SHARED EXPERIENCES OF IMPLEMENTING ACTION RESEARCH PROJECTS FUNDED BY THE FORI PROGRAMME

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May 2025

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Funded by the European Union

DISCLAIMER

This publication was produced as part of the FO-RI program funded by the European Commission/DG INT-PA and the Organisation of African, Caribbean and Pacific States (OACPS) and implemented by AgriCord (FOOD/2021/428-932 + FED/2021/428-937).
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Citation

Dietsch, L. (2025). *Capitalisation transversale des expériences de mise en œuvre de projets de recherche action financés dans le cadre du programme FORI.* Groupe d'Expérimentation et de Recherche : Développement et Actions Localisées (GERDAL); AgriCord.

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ABSTRACT

This experience capitalisation examines **13 action research projects conducted under the Farmer-led Research and Innovation (FORI) programme, implemented by AgriCord and funded by the European Union (EU).** It aims to analyse the approaches, strategies, and actions applied across these projects (highlighting both commonalities and differences), along with the main achievements, challenges, and lessons learned **to inform and improve future initiatives of a similar nature.**

Despite some variation in formalization, **the key stages of implementing action research processes** generally followed a similar sequence of stages:

1. Identification and formulation of key (strategic) issues and problems to be solved.
2. Definition and consultation on action research themes.
3. Development of protocols and/or action research plans.
4. Selection of farmers to participate in the projects.
5. Implementation of protocols and data collection.
6. Processing and analysis of collected results.
7. Dissemination and utilization of results.

Issues to be addressed by each project were typically identified collaboratively through consultation between agri-agencies and farmers' organizations (FOs) during the project formulation phase. A central goal shared across all projects was to support family farming in connection with the agroecological transition. While many projects referenced specific agricultural value chains, they primarily focused on the production level, reflecting the priorities of FOs and their members. However, several projects extended their focus to other segments of the value chains, adapting strategies and actions accordingly.

Once the issues were identified and the projects approved, most projects then conducted in-depth analysis of the context, including farmers' current practices, encountered challenges, and specific problems to be addressed. These analyses were carried out through various methods, with FOs and their technical teams generally playing a central role. The involvement of researchers and farmers varied from project to project.

Identifying and validating specific problems informed the formulation of action research themes. This transition was not automatic but required a process of analysis and reflection, with varying degrees of stakeholder participation.

Subsequent steps included defining, validating and then implementing experimental protocols. Researchers played a central role in this phase, though the approaches varied across projects—some developed the protocols directly, while others focused on capacity building and methodological support for farmers to develop them. Consequently, farmer involvement and ownership of the process varied.

Most protocols focused on agroecological experiments, conducted on individual or collective plots, using standard agronomic experimental designs to ensure scientific rigor. However, alternative action research methods were also used, especially where there were operational challenges in implementing traditional designs (such as the case of perennial crops), or because these practices were not suitable for monitoring the adoption systemic agroecological practices.

While researchers generally led the design of protocols, their involvement in implementation and data collection was often limited by time and resource constraints. To address these challenges and strengthen local capacities (at the FO and/or farmer level), projects implemented various support and monitoring mechanisms. These systems differed in terms of who collected the data: farmers, FO technicians, or students undertaking internships or research projects.

During the implementation of action research processes, many projects also carried out additional activities complementary activities integral to action research processes. These included:

- Training for participating farmers to enhance their capacity to conduct experiments (and others in the future)
- Creation of multi-stakeholder consultation platforms
- Implementation of gender-transformative approaches
- Actions to improve the market value of agroecological products
- Efforts to increase access to seeds and/or finance for agroecological production.

These activities were also crucial in the implementation of action research processes, as they addressed challenges identified during the initial phases that were unsuitable for experimentation (e.g., market access), or tackled issues that experimental results along could not solve.

Initial analysis of the data collected through action research processes was generally conducted by researchers, followed by stakeholder meetings (between FO leaders, technicians, agri-agencies, other stakeholders within multi-stakeholder platforms, and participating farmers) to share and discuss findings.

Although action research processes are still being implemented, activities have already been carried out to disseminate initial results to a broader audience. These include:

- Training sessions, field visits, experience-sharing events, and practical demonstrations for **other farmers** not directly participating in the project.
- Multi-stakeholder platforms to engage **other stakeholders,** such as non-governmental organizations (NGOs) and government technical services
- Dissemination of results **through digital channels,** including social media, and online training content
- **Advocacy campaigns.**

Broadly, the action research processes have yielded several significant outcomes:

- Enhanced **capacity strengthening and credibility** of FOs in leading action research initiatives in partnership with other stakeholders.
- **Strong farmer engagement and empowerment** to conduct independent experiments.
- **Adoption of practices beyond experimental settings**.
- **Recognition and promotion of traditional knowledge and practices,** including indigenous seed varieties and tree species.

The implementation of action research processes faced numerous and diverse challenges.

- **Difficulty in identifying and prioritizing research topics** due to the complex and diverse challenges faced by farmers in most project intervention areas.
- **Operational constraints in conducting experiments and/or follow-up visits,** such as: limited access to sites due to security concerns or infrastructure damage caused by extreme climate events; farmers' limited access to the inputs and resources needed for experimentation; climate-related disruptions; and organizational difficulties related to administrative, contractual, or contextual constraints.
- A significant cross-cutting challenge has been **the difficulty of generating scientifically robust results**. Barriers included data collection difficulties, inconsistent adherence to protocols, diversity of protocols used, and the inability to control experimental variables.

Discussions and analyses of these diverse experiences revealed several key insights on how to effectively implement action research conducted by FOs and farmers:

- **The importance of actively engaging farmers** in problem identification.
- **The need to formulate relevant and actionable research topics** that generate useful knowledge for addressing identified challenges.
- **The value of co-developing protocols** that balance between scientific rigor with participatory approaches.
- **The necessity of involving farmers in data analysis** to ensure practical relevance.
- **The importance of considering the difficulties and constraints** of applying agroecological practices as research topics in their own right.
- **The need to strengthen stakeholder engagement and local capacity** to ensure the sustainability of action research initiatives.

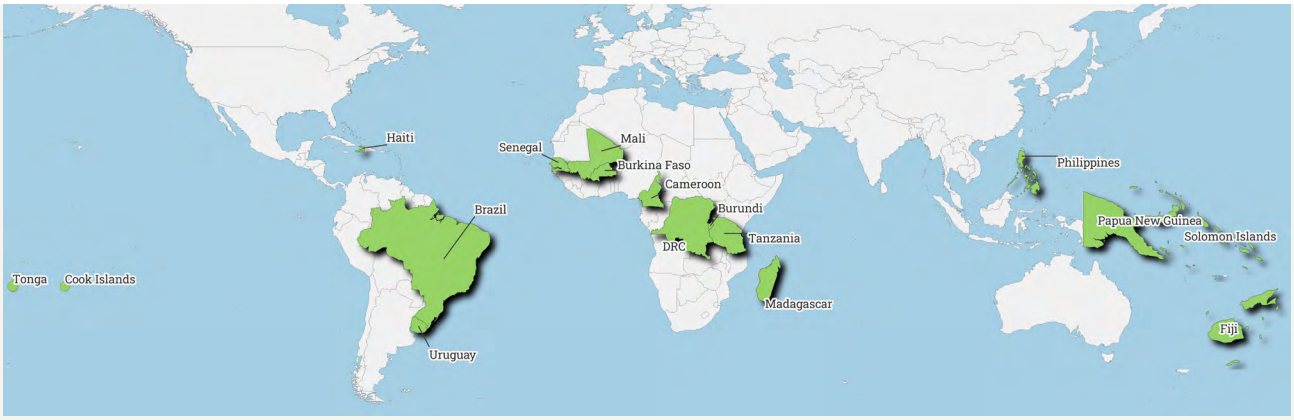

Figure 1: Countries implementing FO-RI action research projects

Introduction

The Farmer-led Research and Innovation (FORI) programme aims to enhance the capacity of farmers and farmers' organizations (FOs) at local, regional, and continental levels to: formulate relevant research questions; leverage local knowledge; establish partnerships; access resources; and mobilize expertise to innovate and experiment at scale. By doing so, the programme supports farmers in driving the agroecological transition towards more productive, resilient and sustainable agri-food systems.

