at the *Maramvya* and *Rubirizi* experimental sites were organized to assess the tested AEPs. A participatory approach was used to compare the performance of various experimental plots in qualitative terms. We used coloured voting cards to capture participants' perceptions on certain parameters like crop yield. The green card indicates the highest-rated plot, the blue card represents the averagely rated plot, and the black card signifies the lowest-rated plot. Farmers reported that plots treated with undiluted human urine outperformed others. Human urine can aid in the restoration of soil fertility. Fall Armyworm appeared in some plots, and its impact was minimal. Neem is effective in combating the fall armyworm.

Farmers have received training on preparing, storing and applying sanitized human urine as a biofertilizer and Neem leaves as a biopesticide. Additional capacity-building activities are scheduled from Month 30 to Month 42, that include field schools, workshops, peer-to-peer learning, mentoring, and dissemination of educational materials in local languages.

3.2.4: Testing and identifying optimal agroecological practices

A split plot design was employed with plant-based biopesticide/synthetic pesticide as the main factor and sanitized human urine as the sub factor (Table 3). There were 10 treatments and six replications i.e., three each at *Maramvya* and *Rubirizi* trial sites. The size of trial plots was 6 m by 8 m (48m^2). There were 10 rows of maize per plot, with 2 rows of soybeans between two consecutive rows of maize. The spacing of maize seed (Maize PAN 53) was 80 cm between row and 50 cm between plants. Improved soybean PEKA 6 was intercropped with maize. The harvest box (4m x 4.8m = 19.2 m^2) was used to collect data related to crop yield, pest incidences, etc. Farmyard manure was applied on average rate 10 tons/ha (Moussa et al., 2021).

Table 3: Split plot design with treatments in maize-bean intercropping systems at Bujumbura ALL sites.

Treatment (code)	Main factor	Sub factor
	Plant based biopesticide & synthetic pesticide	**Sanitized human urine (as soil fertilizer)**
Ts0	Synthetic pesticide -Orthene	No urine
Tsu1	Synthetic pesticide- Orthene	Urine (17.76 liters per application; 2 applications)
Tsu1/1	Synthetic pesticide- Orthene	Diluted urine 1:1
Tsu1/2	Synthetic pesticide- Orthene	Diluted urine 1:2
Ts1/3	Synthetic pesticide- Orthene	Diluted urine 1:3
Tb0	Biopesticide- Neem	No urine
Tbu	Biopesticide- Neem	Urine (17.76 liters per application; 2 applications)
Tbu1/1	Biopesticide-Neem	Diluted urine 1:1
Tbu1/2	Biopesticide-Neem	Diluted urine 1:2
Tbu1/3	Biopesticide- Neem	Diluted urine 1:3

T : treatment, s: synthetic pesticide, b: biopesticides

(i) Applications of Bio-pesticides/Bio-fungicides: Neem leaves were collected from nearby agricultural fields and gently crushed, followed by mixing with water in a container. The mixture was allowed to settle for a minimum of 12 hours. The application rate for each plot was determined based on the utilization of 80 kg of Neem biomass combined with 250 liters of water per hectare. To ensure farmers have adequate supplies, Neem must be widely propagated as it is currently scarce in the area.

(ii) Sanitized Human Urine for Fertilizing Soils: Human urine collection materials were distributed to participating farmers, who installed various collection units with capacities of plastic jerrycans with 3 and 20 litres, each equipped with a 1-meter hose. The urine was stored in a closed container for 3-

4 weeks to allow for natural pathogen die-off, ensuring sanitation. Subsequently, 1 litre of sanitized human urine, containing approximately 1,5 grams of nitrogen, was applied to a maize plant. The application rate for each plot was determined based on 37,5kg N/ha, and it was applied twice during the cropping season. Sanitized human urine was first applied at planting time and again six weeks later.

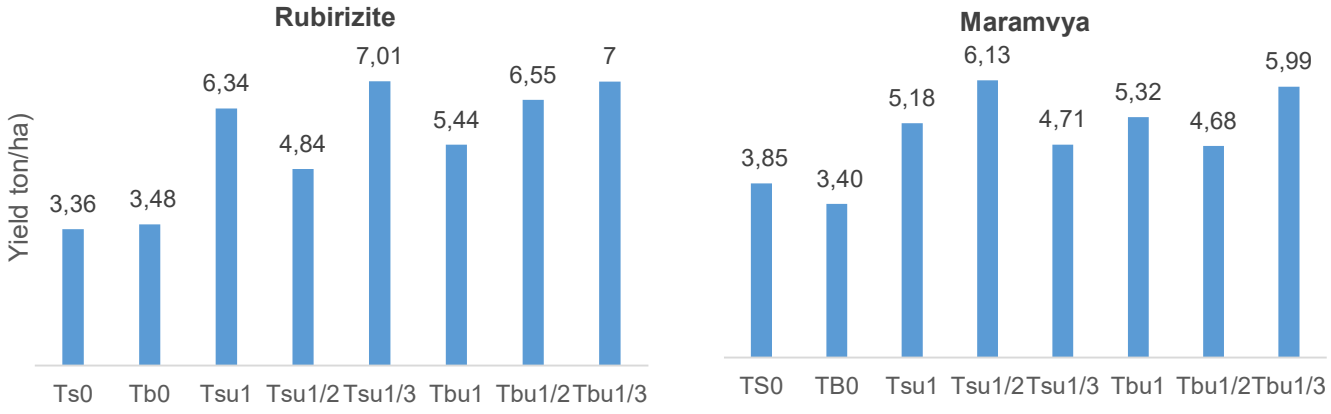

Figure 6: Effect of biopesticides and sanitised human urine on two sites of the Bujumbura ALL: Rubirizite and Maramvya.

Preliminary results indicated that maize yield at the Maramvya site ranged from 3.4 to 6.13 tons per hectare. The highest yield (6.13 tons/ha was achieved in treatment plots utilizing synthetic pesticides combined with diluted urine at a ratio of 1:2. At the Rubirizite site, maize yield varied from 3.36 to 7.01 tons/ha, with the highest yield achieved using diluted urine at a ratio of 1:3 (Figure 6). In both locations, sanitized human urine boosted maize yields.

In Bujumbura ALL, the main challenge encountered was delayed rains followed by heavy rainfall, which flooded the maize fields and resulted in lower yields compared to other trials. Heavy rains after sowing soybean reduced the germination rate and growth of the crop. Furthermore, the absence of a suitable dryer for plant samples has extended the drying time. Additionally, extension workers are not yet familiar with the new technology involving Neem leaves as biopesticides and sanitized human urine as soil fertilizer. Measures to address the mentioned challenges include planting early maturing seeds, providing dryers, and promoting Neem production and organising customized trainings for stakeholders including extension workers.

The action plan until December 2025 includes, among others:

- Finalizing the first-round trial results;
- Organizing the third co-creation workshop;
- Installing new human urine collection systems;
- Meeting with partners and stakeholders to set up the second round of trials; and
- Conducting field monitoring (management, sampling, measurements)

3.3 Bunia ALL: Cocoa-based agroecological farming systems

Bunia ALL is found in Mambasa territory, Ituri Province of Eastern DRC. According to WRB (2015), the dominant soils in the area are Ferrallisols, which are red or yellow, highly weathered soils with low nutrient retention, and covered by dense secondary forest, wooded savannah, and grassland. The farming systems is characterised by mix of cocoa with banana and palm oil with rice and maize. Bunia ALL aims to boost cocoa farming through better input efficiency and market access by building on the existing USAID-funded Shade-Grown Cocoa project. No new AEPs were introduced at the Bunia ALL site.

3.3.1: Stakeholder engagement in WP tasks

(i) Analysis of current situation and forest transition landscapes (WP1): Stakeholders in the Bunia ALL participated in various activities of WP1 such as interviews (n = 23) and in 2 FGDs (n = 43). Additionally, policymakers were interviewed and participated in FGDs under Task 1.4 (investigation of policies, systemic factors, trade-offs and synergies for agroecological transitions).

(ii) Co-development of methodologies, means & tools to support agroecological transitions (WP2): Partner UCB supervised the pretesting of the TAPE tool multiple times on cocoa farms, ensuring data quality before transferring it to the ONA server. Six enumerators were trained in using the TAPE tool with ODK/KOBO as the data platform, focusing on three types of cocoa farmers.

(iii) Set up and operation of multi-actor agroecology living labs(WP3): The Bunia ALL was established after interviews, meetings, and workshops with diverse stakeholders. The ALL consists of 20 stakeholders from various sectors, including public, private, farmer cooperatives namely UPCCO (3000+ members) and Cacao Okapi (400+ members), NGOs, and civil society. It is supported by partners RIKOLTO, IITA- DRC, UCB, and ETHz. ,

(iv) Monitoring and evaluation of performance and impactof of agroecological practices (WP4): Soil and biopesticide samples were collected in collaboration with farmers and coordinated by the partner ETHz team.

(v) Design fair, inclusive and sustainable business models (WP5): Eleven representatives from various stakeholder groups participated in market segment surveys and Value Proposition (VP) workshops at Mambasa. They developed seven value propositions for organic cocoa in the DRC using the Business Model Canvas (BMC) as facilitated by partner AFAAS. These VPs are :

- High-quality, unique Congolese cocoa;
- Sustainably sourced and ethically traded cocoa;
- Organic and chemical-free cocoa;
- Empowering local communities and farmer cooperatives:
- Traceability and transparency from farm to market;
- Low carbon cocoa; and

- Compliance with EU deforestation regulation

FGDs were organized in Bunia/Mambasa with 15 stakeholders. The themes included Business Model Innovation, VP feasibility, and sustainable Business Models using economic, social, and environmental layers. Survey data were collected using ODK from 34 stakeholders. An online survey assessed consumer attitudes towards products from sustainable AEPs in Bunia/Mambasa, involving 50 stakeholders (23 female, 27 male).