The programme was designed based on several key premises:

- **Agroecological transitions require collaborative experimentation, adaptation, and dialogue** involving farmers, FOs, researchers, policymakers, and service providers, among others—particularly at the territorial level. This collaboration is essential to further advance scientific and local knowledge based on evidence.
- **Farmers should be active leaders rather than passive beneficiaries** in the design, implementation, and evolution of research and innovation initiatives. With technical support from Agri-agencies, FOs can evolve into professional and credible institutions capable of providing services to their members, influencing policies, and gaining recognition from other agricultural stakeholders. This would enable FOs to play a decisive role in the agroecological transition and establish partnerships with various stakeholders for the benefit of farming communities.
- **Farmer-led research and innovation has significant potential** to drive the agroecological transition. By fostering partnerships with Agri-agencies, research institutions, and other relevant organizations at both local and national levels, FOs can help overcome dominant top-down research models.
- **Empowering smallholder farmers to build their own innovations** by conducting joint research with scientists is crucial for sound natural resource management and climate change adaptation (Faure et al. 2014; Triomphe et al. 2014; Waters-Bayer et al. 2013). Additionally, farmer-led research can enhance the resilience of rural communities while enabling farmers to thrive, sustain, and improve their livelihoods in rapidly changing environments.

The FORI programme implements **13 action research projects across 17 countries,** aiming to strengthen the capacities of local and national FOs to design and implement an iterative, farmer-led action research approach. This approach builds on local knowledge and experiences while fostering functional partnerships between FOs, agricultural associations, research institutions, and other stakeholders at both local and national levels. FORI also targets agroecological innovations on multiple levels (production, processing, marketing) that address the needs and objectives of farmers and are adapted to the local context.

In practice, the approaches, strategies, and actions implemented by these projects have been highly diverse, reflecting the varied contexts in which they operate. This diversity offers a valuable pool of experience that merits documentation and shared learning undertaken by **AgriCord with funding from the European Union (EU),** this cross-analysis aims to capture and share the approaches, strategies, and actions implemented—highlighting both shared practices and differences across projects—while also identifying key achievements, challenges, and lessons learned.

This document presents the final report of this learning and synthesis process, and highlights:

- The approach and methodology used to carry out this learning process.
- A synthesis of project approaches, activities, and results.
- The main advancements and challenges encountered during project implementation.
- Key lessons and recommendations for future action research.

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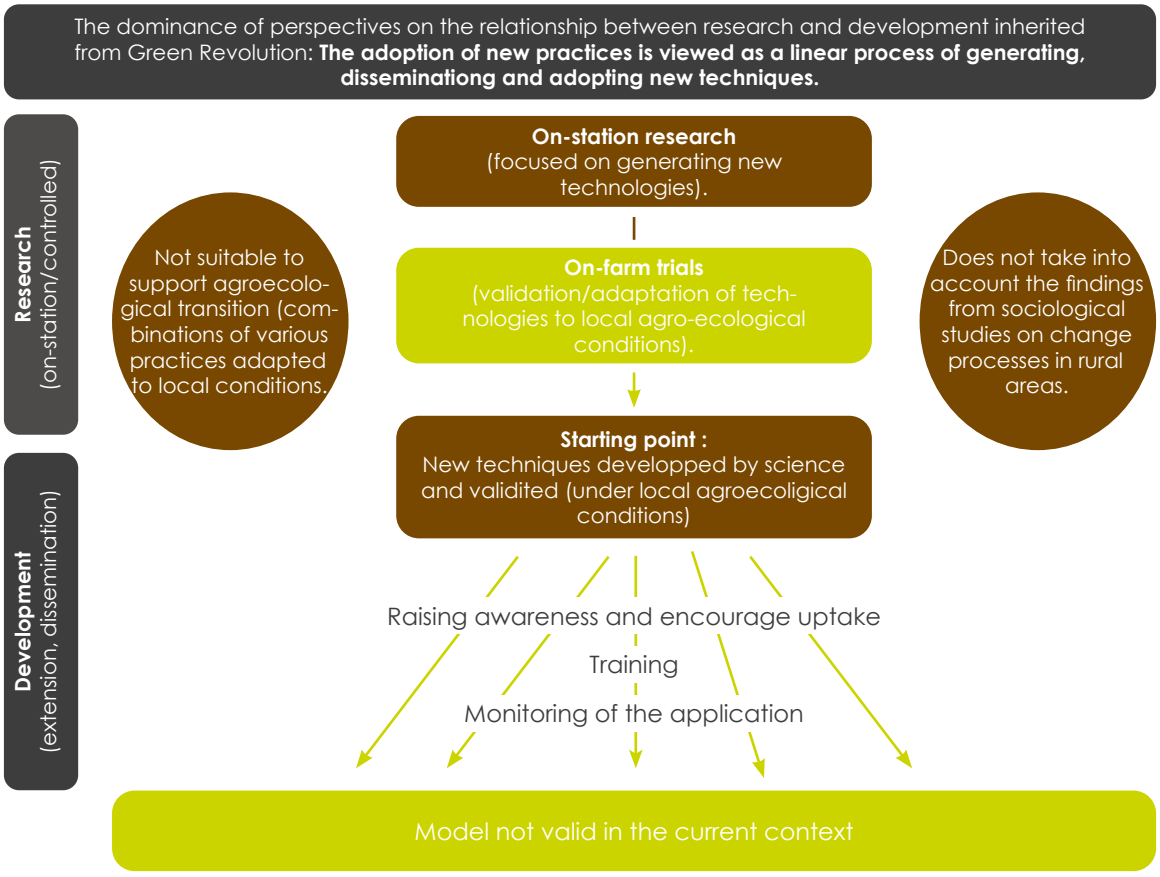
02. Approaches and methodology used for the capitalization

2.1. Objectives of farmer-led action research and the purpose of this capitalization

The action research projects implemented under the FORI programme aim to challenge traditional views on the relationship between research and development that have been shaped by the Green Revolution. These views, which still largely dominate today, emphasize that the adoption of new practices primarily involves the generation and dissemination of new techniques.