(vi) Scaling innovations for agroecological transitions (WP6): Two team members of Bunia ALL attended a five-day Training of Trainers workshop titled "Participatory Methods for Advisory Services in Support of Agroecological Innovations" and participated in cross visits organized by UHOH in Yaoundé, Cameroon. The ALL team contributed to the preparation of Practice Abstracts on the characterization of ALLs in Bunia. Additionally, an online introductory workshop and hands-on training session on the use of DSTs was conducted within ALLs, with multiple stakeholders in attendance.

(vii) Multi-actor dissemination, exploitation and communication (WP7): Under task 7.4, Partner RIKOLTO participated in the first online workshop organised by partner IITA-Cameroon regarding Central and Eastern African Network of Agroecology Living Labs (CANoLL) network design and Knowledge exchange amongst CANoLL members.

3.3.2: Capacity building of partners and stakeholders

In collaboration with IITA-DRC staff, we produced a training manual on good agricultural practices for farmers in Mambasa as part of the USAID-funded shade-grown cocoa project. We used the manual to train farmers, local agronomists, and extension staff for e.g. on grafting (Figure 7).

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Figure 7: Field demonstration as practical training on grafting techniques of cocoa tree.

The training aims to increase the cocoa yield while reducing the pressure on the forest. The growers must be able to regularly prune the cocoa trees, control the different diseases and sort the good pods to

increase the yield, volume and quality. It is very important that cocoa growers maintain their fields well to have the right cocoa calibre.

The primary challenges in Bunia ALL include a lack of knowledge and awareness about agroecology, good agricultural practices, and incidence of pests and diseases. Enhancing stakeholder understanding through training and capacity-building activities on effective agricultural practices can address these challenges.

Action plan up to December 2025 include:

- Attend case country CANALLS project workshop in DRC for knowledge and experience sharing;
- Validate the TAPE results;
- Coordinate cross-visits and mutual learning events among ALLs;
- Monitor existing cocoa farming practices;
- Organize stakeholder workshops for result sharing and discussions; and
- Engage stakeholders in project activities.

3.4: Giheta ALL: Coffee-based agroecological farming systems

Giheta ALL is found in Giheta Commune, located north of Gitega province in central Burundi. In Giheta ALL, there are 20 stakeholders that represent different sectors from the public, private, farmer organization, NGOs and civil society. Women farmers constitute about 30 percent of the members of stakeholders in the ALL. The partners supporting the activities in the ALL are University of Burundi, COCOCA, NATURLAND, ISABU and IITA- Burundi. The main objective is to promote local commercialization of organic products such as beans using Participatory Guarantee Systems (PGSs). Partner NATURLAND has certified all coffee systems in Giheta.

PGSs are locally based quality assurance systems for agricultural products that certify producers based on active participation of stakeholders who are built upon a foundation of trust, social networks and knowledge exchange. They are increasingly seen as an alternative to third-party certifications, especially for organic farms, but also for other farming systems, Source: IFOAM

3.4.1: Stakeholder engagement in Work Package tasks

We use ALL's approach to engage farmers, cooperatives, value chain actors, government and research institutions, NGOs, and civil society in transitioning to organic coffee and other agricultural production.

(i) Analysis of current situation and forest transition landscapes (WP1): Policymakers, researchers, and farmers participated in a multi-actor FGD to gather varied perspectives on agroecological transitions. The stakeholders analysed how land use, yield variability, and market access affect the performance of agroecological systems. The FGD provided insights into the trade-

offs, synergies, and key barriers impacting organic certification and agroecological practices suited to the environmental and socio-economic context of the area. Several cooperatives still depend on conventional certification systems that do not fully incorporate local knowledge. Current practices often result in fragmented data and inconsistent documentation, complicating the tracking of agroecological initiatives' progress. For example, traditional farm records are cumbersome and not available in digital form.

Systemic hindrances to organic agriculture transitions include: i) unclear guidelines and incentives, ii) insufficient financial support, iii) lack of traceability and transparency issues, and iv) regulatory inconsistencies. Solutions suggested by stakeholders include: i) a localized certification system with clear digital documentation, ii) financial incentives like biodiversity credits and eco-labels to improve market access, and iii) using digital tools for better traceability. These findings have been described in detail in Deliverable 1.1 which was submitted and approved in the first term of the project.

(ii) Co-development of methodologies, means & tools to support agroecological transitions (WP2): A workshop held in June 2024 involved farmers and technical experts who made inventory data, including inputs and yield records, establishing a baseline for further data analysis. The workshop clarified data collection expectations and set the foundation for developing analytical models to improve resource allocation in the future. Local partners attended the TAPE training hosted by UCB online.

(iii) Set up and operation of multi-actor agroecology living labs (WP3): In August 2024, a two-day training workshop on PGS using the Kilimohai certification procedures, was held at the Living Lab in Giheta. This training was designed and facilitated by experts, and it was attended by 25 participants representing farmers cooperatives (*Nyarunazi* and *Mboneramiryango*), local administration officials, and research institutions. During the workshop, participants learned about organic guaranteed systems, the PGS concept, and the organizational structures needed for certifications. Regular stakeholder meetings (both online and in person) and monthly reporting that includes modes of engagement (from informing stakeholders about project updates to involving them in decision-making processes) were implemented to follow up on stakeholder activities. These communication channels have facilitated a continuous flow of information between the project team and the local community.

Figure 8*:* Training workshop on PGS in Giheta ALL, August 2024, Burundi.

The Burundi Organic Agriculture Movement (BOAM) owns the Kilimohai trading brand in Burundi. Supported by ALL, the cooperatives Nyarunazi (Commune Rutegama) and Mboneramiryango (Commune Giheta) received technical assistance for PGS certification. A workshop on 14-15 February trained 20 farmers, administration representatives, and researchers on PGS certification, organic agriculture standards, agroecological practices, documentation, traceability, and social justice principles. The cooperatives were prepared to start the organic certification process through PGS, with a focus on compliance with East African Organic Products Standards. They already export certified organic coffee grown alongside food crops, avoiding a conversion period.

(iv) Monitoring and Evaluation of Performance and Impact of Agroecological Practices(WP4): The stakeholders in the Living Lab have participated in longitudinal studies of farm activities, such as soil sampling and field monitoring, coordinated by project partner ETHz. The objective was to compare soil fertility conditions with coffee-based agroecological farming systems at the DRC Living Lab sites in Kabare and Biega ALL.

(v) Design fair, inclusive and sustainable business models (WP5): In November 2024, collaborative workshops were conducted to design sustainable business models and develop value propositions for agroecological products such as coffee. These workshops enabled stakeholders to understand market dynamics, enhance branding, and identify key strategies for accessing local and export markets.

(vi) Scaling innovations for agroecological transitions (WP6): The team in Giheta participated in the preparation of practice abstracts on the characterization of ALL in Giheta. An online introductory workshop and hands-on training on the use of DSTs was conducted in Giheta ALL, where multiple stakeholders were present.

(vii) Multi-actor dissemination, exploitation and communication (WP7): WP7 has supported the exchange of best practices and lessons learned among different ALLs within the CANALLS project. Through online project meetings (as noted in the December 2024 presentation), the Giheta team shared updates, difficulties, and innovative approaches with the project partners.

3.4.2: Capacity building of partners and stakeholders

The first capacity-building round in Giheta ALL focused on equipping partners with the skills needed to shift from conventional to organic farming, emphasizing PGS for certification. The University of Burundi led these initiatives, supported by NATURLAND and NIBIO. In August 2024, a two-day intensive training on PGS was held with 25 participants, covering several critical areas (Figure 9 and Table 4).

Table 4: Topics covered during PGS training at Giheta ALL.

Topics	Descriptions
Organic Guarantee Systems	• an introductory session highlighted the importance of organic guaranteed systems in building consumer trust and ensuring compliance with organic standards
Concept & Principles of PGS	• the participants were guided through the fundamental principles of PGS, including the 11 core elements and the six defining features of an effective PGS. The training emphasized how PGS can stimulate local market development and reduce reliance on costly third-party certification
PGS Structures & Committees	• practical sessions delved into the organizational structures for successful PGS implementation. Participants discussed forming various committees including peer review, marketing, training, disciplinary, and welfare committees to manage the certification process. The structure was designed to be scalable, with each committee representing a segment of the cooperative and eventually being replicated at the cluster level
Certification Process & Documentation	• comprehensive guidance was provided on the certification process, including the requirements under the East African Organic Products Standards. The training covered key topics such as traceability, documentation, and compliance with social justice principles in organic farming
Developing Action Plans	• participants drafted action plans for the respective cooperatives where milestones were defined. The actions include submitting cooperative members list, collecting production data, obtaining certification details from BOAM, and scheduling field visits.

The PGS training yielded several outcomes:

- *Knowledge and Capacity Building:* At least 25 participants, including farmers, administrative representatives, and researchers, gained a clear understanding of the PGS process and organic certification requirements, appreciating the clarity on documentation, traceability, and compliance steps.
- *Establishment of Organizational Structures:* The training established a formal PGS structure within cooperatives, with steering committee members supporting internal monitoring and certification, facilitating smoother certification, trust-based monitoring, stronger farmer-buyer relationships, and community-driven development.
- *Enhanced Decision-Making Capacity:* Capacity-building efforts increased technical knowledge and confidence among local stakeholders, giving farmers a clearer vision for transitioning to organic practices.