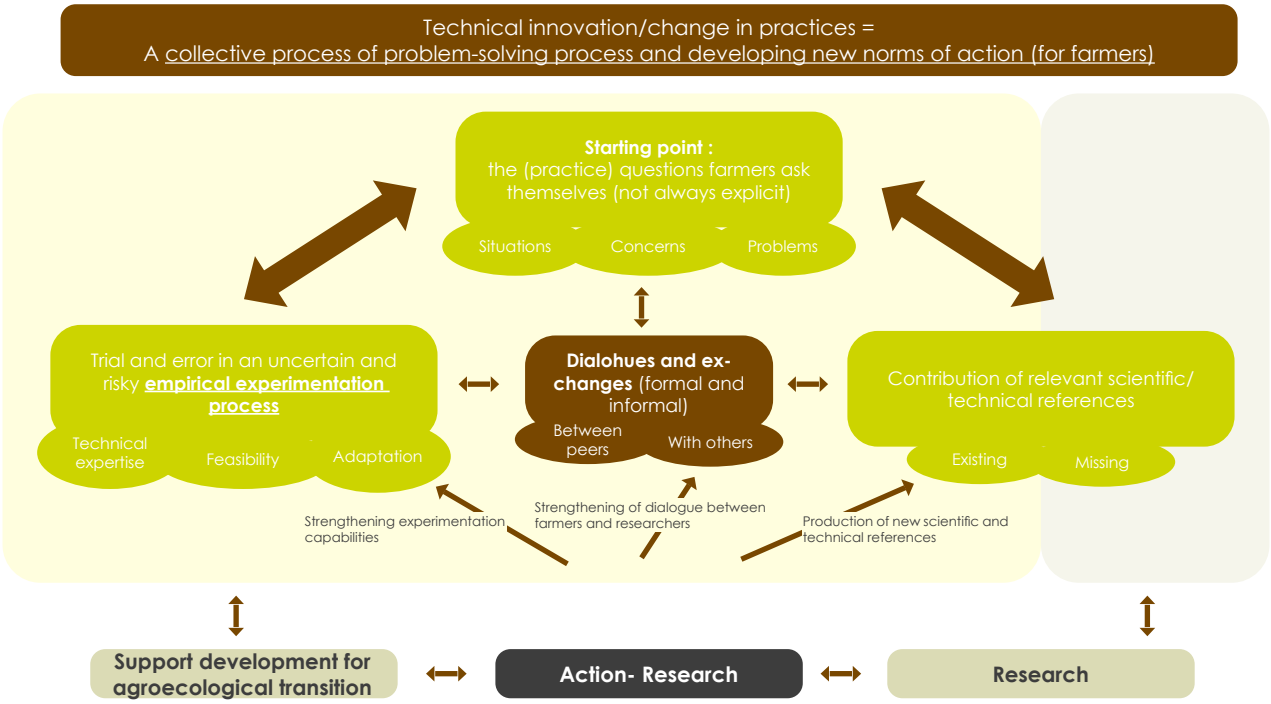


In this traditional model, the starting point for change is new techniques developed by science and validated in local agroecological settings. Scientific research plays a central role in generating new techniques through experimental stations, and adapting them to local conditions via controlled trials on farms. Once developed, these techniques are promoted through extension systems which aim to:

- Raise farmers awareness about the validity of the proposed techniques to motivate their adoption
- Provide training on how to implement the techniques;
- Monitor the application of the practices to ensure they align with the research-validated methods.

While this model had some positive results in widely disseminating a limited number of specific technical alternatives (such as the Green Revolution's improved seed and chemical input packages), it is no longer suitable or relevant. Specifically:

- It fails to support the integral, transformative agroecological transitions, which require strengthening farmers' capacities to apply, adapt, and combine a wide range of practices across highly diverse local contexts.
- It overlooks key insights from nearly 40 years of research in the sociology of work and changes in agricultural practices conducted, among others, by Gerdal (www.gerdal.fr). This body of evidence shows that, from the farmers perspective, the adoption of new practices is not simply a matter of transferring and applying new knowledge. Rather, it is primarily a collective problem-solving process that relies on dialogue and exchange, among peers as well as with other stakeholders such as technicians, researchers and others (see diagram below).



These research findings have shown that for farmers, the starting point for changing their agricultural practices begins with the practical problems they face. Seeking solutions to these problems, and adopting a new practice becomes a process of trial and error (the outcome is not guaranteed), often involving empirical experimentation. This process is uncertain and risky[1], but allows farmers to assess the feasibility and relevance of new practices, and adapt them to their own situations. It also has the potential to facilitate the mastery of the new practice.

Research has also shown that this process is not individual but collective, relying on dialogue with peers, other farmers (particularly within informal local dialogue networks), and external actors, such as technicians and researchers who introduce new ideas to the local peer groups. Contributions from these external actors are discussed and debated locally to determine their usefulness, and if considered relevant, are tested on farms. The results of these tests then contribute to further local discussions.

Experience from various projects show that recognizing the sociological dimensions of change processes can enhance the effectiveness and efficiency of agroecological transition support systems. These improvements are based on:

- A better understanding of farmers problems as the starting point for supporting changes in practices (including methodological support in framing these issues based on the expression of their concerns).
- Strengthening local peer group dynamics for exchanges and empirical experimentation (both within and between farmer groups).
- Introducing relevant scientific-technical references that respond to local needs, shared from a supportive, reflective perspective rather than a prescriptive one[2].

In this context, scientific research (on-station and under controlled settings) still plays an important role in producing knowledge that supports the search for practical solutions to farmers' problems. However, such references related to agroecological practices remain somewhat limited.

→ This cross-cutting evaluation of action research projects implemented under the framework of FORI aims to assess the extent to which farmer-led action projects have helped to **"reverse the traditional model of agricultural research and knowledge transfer by placing farmers at the centre of innovation."** Specifically, the analyse focuses on:

- **Alignment with farmers** (and other stakeholders') problem-solving processes.
- **Strengthening farmers' empirical experimentation capacities**, enabling them to test, adopt, and/or adapt new practices on their farms.
- **Enhancing the quality and intensity of exchanges between farmers and researchers**, to enrich local peer discussions and subsequent empirical experiments with scientific/ technical references that were previously unavailable locally.
- **Creating new scientific/technical references** on locally adapted agroecological practices.

→ **The ultimate goal of this evaluation is to generate insights that will improve future initiatives and similar processes**, particularly with respect to the role of FOs and farmers, as well as other stakeholders.

1. We abandon a practice that we have mastered, for another that we have not mastered (yet), and of which we are not 100% sure that it is relevant/feasible.
2. It is not so much a question of convincing farmers of the validity of the references provided, but rather to open them up for discussion and offer methodological support for collective reflection, enabling farmers to use them to resolve the problems they face.

2.2. Projects under evaluation

The evaluation process covers 13 projects implemented under the FORI programme since early 2022. Below is a table listing each project's name, country of implementation, and key stakeholders.

Project name	Country	FO	Agri-agency partner	Research partner
Socio-productive co-innovation led by farming families and applied to the conversion and sustainability of agroecological zones in vegetable and fruit production systems in Brazil and Uruguay	Brazil & Uruguay	Red ECOVIDA, CAPA, CRESOL, COPROFAM, CFNR	CRESOL	UDELAR's[3] Faculty of Agronomy
Agroecological innovations based on endogenous knowledge for the development of the onion value chain in Burkina Faso	Burkina Faso	CPF[4], UNAPOB[5]	AFDI[6]	INERA[7], IRSAT[8]
Strengthening participatory research and innovation in agroecology in Burundi	Burundi	CAPAD[9]	CSA[10]	University of Burundi, Gerdal[11]
Action research on agroecological practices for the development of the local chicken industry in Cameroon	Cameroon	CNOP-CAM[12]	AFDI	IRAD[13]
Farmer innovation for sustainable and agroecological breadfruit value chains in the Pacific Islands	Pacific Islands	Pacific FOs		
Diversification of agroforestry production in the Baptiste area and production of organic fertilizers	Haiti	UCOCAB[14], FECCANO[15], PNPCH[16]	UPA-DI	UCNH[17] FAMVE[18]
Inclusive action research for an agroecological transition of market gardening in Madagascar	Madagascar	CEFFEL/ FIFATA[19]	FERT	FOFIFA /CIRAD[20]