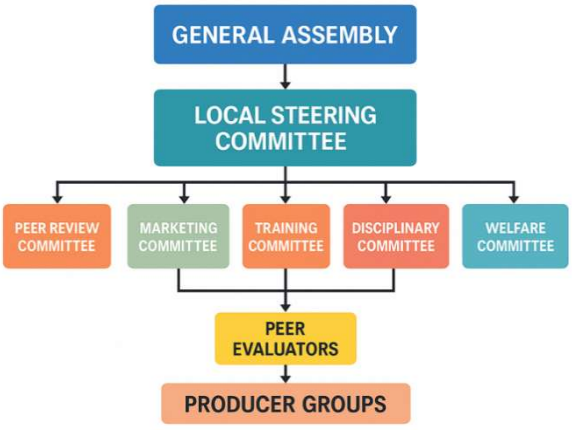

Figure 9: Organizational structure for establishing PGS.

- *Increased Awareness and Motivation:* PGS trainings and stakeholder meetings raised awareness of agroecological benefits, motivating exploration of market opportunities for organic products, especially coffee, which holds potential for organic certification.

Challenges and possible measures: While PGS offers benefits, challenges include supply issues and marketing difficulties. Farmers struggle to find quality seeds and organic inputs, hindering sustainable practices. Transportation and logistics also limit market access, affecting organic product profitability like coffee. Giheta ALL has advanced in engaging stakeholders and building local partners' capacity, fostering trust among them. The CANALLS project supported organic certification via PGS, driven by the ALL-community's collaboration, paving the way for sustainable coffee-based agroecological farming in Giheta.

The action plan for Giheta ALL up to December 2025 includes: PGS pre-auditing, report of the pre-audit findings, site visit, and writing report along with gap analysis.

3.5: Kamonyi ALL: Cassava-based agroecological farming systems

Kamonyi ALL site is located in the Kamonyi district, which is one of the eight districts in the Southern Province of Rwanda. It consists of 12 sectors[1]. In Kamonyi ALL, there are 26 stakeholders representing various organizations such as public, private, farmer organizations, NGOs, and civil society. Local project partners supporting the activities in the ALL are RAB, IITA-Rwanda, COPED, and Magot farm. The primary goal of Kamonyi ALL is to transform cassava-based agroecosystems from increased efficiency (level 1) to redesign of the agroecosystem based on ecological processes (level 3). The tested AEPs combinations included bio-pesticides/fungicides, erosion control, and organic/inorganic fertilizers.

3.5.1: Stakeholder engagement in Work Package tasks

At Kamonyi ALL, we have engaged stakeholders throughout the CANALLs project. We identified key stakeholders from various sectors: government, research, academia, NGOs, farmers' organizations, civil society, media, farmers, private organizations, and companies. These entities nominated representatives to join Kamonyi ALL and participate in various activities of the project. Below is a summary of stakeholder contributions to various project work packages:

(i) Analysis of current situation and forest transition landscapes (WP1): A total of 25 farmers, 11 value chain actors, and various government officials were engaged in focus group discussions and household surveys organized by WP1 task leaders concerning current farming practices and the agroecological transition.

(ii) Co-development of methodologies, means & tools to support agroecological transitions (WP2): On February 6-7, 2025, stakeholders co-designed services and marketing tools to boost demand for agroecological food products at the living lab (Figure 10). Participants ranked services by importance and implementation status. The services included processing cassava flour for desired attributes, selecting suitable varieties (cassava, legumes/beans, soybeans), ensuring consistent supply with long

[1] *Sector is a third-level administrative subdivision in Rwanda, like a subdistrict.*

storage varieties, flexible harvesting schedules, taste of fresh cassava roots, competitive pricing for low-income consumers, appealing flavour, attractive packaging for urban consumers, and diversified formats.

Participants have identified and recommended additional actions to be considered during implementation to improve the service's effectiveness. These include investing in processing, reinforcing seed multiplication and supply, improving infrastructures, training farmers in agroecology practices, promoting agroecology products, and establishing standards and prices for agroecology products. The photo below shows the stakeholders' participation in this task. Local partners participated the TAPE online training organised by partner UCB.

Figure 10: Kamonyi ALL stakeholder meeting regarding demand for agroecological food **products.**

(iii) Set up and operation of multi-actor agroecology living labs (WP3): Within this work package, stakeholders were engaged in the collaborative development of the living lab by identifying issues, proposing potential solutions, and devising implementation strategies. Additionally, they participated in field testing and evaluating selected agroecological practices within the living lab.

In Kamonyi ALL, an initial stakeholder performance was evaluated based on meeting attendance, advice/services provided, resource sharing, and field activity involvement. Many of the stakeholders demonstrated high levels of participation, with only a few exhibiting medium levels of involvement (refer Annex). To enhance their engagement, increased communication and information sharing via a WhatsApp group, were proposed.

(iv) Monitoring and evaluation of performance and impact of agroecological practices (WP4): Stakeholders analyzed the adoption potential of agroecology practices and products at a workshop held from December 12 to 13, organized by Kamonyi Living Lab and local partners (Figure 11). The workshop brought together 36 representatives to discuss intercropping cassava-legumes and combining soil erosion techniques with organic manures in Kamonyi. The QATOCA approach was used for qualitative assessment. The analysis has found that the likelihood of adopting intercrops in Kamonyi was 84.5%, while the adoption of erosion control and organic manure practices was 83%. Participants discussed and evaluated hindering and driving factors for these agroecology practices, providing reasons and solutions for the top three hindering factors. The photo below shows stakeholder participation during QATOCA.

Figure 11: Kamonyi ALL stakeholders' view of Agroecology.

(iv) Design fair, inclusive and sustainable business models (WP5): Under this workshop, stakeholders of Kamonyi Living Lab participated in the value proposition workshop conducted on 17th and 18th October 2024 during which a CANVAS business model was developed for identified agroecological practices and products around Cassava crop. The Coordinator of Kamonyi living lab together with the representative from IITA explained the methodology to use to propose the value for agroecological practices and products in Kamonyi living lab. Thereafter, participants discussed and identified one practice and five products for which to propose and allocate finetuned values. The five identified products based on cassava during the workshop are described in the Table 5 below.

Table 5: Cassava products and their brief description.

Type of products	Descriptions
Cassava cuttings	Cassava producers buy disease-free cuttings at the start of the growing season. Farmers, especially from Kamonyi living lab, will sell these disease-resistant cuttings to others. Regulatory bodies like RICA and RAB issue certificates to recognized seed dealers. The living lab members plan to register as seed dealers and participate actively in selling cassava cuttings.
Cassava tubers and cassava flour	Kamonyi living lab hosts cassava processing plants that purchase tubers from farmers and produce flour.
Cassava leaves	Women proposed this product, stating that harvesting leaves along with tubers provides additional income, contrary to men's opposition. One woman even sells cassava leaves. The group agreed to include this product in the agroecological practice of the living lab.
Cassava-legumes intercrops fertilized with manure	Members of the living lab plan to recommend growing cassava and beans together with manure treatment, following agroecological practices. This common method will be enhanced by technical contributions from the CANALLs project.
Cassava peels:	A Kamonyi living lab member uses peels to create animal feed, providing farmers with a new product.

(vi) Scaling innovations for agroecological transitions (WP6): A team member from Kamonyi ALL attended a five-day Training of Trainers workshop on "Participatory Methods for Advisory Services in

Support of Agroecological Innovations," organized by UHOH in Yaoundé, Cameroon. The ALL team also prepared Practice Abstracts about ALLs in Kamonyi and conducted an online DSTs training session with multiple stakeholders.

(vii) Multi-actor dissemination, exploitation and communication (WP7): Stakeholders from media produced and broadcasted radio messages on agroecology practices in Kamonyi Living Lab. They also shared these messages on social media like Twitter and institutional websites. Below are the links of the produced radio messages. 15/10/2024, 15:28] Florentine- Huguka Mukarubayiza: https://youtu.be/KckLy66ogBY?si=3F7WSn2rC8wAMeca and [13/11/2024, 15:43] Florentine- Huguka Mukarubayiza: https://youtu.be/L1U8HCft80c

3.5.2: Co-creation activities result

We held two workshops with stakeholders to address challenges in Kamonyi Living Lab and brainstorm potential solutions. The first workshop on December 5-6, 2023, covered the agroecological project concept, co-creation process, objectives, and key challenges for sustainable agriculture. The second workshop on February 20, 2024, focused on prototyping agroecological solutions for implementation.

The workshops resulted in several outcomes: (1) stakeholders gained knowledge on the concept of agroecology, (2) a methodology for co-creation was developed, (3) the living lab platform was established, (4) agroecological practices to be tested were selected, and (5) roles and responsibilities of partners in the project activities, including field experiments, were defined. Below are some photos related to the two events (Figure 12).

Figure 12: Field observation for site selection of the experimental trials in Kamonyi ALL.

3.5.3: Capacity building of partners and stakeholders

Capacity-building for farmers' field schools is planned from Month 30 to Month 42. Several exposure visits, observations, and workshops have been conducted. Under task 3.4, we conducted two on site FGDs with local farmers, different field visits together with stakeholders to identify the site for experimental plots establishment. We have also conducted a workshop for the mid-term evaluation of the seasonal experiment and field day to exchange ideas from stakeholders and get their views and perceptions in relation to the practices planned for the experimentation. As results from this field day, we collected helpful information from local farmers that helped to identify sites to host the agroecology experiments. During the field day, stakeholders shared their insights about the ongoing trials, provide the recommendations that helped to design the protocol of the subsequent season (season 2025 B) especially for the rotation plan. Below are some of the photos of the field visits and FGD related to this activity.

3.5.4: Testing and identifying optimal agroecological practices

In Kamonyi ALL sites, a Randomized Complete Block Design (RCBD) was utilized for two experiments. Experiment 1 involved intercropping cassava with soyabean using various planting configurations, and Experiment 2 focused on soil erosion control practices (i.e. ditches) with intercropping of cassava with soyabean. Monocropping served as the control plot in both experiments. Soil samples were collected at the start of the experiment set up within the blocks at 0-20 and 20-50 cm of depth (Table 6).

Table 6: Description of field experiments in Kamonyi ALL site in the first season.

Particulars	**Experiment 1:** Intercropping cassava-soya bean	**Experiment 2:** Soil erosion control combination practices
Treatment (T)	T1: Sole cassava farmer practice T2: Sole soyabean farmer practice T3: Cassava + Soyabean* (1+1 juxtaposed rows) T4: Cassava + Soyabean (1+2 juxtaposed rows)	T1: Monocrop cassava T2: Ditches + Monocrop cassava T3: Ditches + Intercrop (cassava + soybean) T4: Ditches + Intercrop + manure
Replications	5	3
Plot size	$20m^2$	$60m^2$
Data collection	Cassava height, diameter, soyabeans yield and soil chemical and physical properties	Soil loss, crop growth parameters, yield, soil chemical and physical properties

*soyabean is rotated with maize in the second season

During the time of harvesting soyabeans, soil samples were also collected from each experimental plot at the same depth. Agronomic parameters were collected from the crops grown, and soil loss measurements were taken. Data collected from the first cropping season are being analysed and interpreted. Below are photos illustrating the field experimental sites (Figure 13).

Figure 13: Field experiments in Kamonyi ALL sites.

Extreme climate conditions, such as drought, have impacted the start of crop seasonal activities. The soybean intercropped with cassava was affected by drought and did not produce a yield. The silt fence for soil erosion control was delayed but has now been expedited.

The action plan up to December 2025 include:

- Collecting agronomic data, analyse the results and write up a report;
- Continuous collection data on soil erosion;
- Analysis of soil samples and their interpretation;
- Organizing third Co-creation workshop;
- Organizing mutual learning events and cross visit activities;
- Training workshop with farm advisors using the application of OCATI tools; and
- Stakeholders meeting for results sharing and discussion.

3.6: Ntui ALL: Cocoa-based agroecological farming systems

Ntui ALL is located in the Central region of Cameroon within the Ntui subdivision, which spans between 4°20' and 5°00' North and between 11°29' and 11°47' East. It lies at the intersection of three agroecological zones: the humid forest area with a bimodal rainfall pattern, the high Guinean savannah, and the western highlands agroecological zones. The ALL sites include the predominant forest in the north, savannah in the southeast, and a savannah-forest transition in the southwest of the Ntui district. Ntui ALL aims to upgrade cacao agroecosystems to level 2, where conventional inputs are replaced with agroecological alternatives.

3.6.1: Stakeholder engagement in Work Package tasks

(i) Analysis of current situation and forest transition landscapes (WP1): WP1 aimed to analyse the needs, contexts, and practices of rural communities in Ntui ALL, along with mapping food systems, value chains, and markets for agroecological products. Three FGDs were held in Ehondo, Koussé, and Nguila villages, involving 29 farmers (30% women), mostly cocoa growers. IITA-Cameroon conducted a household survey with local partners (IRAD, SCOOPMAN, CAMFASS) and stakeholders in Ntui ALL, interviewing 30 households across 12 villages (37% women, 67% men). Decision-makers (including village chiefs) were interviewed and traders based on operational areas for complete representation.

(ii) Co-development of methodologies, means & tools to support agroecological transitions (WP2): The aims of WP2 are to develop a methodology for co-creating optimal combinations of agroecological practices; to create an agroecology assessment framework specific to farming systems in the African humid tropics; and to establish support tools and services that facilitate agroecological transitions and enhance market access. A representative sample of 60 farmer producers was identified from the three project areas, followed by a household survey to evaluate the agroecological transition in Ntui using FAO's TAPE tool . Initial findings indicate that enhancements are necessary in agroecology practices, particularly concerning diversity, synergies, efficiency, recycling, and resilience (Figure 14). The cocreation and knowledge sharing aspects of agroecology emerged as notable strengths in Ntui.

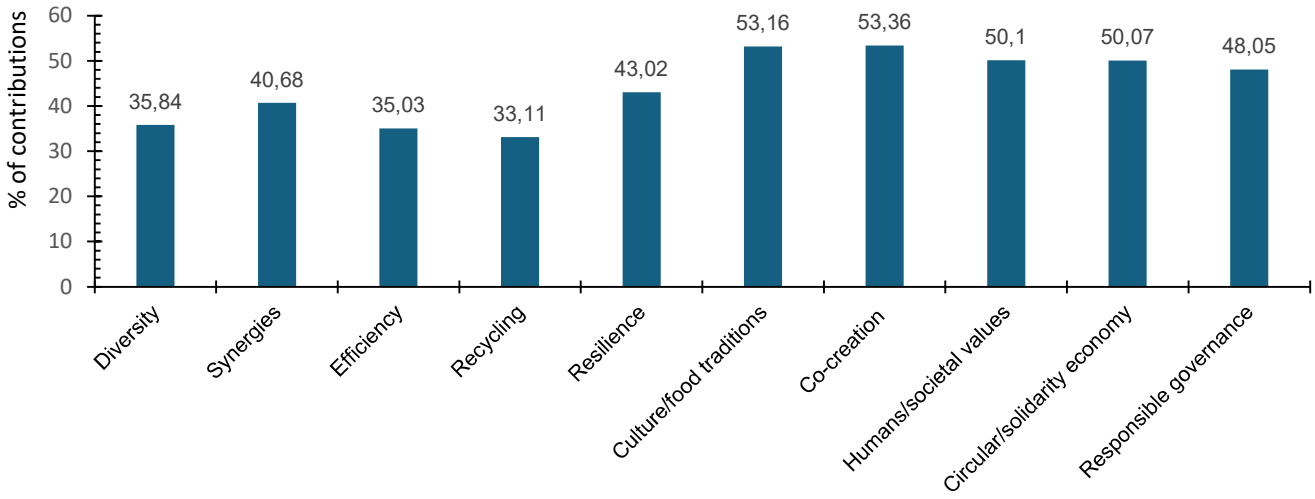

Figure 14: Agroecology elements covered by current farming practices at the Ntui ALL site.

The development of the DST occurred in three phases: design, prototyping, and validation. Simultaneously, agroecological practices were co-created at the Ntui ALL, which was later involved as a DST pilot. During the design phase, user needs were identified through inputs from various users, including national teams and agricultural advisory services. Partner UHOH conducted 11 interviews with researchers, project managers, extension agents, and IT developers. A review of existing digital tools and an initial evaluation with end-users were also completed. The evaluation was conducted

through fieldwork at Ntui ALL, involving ten extension agents participating in a workshop organized by IITA, IRAD, and SCOOPMAN.

(iii) Set up and operation of multi-actor agroecology living labs(WP3): WP3 aims to create ALLs through multi-actor stakeholder communities in transdisciplinary research for agroecological transitions. The Ntui ALL was founded after interviews, meetings, and workshops with 40 stakeholders. It now has 26 members that represent different sectors from the public, private, NGOs, civil society, and farmer organization including seven women, mainly farmers (Figure 15). Ntui ALL is coordinated by partner IRAD and supported by local project partners IITA-Cameroon, CAMFASS, SCOOPMAN, CIRAD-Cameroon and NIBIO which is leading WP3. A half-day stakeholder workshop was organized by NIBIO in collaboration with the ALL team in Yaoundé as a side event during the annual consortium meeting held in 26-28 May 2025. The workshop had over 30 participants representing Ntui ALL stakeholders. The workshop concludes with an action plan to enhance stakeholder participation, which will be closely monitored.

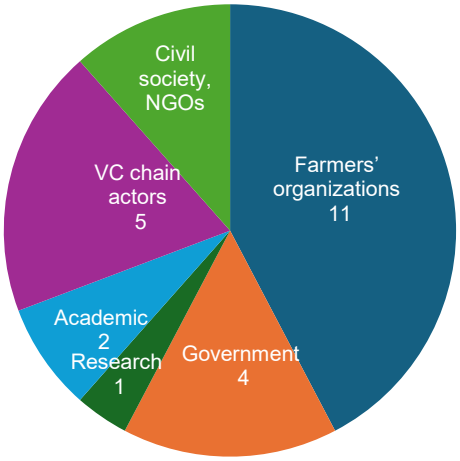

Figure 15: Composition of the different types of stakeholders in

(iv) Monitoring and evaluation of performance and impact of agroecological practices (WP4): WP4 aims to evaluate the environmental and socio-economic performance of implemented agroecological practices, measure changes in perceptions and behaviours among farmers, value chain actors, and stakeholders, and assess the adoption potential of agroecological practices by identifying the drivers and barriers for scaling up. In Ntui ALL, monitoring of AEPs, such as bio-pesticides/bio-fungicides applications, improved tree shade management, and foliar fertilizers applications, has been carried out. However, the evaluation of performance and adoption of AEPs has not yet begun.