3. Universidad de la República de Uruguay
4. Confédération paysanne du Faso
5. National Union of Burkina Onion Producers
6. French farmers and international development
7. Agronomy Research Institute
8. Institute for Research in Applied Sciences and Technology
9. Confederation of Agricultural Producers' Associations for Development
10. Collectif Stratégies Alimentaires
11. Gerdal, Groupe d'Expérimentation et de Recherche : Développement et Actions Localisées
12. National Concertation of Farmers' Organisations in Cameroon
13. The Agricultural Research Institute for Development
14. Union of Baptiste coffee cooperatives
15. Federation of cocoa cooperatives in the north of France
16. National Platform of Haitian Coffee Producers
17. Université Chrétienne du Nord d'Haïti
18. Faculty of Agriculture and Veterinary Medicine of Haiti - Université d'État d'Haïti
19. Conseil Expérimentation Formation en Fruits et Légumes/Association for the Progress of Farmers (FIFATA)
20. Centre National de Recherche Appliquée au Développement Rural, Madagascar

Project name	Country	FO	Agri-agency partner	Research partner
Improving farmers' vegetable seed production through research and innovation in agroecological practices in Mali	Mali	CNOP[21], UNCPM[22]	AFDI	IER[23]
Saving banana plantations through agroecology in Mindanao, Philippines (Save the Bananas)	Philippines	FARMCOOP[24]	TRIAS	University of Vermont
Participatory innovation of agroecological practices in North Kivu, Democratic Republic of the Congo (DRC)	DRC	LOFEPACO[25], FOPAC[26], SYDIP[27], COOCENKI[28]	CSA	INERA[29], UNIGOM[30], UCG[31], Gerdal
Promoting nutritious peasant rice in the Casamance region of Senegal	Senegal	AJAC[32], FONGS[33], CNCR[34],	ASPRODEB[35]	ISRA[36], IPAR[37], LARNAH[38], UAS-Z [39]
Improving the productivity and profitability of the sunflower value chain by strengthening the participation of women in the Arusha region of Tanzania	Tanzania	MVIWAARUSHA[40]	We Effect	TARI[41]
Provision of climate-adapted services by local farmers' organisations in Tanzania	Tanzania	TTGAU, NADO	FFD	SUA

Additionally, it is important to note that:

- These projects are ongoing and will continue until 2025. Therefore, the presentation of results, progress, and challenges is preliminary and may be further refined before project completion.
- For clarity, references to projects will primarily be made by country. However:
  - In Tanzania, where two projects are being implemented, the acronym of the FO responsible for their implementation will also be specified.
  - For the projects in Brazil and Uruguay, references will explicitly mention the country concerned due to significant differences in strategies and activities between the two countries.
  - In the case of the Pacific Islands, the action research project has been implemented in five different countries (Cook Islands, Fiji, Papua New Guinea, Solomon Islands, and Tonga) following a largely similar approach. Therefore, the processes implemented in one of these countries (the Solomon Islands) has been used as an example and explored in greater depth.

21. National Coordination of Farmers' Organisations in Mali
22. National Union of Cooperatives of Planters and Market Gardeners of Mali
23. Institute of Rural Economics
24. Foundation for Agrarian Cooperatives in Mindanao
25. Ligue des Organisations des Femmes Paysannes du Congo
26. Federation of Agricultural Producers' Organisations of the Congo in North Kivu
27. Union for the Defence of Farmers' Interests
28. Cooperative Centrale Du Nord-Kivu
29. The National Institute for Agronomic Studies in Congo
30. University of Goma
31. Catholic University of the Graben
32. Association of Young Farmers of Casamance
33. Federation of Non-Governmental Organisations of Senegal - Action Paysanne
34. Conseil National de Concertation et de Coopération des Ruraux/National Council for Rural Dialogue and Cooperation
35. Senegalese Association for the Promotion of Grassroots Development
36. Senegalese Agricultural Research Institute
37. Initiative Prospective Agricole et Rurale
38. Human Nutrition and Food Research Laboratory, Cheikh Anta Diop University, Dakar
39. Assane Seck University Ziguinchor
40. A network of farmers and livestock groups in the Arusha region of Tanzania
41. Tanzania Agricultural Research Institute

2.3. The methodological approach implemented

The overall approach adopted for the evaluation process followed a standard methodology:

- Evaluation of specific action research experiences by the actors involved, focusing on:
  - Identification of key steps in project implementation.
  - Provision of a concrete description of what was done, by whom, and the results achieved at each stage.
  - Analysis of activities carried out, including progress made, results obtained, challenges encountered, and any explanatory factors.
- Cross-disciplinary analysis of all experiences to highlight commonalities and specificities and derive broader lessons.
- Development of a first draft of an evaluation, to be presented and discussed with partners and project leaders, before finalization of the document.

This evaluation approach was informed by various activities, including:

- A documentary review of project information: project reports, PowerPoint presentations, minutes of meetings, etc.
- Three 2-hour evaluation sessions via videoconference in July 2024, organized by language:
  - French-speaking: Burkina Faso, Burundi, Cameroon, DRC, Haiti, Madagascar, Mali, and Senegal
  - English-speaking: Pacific Islands, Philippines and Tanzania
  - Hispanic/Lusophone: Brazil and Uruguay

For each session:

- One or two experiences of implementing an action research approach were presented. Criteria used to select the projects included:
  - Having made significant progress in implementing the action research approach.
  - Having a certain level of representativeness of the types of approaches implemented across the group of projects involved in each session.
  - Being prepared to present progress and difficulties encountered in an open manner, to discuss how these could be overcome.
- The presentations were prepared in advance of each session: Information included in the presentations include a description of the various stages of implementation, and a summary of the main results obtained, and the difficulties encountered:
  - Guidelines were sent to the presenters who then sent a draft PowerPoint presentation.
  - If necessary, feedback was shared with the presenters to improve the presentation.
- Each session took place in three stages:
  - Presentation of experiences.
  - Discussions between participants about the experiences presented.
  - A round-table discussion with all participants so that each project could share the similarities and differences they identified in their own experiences.

- A workshop for discussion and exchange was organized in Gembloux (Belgium) in November 2023 by Collectif Stratégies Alimentaires (CSA) and AgriCord. Several project leaders participated (both in person and via videoconference), including other key stakeholders involved in action research. It provided an opportunity to present and exchange insights on various action research experiences (in Cameroon, DRC and Tanzania in particular) and to facilitate working groups on two key questions:
  - How can action research themes that genuinely address farmers' challenges be effectively identified and defined?
  - How can action research protocols that strike a balance between scientific and technical rigor and a participatory approach be designed and implemented?

The main insights and findings from these discussions have been compiled in this document, particularly in terms of the key learnings.

Additionally, this document includes an evaluation of experiences from other activities implemented within the FORI programme in Burundi and DRC, in partnership with CSA and with the support of Gerdal.

03. Approaches used, activities carried out, and results obtained in the implementation of action research processes

Despite differences in how they are formalized[42], the implementation of action research processes are broadly similar across the different projects supported by the FORI programme:

1. **Identification and formulation of key (strategic) issues and problems to be solved.**
2. **Definition and consultation on action research themes.**
3. **Development of protocols and/or action research plans.**
4. **Selection of farmers to participate in the project.**
5. **Implementation of protocols and data collection.**
6. **Processing and analysis of collected results.**
7. **Dissemination and utilization of results.**

While the steps and activities undertaken to achieve each stage differ in certain respects, they also share commonalities. These are presented in this section, grouped by each stage.

> "During the workshop, there was a broad consensus on the general approach, and going forward, the FORI projects will offer a wealth of diverse experiences." (report from FORI Gembloux workshop, 2023).