*(***v) Design fair, inclusive and sustainable business models (WP5):** WP5 objectives are to analyse markets for agroecological food products thereby identify segments that can drive demand; to co-design and validate inclusive and sustainable business models based on fair value propositions; and to enhance demand for agroecological food products and facilitate access to markets for farmers. Partner Q-Plan developed a questionnaire to assess consumer attitudes towards agroecological products. In collaboration with all stakeholders, our local partners conducted an online survey of 60 consumers using social media, mailing lists, and other channels.

(vi) Scaling innovations for agroecological transitions (WP6): WP6 aims to build advisors' capacity to support agroecology with specific skills and tools. Partner UHOH, in cooperation with local collaborators, conducted a Training of Trainers (ToT) workshop focused on agroecological innovations (Figure 16). The workshop was attended by the coordinators of the 8 living labs as well as other partners.

Figure 16: Training of trainers and cross visits of ALLs in the Ntui cocoa fields.
Representatives from partners IRAD, IITA, AFAAS, CAMFAAS, and SCOOPMAN attended the training in Cameroon. From Ntui ALL, farm advisors (including FBO advisors, private sector advisors, public sector advisors), trainers of the Centre de Formation des Jeunes Agriculteurs de Nachtigal, and the Directorate of Agricultural Extension. Participants are expected to share experiences with peers from different countries and Living Labs, enhance their knowledge and skills through hands-on learning, and develop strategies and action plans.

(vii) Multi-actor dissemination, exploitation and communication (WP7): One of the objectives of WP7 is to establish a regional network for Central and Eastern Africa (CANoLL) by leveraging the existing ALLs from the CANALLS project. This regional network will serve as a collaborative platform where communities, researchers, farmers, and various organizations can work together to test, innovate, and deploy sustainable agricultural practices on a larger scale. The initial design of the CANoLL network was developed through an extensive literature review and discussions with relevant stakeholders of the ALLs in the project. Additionally, an operational model detailing the implementation of the network's activities, processes, and strategies was created. The application of this methodology will enable CANoLL members to exchange knowledge in the future.

3.6.2: Co-creation activities result

The Ntui ALL has conducted three consecutive co-creation workshops, involving various stakeholders and local partners. Figure 17 illustrates Ntui ALL's cocreation cycle.

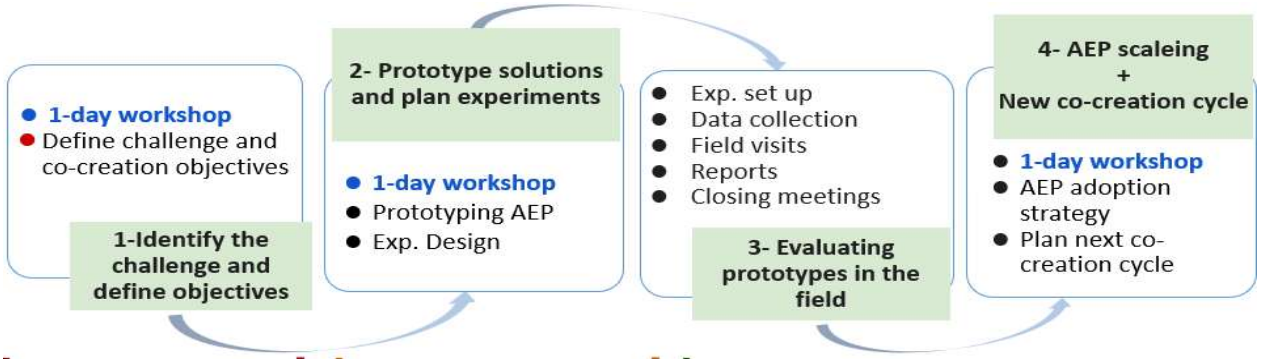

Figure 17: Cocreation activities during various phases of the CANALLS project (Adapted from D2.1).

The second co-creation workshop took place on 17 January 2024, focusing on the practical application of agroecological strategies (Figure 18). The objectives were to brainstorm solutions adapted to local challenges, identify suitable sites for implementing agroecological interventions, design experiments to test these practices' effectiveness, and clarify stakeholders' roles and responsibilities to ensure effective implementation and monitoring. During the group work sessions, three main challenges were identified. These are non-sustainable management of shade in cocoa systems, nutritional deficiencies, and diseases and pests. To address these issues, proper shade management, efficient use of chemical foliar fertilizer, and use of biopesticides (Beauveria and Trichoderma) were proposed.

Figure 18: Project partners and stakeholders in the co-creation workshops.

The third co-creation workshop was held from 25 to 26 February 2025 to collectively analyse and interpret trial data and draw conclusions. Based on the trial results and the readiness of the practices, a strategy was developed for extending and disseminating the practices. Various stakeholder groups participated in the workshop, and deliberations were made regarding the following:

- **Trial Design for Next Season:** There will be no changes in the foliar fertilizer trials. In the biopesticide trials, the treatment remains consistent. Within one block, there are three treatments (recommended pesticide, biopesticide, and the farmer's treatment). The number of farms has increased from three to four. Additionally, there is a modification in data collection for potential yield.
- **Gender Integration:** Strategies were formulated to involve more women in project activities, addressing gender aspects.

3.6.3: Capacity building of partners and stakeholders

Capacity-building activities related to farmers' field schools are scheduled to be implemented between month 30 and month 42. Additionally, several exposure field visits and farmer observations have been conducted.

3.6.4: Testing and identifying optimal agroecological practices

Three experiments were conducted in the first round of testing the identified agroecological practices.

Experiment 1: Proper shade management trial: was coordinated by CIRAD-Cameroon: Same methodology as foliar fertilizer, Data of shade currently being analysed by partner CIRAD and ETHz.

Experiment 2: Efficient use of chemical foliar fertilizer trial: was coordinated by IITA- Cameroon:

Two treatments namely **Foliar Fertilizer (FF) and Organic Fertilizer (OF)** were applied. The primary factor, involve the application of foliar fertilizer according to the activity schedule of the cocoa farm. The OF treatment involves no application of foliar fertilizer, while the FF treatment utilizes the best foliar fertilizer available on the market or the development line Ntui, following CocoaSoils application protocols. This experimental trial comprises 12 plots, i.e. 4 mother trials and 8 baby trials.

The trial sites are divided into two categories: intensively measured blocks (45m × 29m), referred to as mother trials, and lightly measured blocks, known as baby trials. Data was collected using ODK forms. Following plot selection, monthly data collection commenced in May 2024. The parameters measured included *weeding, structural pruning, sanitary pruning, pest and disease management, foliar fertilization, pod count, pod harvest, pod harvest index, soil nutrients, shade* within the transect of the experimental unit, and *farmers' perceptions* of nutritional status at plant level accompanied by nutritional measurements at the plant level. Analysis and interpretation of the data revealed that foliar fertilization did not yield the anticipated results in our trial (Figures 19).

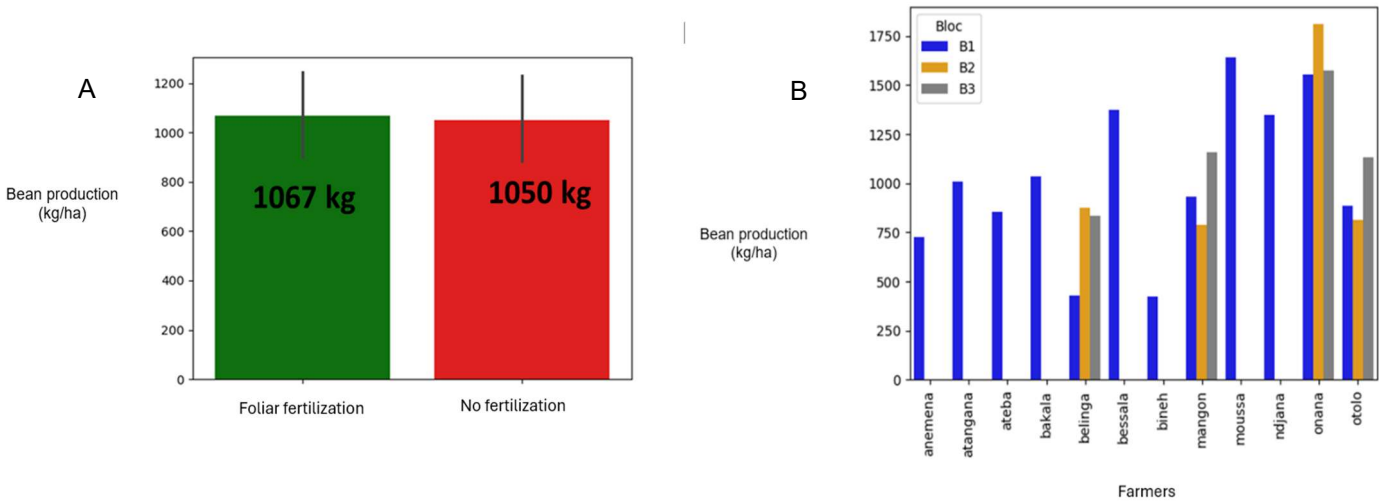

Figure 19: Cumulative production of cocoa beans according to different treatments (A) and cocoa bean production by block in different plots (B).

Foliar fertilization did not significantly affect cocoa bean production (Figure 19A). Treated plants yielded 17 kg more than untreated ones, but overall, foliar fertilizer didn't benefit cocoa production (Figure 195B). Production varied from 450 to 1700 kg/ha, likely due to shade management or soil fertility. Pre-harvest pod counts differed from harvested pods, with 25% of trees contributing to 50% of total production. Pulp and bean content remained consistent, indicating accurate data collection.