3.1. Identification and formulation of key (strategic) issues and problems to be addressed

3.1.1. Agroecological transition issues most often identified in connection with value chains supported by FOs, and considered strategic for their members

In most cases, agroecological transition challenges **were identified during the project proposal stage. This typically occurred through discussions and exchanges between FO leaders and partner agri-agencies, taking into account their knowledge and analysis of local situations and challenges**[43] and also strategic value chains relevant to their members and local contexts.

The table below provides a country-by-country summary of the identified challenges:

42. Some projects organized the stages differently, providing varying levels of detail and using different names for them.
43. The only exception is Senegal, where the problem was formulated at the request of a local FO: "In our case, the idea for the project came from the farmers themselves. They came to ASPRODEB with the idea that we should help them restore their traditional crop varieties. When the opportunity arose with the launch of this project, we shaped it to support them in reviving these traditional varieties" (Senegal).

Country	Value chain	Challenges
Brazil	Vegetables	Increase the productivity of horticultural and fruit value chains through resilient and sustainable agroecological practices, using both indigenous and adapted/resistant seeds, bio-inputs, direct seeding, and farmer-to-farmer agroecological knowledge exchanges.
Uruguay	Fruit	Provide evidence that an agroecological transition is viable for both conventional producers and public authorities (for public policy purposes), and identify possible approaches and methods for scaling up an agroecological transition (only 1% of farmers practice agroecology).
Burkina Faso	Onion (45% of market garden land)	Improve incomes of onion value chain stakeholders: • Application of agroecological practices to improve onion production and conservation. • Reduction in post-harvest onion losses (due to poor quality bulbs and inadequate storage facilities). • Improvement of market access for FOs (warrantage and bulk sales).
Burundi	Various	Strengthen the resilience and food security of family farmers in the face of declining soil fertility, the spread of crop pests and diseases, and environmental degradation
Cameroon	Local chicken	Increase the productivity and resilience of local chicken farming to boost income generated by this activity, which is largely operated by women
Haiti	Coffee and cocoa	Address environmental and agronomic problems, and improve farmers' sources of income by diversifying agroforestry production and capturing carbon
Pacific Islands	Breadfruit	Improve food security, economic opportunities, and cultural heritage through sustainable breadfruit production, processing and market development, which is a versatile and nutritious crop
Madagascar	Market gardening	Reduce losses from pests and disease, and the excessive use of synthetic fertilizers by identifying effective alternatives that are less harmful to health and more eco-friendly
Mali	Farmers' vegetable seeds	Develop a network of quality vegetable seeds, grown using agroecological practices, as an affordable and suitable alternative to commercial seeds
Philippines	Bananas	Combat fusarium and biodiversity loss caused by monocultures and intensive use of pesticides (leading causes of major losses in Mindanao's banana plantations)
DRC	Rice, maize, potato	Promote sustainable soil fertility management and pest control for the major food crops in intervention areas (rice, maize, and potatoes).
Senegal	Traditional rice varieties	Promote and preserve traditional rice varieties, where salinization is reducing land available, to secure a more sustainable and diversified food system
Tanzania	Sunflower	Improve the productivity and profitability of the sunflower value chain (an important cash crop in Arusha) by increasing the participation of women, preserving local varieties, increasing yields, reducing soil fertility degradation, and combatting pests and diseases with cheaper agri-inputs.
Tanzania	Trees (avocado and macadamia)	Improve the capacity of local FOs to provide services to their members in relation to tree crops, with a focus on climate adaptation.

- Across all projects, a common underlying objective is to **support family farming in the face of agroecological transition challenges**. These can be grouped into two main categories, depending on the country, territory and/or sector involved:
  - **Family farmers, with traditional low-input production systems who have limited means to access Green Revolution technologies** (improved seeds, synthetic fertilizers and pesticides, etc.). Most projects felt that agroecological practices were more accessible ways to increase production and productivity.
  - **Family farmers engaged in intensive agriculture,** and using Green Revolution technologies which are resulting in soil degradation, insect and disease resistance, increasingly expensive and inaccessible inputs, and health risks (e.g., banana growers in the Philippines, and market gardeners in Uruguay and Madagascar).

- While 12 of the 13 projects target specific value chains, in practice they **mainly focus on the production level which is the primary focus for FOs and their members (often in response to models promoted by the Green Revolution):**
  - **Prevention and/or natural control of crop pests and diseases** (8 projects: Burkina Faso, Brazil, Burundi, DRC, Madagascar, Mali, Philippines and Tanzania/MVIWAARUSHA)
  - **Sustainable/agroecological management of soil fertility** (7 projects: Brazil, Burkina Faso, Burundi, DRC, Madagascar, Tanzania/MVIWAARUSHA and Tanzania/TTGAU-NADO)
  - **The recovery and multiplication of traditional seeds** adapted to local conditions and/or climate change challenges (5 projects: Brazil, Mali, Pacific Islands, Senegal and Tanzania / TTGAU-NADO)

- In terms of production, it is also interesting to note that:
  - Three projects focussed on **improving agroforestry systems and/or adapting them to climate change** (Haiti, Pacific Islands and Tanzania/TTGAU).
  - While the integration of agriculture and livestock farming is often a major challenge in agroecological transition processes, only one project (in Cameroon) looked at **livestock farming, specifically of local chicken breeds.**

- Several projects looked at **value chain integration beyond production**, and defined specific strategies to tackle the challenges:
  - **Burkina Faso:** analysed the effect of agricultural practices on onion quality and tackled storage and marketing challenges.
  - **Pacific Islands:** focussed on the entire breadfruit value chain, including post-harvest management, preservation, processing, marketing and consumption.
  - **Madagascar:** promoted agroecological products in local markets through participatory certification mechanisms.
  - **Cameroon:** looked at online or physical marketing platforms to improve the marketing of agroecological products.

- Many projects had advocacy components (or planned to). However **their primary aim was to resolving challenges faced by farmers during an agroecological transition** process. **Uruguay is the exception, where the project's primary goal is to prove to policymakers that an agroecological transition by traditional farmers is possible.**

"We are part of the national agroecology plan's governance. One of its priorities is to scale up the pace of agroecological transitions. The problem with past governments is that there was no budget and no political will to fund it with the resources needed for this scale of change. What we want to do is to demonstrate ways of achieving this so that future political decision-makers will consider devoting resources to it. This type of project therefore plays a role in building evidence that increasing the agroecological transition is possible on conventional farms, and also demystifying some arguments put forward by our own producers, that "agroecology is not profitable." We're not working with farmers who want to be agroecological, but with conventional farmers who want to survive as family farmers. We want to show these farmers that agroecology is the way forward in the face of existing challenges. There will be a great deal of added value once the conditions for an agroecological transition are in place, and the path is already mapped out." (CFR, Uruguay)

3.1.2. Diagnostic analyses of farming situations, practices, and the problems to be addressed

Once the key issues to address had been identified, and the projects formulated and approved, most then conducted a more in-depth analysis of farmers' situations, practices, difficulties they were encountering, and potential entry points for action research to overcome the obstacles. This was done in a variety of ways, and with varying degrees of participation by different stakeholders:

Project	Purpose	Method	Led by
Burkina Faso/ CPF	Characterize agroecological production, storage practices and priority problems Identify, characterize and analyse existing warrantage and group sales initiatives	Data collection (surveys) at six market garden sites, involving 226 stakeholders (farmers, traders, technical service providers), followed by processing and analysis of the data collected	Team of researchers
Tanzania/ MVIWAARUSHA	Identify applied agricultural practices and assess soil health in the villages Use participatory tools to identify and analyse farmers' problems	Focal groups, surveys (using FAO's TAPE tool), and analysis of soil samples involving 60 leading farmer experimenters	FO and TARI
Burundi and DRC	Characterize farming practices and the underlying concepts that support them Formulate, validate and prioritize the problems to be solved	Carry out case studies of production systems in the intervention areas Meetings to express concerns and validate and prioritize problems to be dealt with	FO support from Gerdal
Pacific Islands/ Solomon Islands	Identify and characterize farming/traditional practices, which are then integrated into and carried out as action research themes		
Uruguay	Draw up a plan for each family involved in the project, considering their objectives and context, to help them transition to agroecological production	Provide individual support for six family farms and one collective farm to assess their farm and consult with them on the redesign plans	FO
Mali	Identify traditional practices for seed production in project intervention zones, as well as the constraints and potential for seed multiplication	Participatory diagnostic study of local players, practices and innovations	Consultant
Tanzania/ TTGAU-NADO	Identification by farmers of priority challenges impacting the resilience of their current production, and plan possible interventions linked to the integration of trees into food crop production.	Use of the Building Resilience Tool	
Cameroon	Characterize local animal husbandry practices, including agroecological practices and producers' needs		
Senegal	As the request came from a group of local producers, there was no diagnostic phase.		
Philippines	Identify existing knowledge related to Fusarium and its impact on banana plantations, and capacity-building needs at the FO level.	Organize and run a workshop with all partner FOs	FO

Project	Purpose	Method	Led by
Madagascar	Understand the farming context and identify the main problems facing farmers Identify agroecological solutions and practices already tested and adopted/rejected by farmers Establish a solid reference base about agroecological solutions/practices	Carry out initial analysis in three intervention regions (Amoron'i Mania, Vakinankaratra, and Haute Matsiatra)	FO

- FOs and their technical teams played a major role at this stage, usually by carrying out direct field visits, surveys, meetings, focus group discussions with farmers (often FO members) and other relevant stakeholders. The purpose of these activities was generally threefold:
  - **Better understand and characterize the situation at the local level**, including farmers' practices, the concepts underlying these practices, the technical and economic results obtained (as seen in DRC and Burundi), marketing practices, market characteristics, soil properties, etc.
  - **Collect and/or encourage farmers to express their views** on the challenges they face, their concerns, specific problems they wish to address, aspirations, etc., in relation to the initial issues identified.
  - **Identify agroecological practices already applied by farmers** (traditional practices) that could offer potential alternatives to current challenges in order to overcome them.

- **The role of the research actors varied** depending on the situation:
  - **In some cases they were entirely absent during the initial stage**. They were only contacted at a later stage once local contexts and specific problems had been better identified. In some instances, discussions were already underway to establish and agree the action research partnership for the upcoming stages.
  - **More commonly, research actors provided technical and methodological support**, including **capacity-building for FOs** to carry out these activities, and process and analyse the data collected, etc. It is important to note that agri-agencies also often played an important role.
  - **In only one case (Burkina Faso), the FO tasked researchers with directly carrying out this diagnostic phase.** A somewhat similar situation occurred in Mali, where the FO chose to outsource the diagnostic work by hiring a consultant. However, in that case, the study faced difficulties and the contract was terminated before it could be completed.
- **The level of farmer participation at local level varied** depending on the context and type of activity:
  - As **sources of information** on the local context and farming practices, by responding to surveys.
  - As **stakeholders consulted**, in meetings and focus groups, where they were invited to share their point of view on their local realities, difficulties, and problems to be solved.
  - As **co-participants** in defining priorities and/or the action research activities to be carried out, particularly when feedback and validation meetings were organized directly with farmers themselves (and not only with FO leaders).

- **In only a few cases was this diagnostic phase not carried**, or was only done briefly:
  - When **the specific problem to be tackled was already clearly identified from the outset**, such as the impact of Fusarium wilt on banana plantations in the Philippines.
  - When **the problem to be addressed came directly from the local farmer group** that was then later engaged in the action research process (as in Senegal):

"Initially, it was the growers themselves who went to the different communities to collect the varieties they knew. When they returned, they were the ones who chose the women farmers to carry out the experiments. Together with ASPRODEB, we went to see the research institute, which agreed to support their activities." (Senegal)

  - In cases where **analysis and diagnostic activities were fully integrated into the implementation of action research processes**, rather than being treated as a preliminary stage, as was the case in the Pacific Islands (see more details in the following sections). In these contexts, the starting point for the implementation of action research processes was the creation of multi-stakeholder platforms.

3.1.3. The creation of multi-stakeholder platforms as the starting point for action research processes

In the case of the Pacific islands, the approach was different, as the first step was to **set up multi-stakeholder 'innovation groups' on each of the islands involved in the project** (Cook Islands, Fiji, Papua New Guinea, Solomon Islands, and Tonga). These groups were formed following exploratory missions to these islands, supplemented by a review of relevant documentary analysis.

These missions aimed to identify all of the stakeholders on each island who were actively involved with breadfruit, and whose key objectives could be aligned with the project. These stakeholders were then invited to join the innovation groups, which brought together FOs and their representatives, private and public stakeholders and research partners. Each group is coordinated and managed by the lead FO on its respective island, and each member brings a different perspectives to the group.

→ These multi-stakeholder platforms made it possible to:
- Build a common understanding of key concepts related to innovation clusters and farmer-led research.
- Identify more specific challenges related to the breadfruit value chain. For example, in the Solomon Islands, the following priorities were defined:

"Optimizing and promoting the sustainable cultivation and use of breadfruit, including improved cultivation methods, redesigning agroforestry systems, propagation techniques, standardizing varieties, improving primary processing, food product innovation, nutritional analysis, post-harvest processing techniques, and market development strategies to increase demand, consumption, and the national and international market presence of breadfruit products." (Pacific Islands)

- Identify research priorities, based on this shared understanding of the challenges to be addressed in order to improve breadfruit production and strengthen the local breadfruit value chain.

3.1.4. Action research processes grounded in the social organization of farming families

In Brazil, the operational starting point was the core groups of the ECOVIDA network. These local groups established an operational structure (working groups) that committed to implementing the action research processes. This organizational dynamic was central to the initiative. It enabled the formulation of research projects by each of the 34 family farmer groups involved in the project, aligned with the priority issues they had identified.

These working groups received technical support at various stages:
- Characterizing the objective situations in which the research would take place: including the social, organizational, productive, and technological context.
- Determining the priority problems to be addressed through the research, and the practices to be explored.
- Formulating and implementing micro action research projects within each group.

3.2. Definition and consultation of action research themes

In most projects, the formulation of action research themes was based on the specific problems identified or validated during the previous phase. These problems, served as starting point to design the topics to be investigated:

Project	Problems identified	Action research themes
Burkina Faso/CPF	• Insufficient availability of water for irrigation • Insufficient organic manure (conflicts over use of straw for fodder) • Post-harvest onion losses	• Impact of efficient water management practices (cultivation operations (hoeing), mulching) on onion productivity. • Impact of different types of organic fertilizer on onion productivity. • Impact of biological pesticides on disease and pest control • Cross-sectional analysis of the impact production practices had on onion quality.
	• Difficulties in accessing storage and marketing facilities for onions	• Evaluation of different warrantage models to determine which is best suited
Tanzania/ MVIWAA-RUSHA	• Low yields, deteriorating soil fertility, high rates of disease and pest attacks, high input costs	• Impact of using farmyard manure and different varieties on yields, oil content of sunflower seeds • and incidence of disease
Tanzania/TTGA-NADO	Difficulties and limitations in: • Access to suitable genetic material for tree plantations and tree crops • Management of planting material • Silvicultural management to improve/maintain yields • Obtaining alternative sources of income to improve the profitability of land under tree plantations	• Production and testing of biochar as a fertilizer for food crops (maize and beans) planted with trees • Hive management/beekeeping as an additional activity • Alternative management practices for wooded areas • Alternative management practices for growing seedlings of local species in the local FO nursery • Testing of digital applications for fire monitoring and soil improvement
Pacific Islands/Solomon Islands	• Existence of a wide variety of unidentified and uncharacterized local breadfruit varieties • Agroforestry systems used to grow breadfruit trees are often old and unproductive • Low local consumption of foods prepared from breadfruit • Market access difficulties	• Morphological characterization of existing local breadfruit varieties in three Solomon Islands provinces to analyse variations from one tree to another (particularly in terms of production) • Optimization of agroforestry systems based on breadfruit, through: ⊖ Evaluations of planting patterns, row/plant spacing, intercropping, mixed cropping and alley cropping ⊖ Evaluations of the results of pruning 20-year-old trees to observe survival after drastic pruning and changes in growth and shape • Effects of different breadfruit processing methods (traditional and modern) on process efficiency for small- and medium-sized enterprises • Identification of traditional breadfruit recipes, and development of new ones • Study existing marketing channels (local, provincial, national and export) for fresh, processed and diversified breadfruit products

Project	Problems identified	Action research themes
Uruguay	• Limitations of intensive, conventional production methods: high production costs, soil depletion, disease and pest resistance, health risks	• Analysis of progress in the agroecological transition of conventional family farms, based on validated good agricultural practices developed nationally through collaboration between research centres and FOs, using a co-innovation approach. • Assessment of the impact achieved on production systems through the implementation of good agricultural practices within a co-innovation approach, over a three-year period.
Brazil	• Difficulties in accessing local, non-hybrid seeds adapted to local agroecological systems • Lack of tools and equipment suited to small-scale agroecological production • Increasing climate variability and occurrence of extreme weather events	• Identification of open-pollinated seed and seedling varieties, and analysis of their degree of adaptation to local conditions • Identification and validation of different recipes for bio-inputs to be produced and tested on farms • Development and evaluation of the effects of different organic vegetable direct seeding technologies on soil health, workload and resilience to climate change
Madagascar	• Extensive damage caused by pests and diseases • Extensive (and sometimes excessive) use of synthetic fertilizers	• Performance of organic fertilization on potato production • Performance trials of tomato varieties • Biological control of onion mildew • Biological control of thrips in onions • Control of tuta absoluta in tomatoes
Philippines	• High incidence of Fusarium in conventional intensive banana monocultures, which are increasingly difficult to control with synthetic pesticides	• Combined effects of a set of practices (compost application, crop diversification and others) on the incidence of Fusarium Oxysporum f.sp. Tropical Race 4 (TR4) in banana plantations
Senegal	• Increasing trend towards the loss of traditional local varieties	• Evaluation of the productivity of different local/traditional rice varieties by comparing them with improved varieties
Mali	• Market garden production limited by access to seeds • Farmers capacity to produce farm-saved seed not sufficiently recognized/considered (political issues)	• Evaluation of germination rates and productivity of seeds produced from market garden crops and the application of bio-inputs
Burundi	• High rates of crop pests and diseases • High cost of preventive and curative plant protection products that aren't a health risk • Challenge of restoring soil fertility without using manure or chemical fertilizers • Heavy rain or drought causing crop losses	• Impact of applying a sand/ash mixture on the incidence of armyworms in maize • Impact of applying Tithonia Purin on the incidence of armyworm in maize • Impact of using banana rhizomes on tomato pests • Impact of incorporating Tithonia Purin as a green manure on crop yields (rice, maize, others) • Impact of applying different types and thicknesses of mulch on crop yields

Project	Problems identified	Action research themes
DRC	• Challenge of controlling crop pests (maize, potatoes, cabbage) • Challenge of restoring and maintaining the fertility of over-exploited, fallow soils	• Impact of local types of bio-pesticides (ingredients, form of preparation and doses) on the control of maize, potato and cabbage pests • Impact of combining leguminous plants (beans, soya, lupins, peas, mucuna) with maize on farm fertility and crop profitability • Impact of different types of organic fertilizer (goat, rabbit, guinea pig, other) on crop yields (maize, rice)
Cameroon	• Poor access to locally bred chicks • Variable poultry diets and medicinal treatments based on local know-how • Little or no livestock habitat • Weak capacity to manage livestock • Lack of market access and knowledge	• GIC Friendship (Ngaoundéré): livestock farmers have come together to conduct joint experiments and pool livestock breeding, and the production of fodder and medicinal plants • GIC AGREN (Nkolmefou): farmers run their livestock production activities individually. Pastoral fields and medicinal plant production gardens have been set up to feed chickens

→ A key insight[44] across multiple country experiences is that, for farmers, the starting point of any change in practices lies in the challenges they want to overcome—the questions they raise and the problems they wish to resolve. **Initiating action research processes through the identification and joint analysis of these problems proved highly relevant and effective.**

"To be functional and have an impact, innovation must start from the concrete reality of families' lives. The greater the understanding, the more effective the actions." (Brazil)

→ Documentation of experiences in Burundi and DRC shows the **importance of formulating these problems as clearly and precisely as possible. Doing so ensures they reflect farmers' perspectives as faithfully as possible.**

"We held an initial meeting with the farmers, in which we invited them to express their concerns as precisely and completely as possible. Then we formulated problems (how to...) that reflected these concerns as closely as possible and presented them at a second meeting to confirm with the farmers that these were indeed the problems they wanted to resolve." (DRC).

Farmers concerns	Initially formulated problem that does not accurately reflect the concerns expressed	Reformulation problem that more accurately reflects the concerns expressed
"We cultivate our fields every season without rest or fallow because of the scarcity of fields and the growing population." "We are not accustomed to transporting organic matter from the farm (livestock area) to the fields because of the long distance and difficult transport conditions."	How can we strengthen and maintain the fertility of our fields?	How can we maintain the fertility of our fields when we can no longer fallow and fields are too far away to take manure?
"We can't manage to grow maize properly: we don't respect the time for weeding, line sowing or treating diseases, because we are too busy with other activities or are prevented from doing so by social challenges (bereavement, illness, etc.)."	What can be done to improve cultivation techniques to increase maize production?	How can we ensure that our cultivation practices are carried out on time when we're so busy with other things?

44. From research on the sociology of work and changes in agricultural practices, carried out by Gerdal (see Introduction).

Farmers concerns	Initially formulated problem that does not accurately reflect the concerns expressed	Reformulation problem that more accurately reflects the concerns expressed
"During the rainy season, especially during the ploughing period up to sowing and plant emergence, when the fields are not yet well covered by vegetation, gullies can be found in the fields. All of the soil and the tops that were there will end up in the shallows." "In cases where the plants already had a certain height and could resist, they fall and lie down along the slopes." "No technique is currently available to deal with this scourge."	What can be done to limit the damage caused by soil erosion during the rainy season?	What can be done to limit the damage caused by erosion in fields during the rainy season when they are not yet well covered by vegetation?

- It is important to note **that the problems identified and validated in the previous phase did not, in themselves, constitute action research themes, as they fall within different categories:**
  - **The problems are practical in nature**, referring to unsatisfactory situations that need to be changed—typically by applying new practices. Examples include excessive use of chemical products, severely degraded soils, low production levels, or persistent pests infestations that cannot be controlled.
  - **Action research themes and processes lead to the production of technical scientific knowledge** that will be useful in resolving the practical problems identified. Examples include the effect of organic fertilizer on yields, bio-pesticides on the incidence of pests, and the identification and classification of traditional seed varieties.