Experiment 3: Use of biopesticides (Beauveria and Trichoderma) was coordinated by IRAD. This experiment has three specific treatments: the control treatment, which is the producer's pesticide application, the treatment recommended in terms of pesticides by the CocoaSoils project, and a treatment based on biopesticides (Beauveria and Trichoderma). Three plots were selected for this experimental trial. The plots were selected according to the same criteria of Experiment 1. The plots were divided into 9 experimental units measuring 20m × 20m. Good agricultural practices were applied monthly according to the cocoa farming calendar. Figure 20 shows effect of biopesticides on the various parameters collected as a function of the treatments applied.

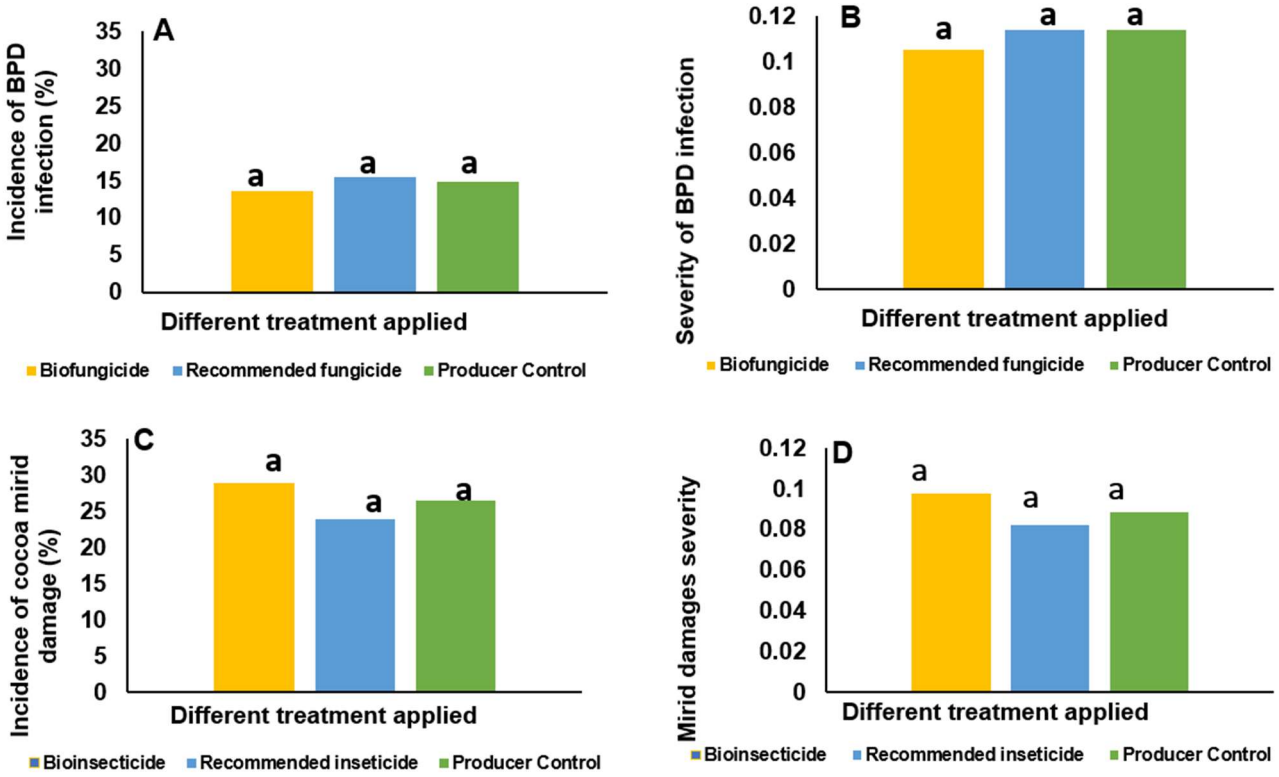

Figure 20: Effect of biopesticides on the various parameters collected as a function of the treatments applied. A: Incidence of BPD infection; B: Severity of BPD infection, C: Incidence of cocoa mirid damage; D: Mirid damage severity. BPD = Black Pod Disease.

No significant differences were observed between the different treatments regarding producer's treatment, treatment based on the CocoaSoils project's formulation of phytosanitary products and treatment based on biopesticides. However, the bio fungicide and bioinsecticide trials respectively showed a variation in brown rot and mirid damage on pods over time according to treatment. Yields appear higher in blocks treated with organic fungicides and insecticides, followed by blocks with recommended pesticides.

The key challenges raised by ALL stakeholders during the stakeholder meeting in Yaoundé was poor communication, coordination issues, lack of awareness about the project, insufficient gender integration, and missing data on biopesticide residue analysis. Solutions include creating a digital platform for knowledge sharing, assessing the environmental impact of biopesticide residues, engaging stakeholders in trials with a focus on gender equity, and using local media to promote the project.

The action plan for Ntui ALL up to December 2025 includes analysing the trials results and writing a report, organizing farmers' field school, setting up a second round of the trial, field monitoring (management, sampling, measurements, etc.) and developing indicators for cocoa agroecological products.

3.7: Uvira ALL: Rice-based agroecological farming systems

The Uvira ALL site is situated between 3°20' and 4°20' latitude S, and 29° 0' and 29°30' longitude E in DRC. It is bordered to the north by Walungu territory, to the west by Mwenga territory, to the south by Fizi territory, and to the east by Lake Tanganyika and the Ruzizi River plains, which separates it from Burundi. The primary goal of Uvira ALL is to transition the rice-based agroecosystems from level 1 (enhancing input use efficiency while lowering harmful environmental inputs) to level 2 (replacing conventional inputs and practices with agroecological alternatives).

3.7.1: Stakeholder engagement in Work Package tasks

(i) Analysis of current situation and forest transition landscapes (WP1): Stakeholders in the Uvira ALL participated in various activities of WP1 (Table 7). In WP1, both male and female stakeholders from value chain actors took part in two FGDs and a household survey organized by Task 1.1 and 1.2. Additionally, policymakers were interviewed and participated in FGDs under Task 1.4.

Table 7: Stakeholder engagement in Work Package 1 and 2 tasks.

Task no and Name		Type of Activities and stakeholders engaged	Sample size		
			Total	Men	Women
1.1	Analysis of needs, contexts and practices of focal rural communities	2 FGDs	24	15	9
1.2	Mapping of food systems, value chains and markets for agroecological products	Household survey	12	7	5
		Decision makers	6	4	2
		Value chain actors	8	4	4
1.4	Investigation of policies, systemic factors, trade-offs and synergies for agroecological transitions	Interviews (All DRC)	10	10	0
		FGD	6	6	0
1.5	Analysis and evaluation of innovation support services under the framework of AKIS	FGD (Research, NGO, Government institution & Academic institution)	17	15	2
2.1	Development of methodology for co-creating optimal agroecological practice combinations	2 workshops	40	32	8
2.2	Design of holistic agroecology assessment framework	Interviews (TAPE) with rice farmers	60	48	12

Approximately 17 individuals representing various stakeholders from research, non-governmental organizations, governmental institutions, and academic institutions participated in the Focus Group Discussion organized by Task 1.5.

(ii) Co-development of methodologies, means & tools to support agroecological transitions (WP2): In WP2, two workshops were held with 40 participants, and interviews on TAPE where 60 rice farmers, both male and female involved.

(iii) Set up and operation of multi-actor agroecology living labs (WP3): The Uvira ALL was set up after conducting interviews, meetings, and workshops with diverse stakeholders. Currently, there are 20 stakeholders representing various sectors, including the public sector, private sector, farmer organizations, NGOs, and civil society including 4 women. Uvira ALL is coordinated by partner IITA-DRC and supported by local project partners INERA, RIKOLTO, and APDIK and NIBIO which is leading WP3. Stakeholders were engaged by informing, consulting, involving, and collaborating in meetings, field trials, field days, and knowledge exchange.

Figure 21: Applying biopesticides in Uvira ALL site.

(iv) Monitoring and evaluation of performance and impact of agroecological practices (WP4): In collaboration with farmers, composite soil samples and biopesticide samples were collected at all 20 field sites, coordinated by partner ETHz team.

(v) Design fair, inclusive and sustainable business models (WP5): Stakeholder participation in Task 5.1 (a market segmentation survey) involving 30 representatives from various VC groups: consumers (10), producers (10), processors (3), traders (3), transporters (2), and decision makers (2). A workshop on value propositions was held as part of Task 5.2, with various stakeholder groups, including members from outside ALL, in attendance. The participants included three representatives from producers, one from an agro-processor, two from governmental agencies, one from a certification agency, one from an input provider, one from an NGO, and one from a transport agency. Task 5.2 involved multi-actor FGDs on agroecological business model innovation with 15 participants from various stakeholders. The groups included farmers and cooperatives, agro-processors, government agencies, regulation and certification bodies, NGOs, transporters, distributors, and others from outside ALL.

(vi) Scaling innovations for agroecological transitions (WP6): The Uvira ALL coordinator participated in a 5-day Training of Trainers workshop titled "Participatory Methods for Advisory Services in Support of Agroecological Innovations" and attended cross visits organized by UHOH in Yaoundé, Cameroon. The Uvira team contributed to the development of Practice Abstracts focused on the characterization of ALL in Uvira. Additionally, an online introductory workshop and hands-on training session on the use of DSTs was conducted at Uvira ALL with the participation of multiple stakeholders.

(vii) Multi-actor dissemination, exploitation and communication (WP7): In WP7, broadcasts of programs on local radios in ALL Uvira were produced, organization of meetings with stakeholders, production of banners for different activities related to agroecology, availability of photos, organization of meetings between representatives of farmers organizations and their members.

3.7.2: Co-creation activities result

Two co-creation workshops were conducted to identify key challenges and AEPs for testing with farmers in collaboration with other stakeholders. The primary objective was to evaluate the combined effects of organic and inorganic fertilizers on rice production, as well as the impact of biopesticides on pest incidence against the control (rocket pesticide). By engaging the stakeholders of ALL, a split plot

experimental design was formulated. The main factor/plot was pest and disease control, and the sub factor/plot was fertilization. In Uvira, three sites were established: Luvungi (12 fields), Katogota (4 fields), and Kamanyola (4 fields), with a total of 20 fields, each plot measuring 20m x 10m.

3.7.3: Capacity building of partners and stakeholders

Two training sessions on the implementation of the demo trials experiment were organized in 2024, one on June 28th in Luvungi and another on June 29th in Kamanyola. The training was provided to 20 farmers participating in the trials. Capacity-building for farmers' field schools will occur between months 30 and 42. Several field visits and farmer observations have also taken place.

3.7.4: Testing and identifying optimal agroecological practice

(i) Bio-pesticides/bio-fungicides applications: Chemical pesticides (Rocket) and biopesticides were used in the treatments and applied as per the recommendations (Figure 22). Data collection included type and incidence of pests and diseases in the rice field.

(ii) Organic and inorganic fertilizers applications*:* The type of organic fertiliser used were compost, Urea and DAP inorganic fertilisers were used. Different rates of fertilizers applications were used in the treatment plots. The methods of fertilisers application for compost were by incorporating into the soils. In the case of urea, it was applied as top dressing and band placements for DAP. Data collection included rice development (sprouting ability, seedling vegetative vigour, stem diameter, tillering ability, leaf area, plant height), biomass(kg), number of panicles per stem, paddy (kg) per panicle, fresh and dry paddy.

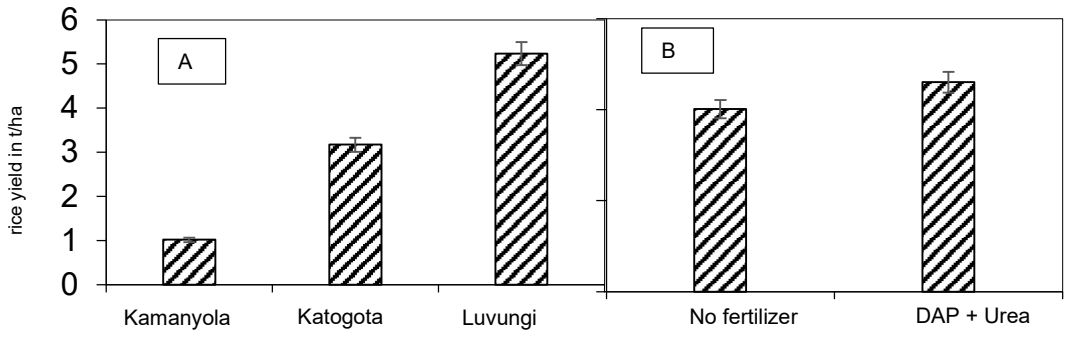

Figure 22: Effect of sites (A), and mineral fertilizer (B) on rice yield.

Preliminary results showed that paddy rice production increased by 4.2 t/ha in Luvungi and 2.1 t/ha in Katogota compared with Kamanyola. Production decreased by 0.59 t/ha in plots without mineral application. The biomass yield increased by 7.8 t/ha at Luvungi and 4.5 t/ha at Katogota compared to Kamanyola. Biomass decreased by 3.2 t/ha in plots without mineral application (Figure 23).

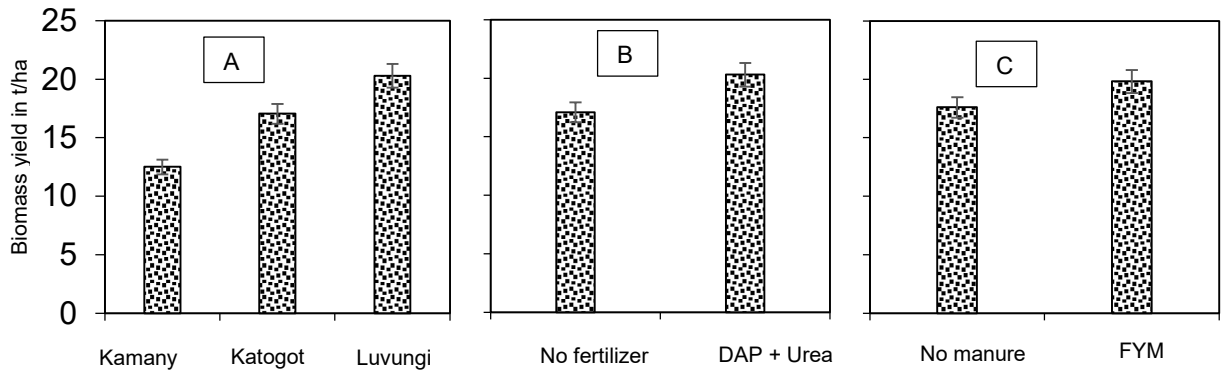

Figure 23: Effect of sites (A), mineral fertilizer (B) and organic fertilizer (C) on biomass yield.

In Uvira ALL, the armed conflict in Eastern DRC has hindered trial monitoring and field data collection. Potential solutions could be utilizing lead farmers and front-line extension workers to collect essential data by providing guidance and technical support using Information and Communication Technology (ICT)-based digital tools by local partners. These include organising regular virtual meetings (where and when possible) and facilitate communication using WhatsApp, Short Message Service and phone calls for urgent matters. Apart from this, there was a delay in setting up the field trials due to lack of rainfall. One possible measure is the community-based smart valley approach implemented by RIKOLTO which supports the Uvira ALL. In essence, "smart valley approach " is a farmer-led approach designed to improve water management in inland valleys while enhancing resilience to both drought and flooding in rice-based systems (Djagba et al., 2024).

The Uvira ALL action plan until December 2025 includes organizing a third co-creation workshop to evaluate the initial round of field trials. Following this, there will be a meeting with partners and stakeholders to discuss the second round of field trials, including the design, monitoring and evaluating the trials.

4. Conclusions and Way Forward

The key lessons learned over the past 18 months of implementing the 8 ALLs in the CANALLS project can be summarized as follows:

1. Living Lab awareness: Initially, stakeholders and local partners were unfamiliar with the living lab concept. Understanding the living lab concept and its implementation procedures took a considerable time which varied from one living lab to another. The living labs differ among each other in terms of resources, farming systems from biophysical and socioeconomic aspects, necessitating to apply management strategies tailored to their specific contexts. In each ALL, training workshops, cocreation sessions, and stakeholder meetings were conducted to improve stakeholders' understanding of living lab concept, encompassing their establishment and implementation.

2. Co-creation method: Most partners and stakeholders within the ALL were not well-acquainted with the co-creation method, which is a fundamental component of the living lab approach. By conducting a series of cocreation workshops and various capacity building activities, such as trainings, field days, and cross visits, their knowledge has increased so also their engagement in different activities of the project.

3. Stakeholders' engagement in project activities: At the outset, several stakeholders had different expectations regarding their involvement in the project. To address this, we developed a Terms of Reference (ToR) for each stakeholder groups (farmers/cooperatives, value chain actors, government institutions, academia, and civil society). In the ToR, their contributions and benefits were clarified (refer D3.1). We discussed these ToR with representatives from each group and created a comprehensive stakeholder engagement plan. The plan elaborates in detail the methods, responsibilities, and timelines for engaging stakeholders without interrupting their daily operations. It is important to note that active stakeholder engagement requires considerable time and effort from all parties.

4. Testing of agroecological practices in real-life settings: During testing of combinations of AEPs, field activities such as planting have been delayed due to extreme weather events for e.g. droughts in Kamonyi ALL sites and flooding in Bujumbura ALL sites. Measures taken included replanting climate-resilient seeds, adjusting sowing dates, and/or implementing early warning systems. Additionally, the conflict in Eastern DRC, where our 4 ALLs are located, has hindered access to implement field-monitoring activities. Despite this, front line extension workers and lead farmers have managed to collect crucial field data through online services which includes advice and guidance provided by local project partners.

5. The Way Forward: The eight ALLs have developed comprehensive action plans for the project's final phase, including common activities such as:

- Analysing data and writing research reports for the first-round cycle;
- Organizing the third co-creation workshop along with stakeholder meetings to gather feedback;
- Coordinating cross-visits among the ALLs and mutual learning events;
- Setting up and monitoring the second round of trials at the ALL sites;
- Actively engaging stakeholders in project activities;

- Enhancing the capacity of stakeholders and partners within the ALLs;
- Monitoring and evaluating the performance of multi-actor ALLs; and last but not the least
- Developing an exit strategy plan for ALLs, such as integrating ALLs with relevant ongoing national and/or regional projects and networks (e.g., CANoLLs within this project).

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6. Annex

Table 8: Example of stakeholder engagement plan template

Name of ALL: _____																			
WP title: _____																			
Activity	**Type of stakeholder group(s)*;** mark with X							***Level of engagement* by a stakeholder group(s)** on a specified activity during 2025***											
	FC	*VCA*	*Gov*	*Res*	*Aca*	*NGO*	*CSP*	J	F	M	A	M	J	J	A	S	O	N	D

- ***Cocreate/collaborate with stakeholders** by organizing a series of co-creative workshops where new ideas/ innovations will be considered for decision making.*
- ***Involve stakeholders** by engaging stakeholders and actively taking part in the ALLs implementations, (e.g., field measurements, conducting trainings, and workshops)*
- ***Consult stakeholders** by asking stakeholders for their views, ideas, etc. to give advice and suggestions on specific issues.*
- ***Inform stakeholders** by providing timely information, presenting project activities and results to multi-stakeholders in ALL*

FC: Farmers/Cooperatives, VCA: Value Chain Actors, Gov: Government institutions, Res: Research institutions, Aca: Academic institutions, NGOs: Non-Government Organizations, CSP: Civil Society/Public

Stakeholder Engagement Monthly Report Template

Case Country:_____, Agroecology Living Lab name: _____

Month: _____

Note: Mark with **X** in which of the stakeholders and at what level were engaged (Inform, Consult, Involve, Co-create/collaborate).

*If you **inform** a given stakeholder: what type of information/data do you share/provide to them?*

*If you **consult** a given stakeholder: what did you ask them and what was their views/advice?*

*If you **involve** the stakeholder/s: In which specific activity they were engaged?*

*If you **cocreate/collaborate** with the stakeholder/s: what new initiatives/ideas/innovations have you reached?*

Type of stakeholder group and their level of engagement in -------ALL.

Type of Stakeholder	*Level of engagement*			
	Inform stakeholders	*Consult stakeholders*	*Involve stakeholders*	*Collaborate with stakeholders*
• Farmers/Cooperatives				
• Value chain actors				
• Government institutions				
• Research institutions				
• Academic institutions				
• NGOs				
• Civil Society/public				
• Other (specify)				

(2) Describe in detail the work done and key outputs/results achieved in engaging the different stakeholders. Include good quality photos and use a separate sheet if needed

Date:_____

Reported by :_____

Table 9: Bujumbura- Agroecology Living Lab- Initial stakeholder (including project partners) assessment

S.No.	Name of Organization	Performance of stakeholder (so far) in ALL activities*			Remarks (describe why high or low performance was observed ?)	Measures to improve (stakeholder participation)	Type of stakeholder
		High	Medium	Low			
1	University of Burundi/FABI			x	Due to lack of budget, not really involved in planned activities.	Try to get them involved in some kind of activity if the budget allows it.	Academic institution
2	ISABU-Natural resources Research Program	x			Involved and providing support/ advice in all planned activities in Bujumbura and Gitega ALL	In all planned activities, continue to work closely with all stakeholders	Research Institution
3	ISABU-Maize unit		x		Providing improved seeds for our trials	Keeping a close relationship with them	Research Institution
4	IITA-Burundi	x			Involved and providing support/ advice in all planned activities in Bujumbura ALL	Maintaining a close relationship with all stakeholders	Research Institution
5	CAPAD		x		Involved and providing support/ advice in some planned activities in Bujumbura and Gitega ALL	Keeping a close relationship with all stakeholders	Local NGO
6	SANGWE Cooperative (3 cooperatives involved)	x			Participating in meeting, involved and providing contribution in some planned activities in Bujumbura ALL	Facilitate the access to any information about the activities planned within the CANALLS project.	Farmer organization
7	Agro dealers		x		Participating in cocreation meeting and field day, participating in survey conducted	Involving them in some activities relating to selling maize products	Value chain actor
8	Local Government	x			Participating and opening all meetings, administration services, awareness-raising of stakeholders	Maintaining a close relationship with them in all activities	Public institution
9	Extension services	x			Awareness-raising, participating in all planned activities, cooperative management and providing advice	Maintaining a close relationship with them in all activities	Public institution

** ALL activities include participation in meetings, providing advice/services, sharing resources (e.g. data/information, facilities, etc.), involving in field activities, etc.*

Table 10: Kamonyi- Agroecology Living Lab- stakeholder assessment*

S.No.	Name of Organization	Performance of a stakeholder			**Remarks** (describe why high or low performance was observed ?)	**Measures to improve** (stakeholder participation)	Type of stakeholder
		High	Medium	Low			
1	Institut Catholique de Kabwayi	x			Participation in meetings and workshops	Maintain progress	Academic institution
2	Radio Huguka	x			Participation in meetings, produce radio messages	Keep the momentum	Civil society
3	IMPUYABO	x			Participation in meetings, workshop, field evaluation of activities	Keep the momentum	Farmer org./coop.
4	KOMINYA (Koperative Muhinzi W'imyumbati Nyamiyaga)	x			Participation in meetings, workshop, field evaluation of activities	Keep the momentum	Farmer org./coop.
5	KOUBITE (Koperative Ubumwe bugamije Iterambere)	x			Participation in meetings, workshop, field evaluation of activities	Maintain momentum	Farmer org./coop.
6	SYNDICAT INGABO (Farmers 'syndicate)	x			Participation in meetings and workshop, provide advice to farmers	Keep the momentum	Farmer org./coop.
7	Urugaga Imbaraga		x		Participation in some meetings	More communication and sharing information through WhatsApp group of the living lab	Farmer org./coop.
8	KAMONYI DISTRICT	x			Participation in all meetings, mobilization of farmers, and provide advice	Keep the momentum	Government institution
9	NYAMIYAGA SECTOR	x			Participation in meetings, contribute to sites identification, materials and casual labour for field trials	Keep the momentum	Government institution
10	MUGINA SECTOR	x			Participation in meetings, contribute to sites identification, materials and casual labour for field trials	Keep the momentum	Government institution
11	RAB Muhanga Station manager	x			Participation in meetings, provision of cassava cuttings	Keep the momentum	Government institution
12	RAB	x			Coordination of overall project activities, stakeholder engagement, maintaining partnership, and reporting	Keep the momentum	Government institution
13	RAB Cassava Program	x			Participation in meetings, field implementation of trials	Keep the momentum	Research institution
14	ICRAF		x		Participated in some meetings	More communication, consultation, and sharing information through WhatsApp group of the living lab	Research institution
15	CEFAPEK (Centre de Formation Agricole et de Petit Elevage de Kamonyi)	x			Participation in meetings, workshops and field evaluation	Keep the momentum	NGO
16	COCOF (Conseil Consultatif des Femmes)	x			Participation in meetings, workshops and field evaluation	Keep the momentum	NGO
17	Global Civil Sharing		x		Participation in meetings, workshops	More communication and sharing information through WhatsApp group of the living lab	NGO
18	UGAMA-CSC (Umuryango wo Gushyigikira Amakoperative-	x			Participation in meetings, workshops and field evaluation	Keep the momentum	NGO

	Centre de Service au Cooperative						
19	Rwanda Organic Agriculture Mov't	x			Participation in meetings, workshops, and field evaluation	Maintain momentum	NGO
20	Hitimana Eulade	x			Participation in meetings, workshops, field activity involvement	Maintain momentum	Value chain actor
21	Nyirasagamba Alice		x			More communication and sharing information through WhatsApp group of the living lab	Value chain actor
22	Nyirasangwa Sophie	x			Participation in meetings, workshops, and field evaluation	Keep the momentum	Value chain actor
23	NYAMIYAGA SECTOR (Nyandwi Jean Baptiste)	x			Participation in meetings, workshops, follow up of field activities	Maintain the progress	Farmer representative
24	NYAMIYAGA SECTOR (Baziruwiha Emmanuel)	x			Participation in meetings, workshops, follow up of field activities	Keep the momentum	Farmer representative
25	MUGINA SECTOR (Muhire Jean Bosco)	x			Participation in meetings, workshops, follow up of field activities	Maintain the progress	Farmer representative
26	MUGINA SECTOR (Niyigena Edithe)	x			Participation in meetings, workshops, follow up of field activities	Maintain momentum	Farmer representative
27	Nyirakanani Mediatrice	x			Participation in meetings, workshops, follow up of field activities, field supervisor	Maintain the progress	Social affairs & farmer's development (para-social)
28	UTAB		x		Participation in meetings, workshops, knowledge sharing	More communication, consultation, and sharing information through WhatsApp group of the living lab	Academic institution
** ALL activities include participation in meetings, providing advice/services, sharing resources (e.g. data/information, facilities, etc.), involving in field activities, etc.*							

Table 11: AEPs that have been implemented by CANALLS project and their contributions to Agroecology elements (FAO, 2018) and/or principles (HLPE, 2019)

Agroecology elements and/or /principles	*Agroecological practices/solutions implemented by CANALLS project*							
	Plant-based bio-pesticides	*Foliar fertilizer*	*Tree shade management*	*Sanitized human urine*	*Erosion control*	*Integrated soil fertility management*	*Intercropping, cover crops*	*Agroecology living labs*
	Biega/Kabare, Ntui, Bujumbura, Uvira	*Ntui*	*Ntui*	*Bujumbura*	*Kamonyi , Biega/Kabare*	*Bujumbura, Kamonyi*	*Buja, Kamonyi, Biega/Kabare*	*Biega, Bunia, Buja, Giheta, Kabare, Kamonyi, Ntui, Uvira*
▪ *Diversity/biodiversity/ economic diversification*			+++	+			+++	
▪ *Resilience*	++				++		++	
▪ *Soil Health*		++		++	+	+++	+++	
▪ *Animal health*								
▪ *Efficiency /input reduction*	+++			+++		++		
▪ *Recycling*	+++			+++				
▪ *Synergies/Synergy*						+	++	
▪ *Circular & solidarity economy*								+
▪ *Co- creation & sharing of knowledge/Co-creation of knowledge/ Participation*	+++	++	++	+++	+	++	++	+++
▪ *Responsible governance/Land & natural resource governance*								++
▪ *Human & social values/social values & Diets*							+	++
▪ *Culture & Food traditions*							+	
▪ *Connectivity*								+++
▪ *Fairness*								+++

Legend: +: low, ++: medium, +++: high contributions to the elements and/or principles of Agroecology.