- The transition from identifying problems to defining action research themes was not automatic. It required a process of **analysis and reflection, which took different forms and involved varying levels of participation from different stakeholders, depending on the project:**
  - **Led by researchers**, based on their analysis of local situations and problems, combined with their knowledge of potentially relevant technical alternatives worth testing. These proposals were then presented to other stakeholders—particularly FOs and, in some cases, the farmers themselves—for validation. This was the case in Burkina Faso (for production-related challenges).

"Farmers tell us about their difficulties and we try to look into this further with the help of researchers, and from there, experiments are identified." (Burkina Faso)

  - **Led by FOs**, either by leadership or technical staff, often in consultation with other stakeholders such as researchers, partner agri-agencies, and sometimes farmers themselves. This was the case in the Pacific Islands, where innovation platforms were established) as well as in Burkina Faso (for themes relating to onion storage and marketing).

"In all five islands, the process of formulating research priorities was the same: we set up innovation platforms in each country. The priority research topics were defined within these platforms: brainstorming sessions were organized on breadfruit-related problems. We had researchers on the team, farmers and various stakeholders... so we identified all of the different questions that needed to be answered through the action research process. The process of identifying research priorities was the same, but the research priorities differed from one country to another: Fiji focussed on a gene bank, while the Cook Islands emphasised transformation. But the approach in terms of methodology was the same." (Pacific Islands)

  - **Led directly by farmers**, particularly those actively involved and interested in implementing action research processes on their farms. This was observed in several countries:
    - **Senegal:** a group of producers initiated the action research project themselves, focussed on the recovery and analysis of traditional seeds and their productivity.
    - **Brazil and Madagascar:** farmers (individually and collectively) were directly responsible for defining and implementing action research projects or protocols, with the support and guidance of other stakeholders.
    - **Uruguay:** with the support of Fos, farmers developed their own plans to redesign their farms, defining which agroecological practices to adopt based on their objectives and contexts.
    - **Philippines:** farmers were directly involved in designing prototype agroecological banana plots they wanted to test.
    - **DRC and Burundi:** FOs organized brainstorming meetings with groups of farmers intending to take part in action research and researchers. The aim was to identify possible solutions to the identified problems and agree on possible action research themes. Interested farmers were then able to choose which practices

they wished to implement.

→ In addition, **other factors were sometimes considered when defining the action research themes:**

- **Existing 'endogenous' agroecological practices already applied by farmers** were sometimes integrated into action research protocols. This served various purposes:
  - ⊖ **To compare** these practices with other agroecological alternatives proposed by researchers:

"We have identified agroecological practices to be tested using endogenous solutions based on exchanges between farmers and research structures, and we want to compare them with farming practices that have been improved by research." (Burkina Faso)

  - ⊖ **To scientifically test the effects of these practices**, before promoting their wider application:

"In Madagascar, many of the proposals for research topics and protocols are based on practices that farmers are already implementing themselves and they want to check that they really work, scientifically."

  - ⊖ **To improve traditional agroecological practices,** such as the management of agroforestry systems or the use of animal manure as organic fertilizer.
- **The expertise and interests of the researchers** involved as action research partners also influenced the selection of certain agroecological practices to be tested over others.

3.3. Development of research protocols and selection of participating farmers

Once the action research themes were defined, the next steps generally involved the development and validation of experimental protocols, followed by their implementation.

Projects	Formulated protocols	Achievements
Burkina Faso/CPF	Four experimental protocols have been validated (in relation to three identified themes) and one biochemical analysis protocol analysed the effect of agroecological practices on onion quality	Three sites, nine experimental plots and 364 farmers involved (in terms of inputs, monitoring and advice, guided tours) All protocols were tested on the three sites (one collective experimental plot per site)
Tanzania/ MVIWAARUSHA	One standard experimental protocol with eight treatments covering all issues identified	60 experimental plots set up by 60 leading farmers
Tanzania/ TTGAU-NADO	Defined and implemented experiments on defined themes	
Brazil	At each regional core level, research projects were formulated with specific objectives and methodologies, linked to the identified themes and the locally specific problems	A total of 34 core groups established and managed their own research units to carry out experiments on priority themes: 10 groups focussed on seedlings and seeds 10 on green manures and direct seeding, and 10 on the preparation and use of bio-inputs
Madagascar	Each producer drew up a proposal for the experimental protocol they wanted to implement: the practices to be tested, the number of repetitions The protocols were then presented, validated and finalized by researchers	A total of 39 farmers carried out experiments on fertilization, biological control and varieties: potatoes (15), fertilization of onions (7), biological control of mildew on onions (4), fertilization with different types of biochar (rice husks, groundnut hulls, etc.), tomato varieties (4) and strawberries.

Projects	Formulated protocols	Achievements
Mali	The development and implementation of research protocols on issues relating to bio-pesticides, fertilization, diseases and varietal aspects were carried out in 10 villages where farmers identified a site each to carry out the corresponding experiments (a total of 45 participating market gardeners were identified)	
Philippines	Definition and implementation of prototype diversified banana plots	Four cooperatives engaged in setting up the prototypes
Senegal	Definition and implementation of protocols (led by researchers) to assess the productivity of different traditional rice varieties	Experimental plots were set up in parallel on-station and in farmers' plots (with the same varieties)
Cameroon	A research protocol was proposed by the project's IRAD focal point The protocol was discussed with all stakeholders (FOs, AAs, and farmers) through a scientific platform (including GIC focal points[45] to represent producers' point of view)	Six pastoral fields in production, covering an area of 6.57 ha (maize, sweet banana, sweet potato, cassava), and eight sites prepared for the next seaso
Burundi	Five research protocols were formulated by researchers then presented, adjusted and validated with farmers	A total of 81 growers set up experimental plots using the protocols in 2023: mulching (4), incorporation of Tithonia Purin (9), use of sand and ash against armyworm (39), and use of Tithonia Purin (29)
DRC	Research protocols were formulated by researchers then presented, adjusted, and validated with the farmers: two to three protocols were presented in each locality in line with their priority themes, then the farmers chose the protocols they wanted to implement according to their own interests and farm types (individual or collective)	Forty experiments, chosen by farmers, were set up in 2023 in eight villages/sites (on individual or collective farms): an average of 20-25 sites • 20 on biopesticides • 10 on the impact of organic and synthetic fertilizers • 10 for maize/legume combinations

- Researchers have generally played a central role in development and validation of protocols, however their involvement varied from project to project:
  - In most cases, researchers were responsible for formulating protocol proposals, which were then presented, discussed and possibly adjusted with input from other stakeholders. Within this discussion-validation process, two main approaches can be observed:
    - Standardization approach: A preference to finalize a very small number of protocols (sometimes just one) to be implemented uniformly across multiple sites. This was intended to enable the most valid and rigorous technical and scientific comparisons possible, while still considering certain local specificities. Examples include Burkina Faso, and Tanzania/MVIWAARUSHA.

"The researchers proposed standardized research trials to ensure sufficient quality." (Tanzania/MVIWAA-RUSHA)

    - Adaptive approach: Establishing a general framework that could subsequently be locally adapted by farmers according to specific contexts and interests. This included adjustments in treatment types, bio-input ingredients (depending on local availability), control plots, crops, etc. This approach resulted in a variety of specific protocols addressing the same research theme, notable observed in Burundi and DRC.
  - In some projects, researchers played more of a capacity-building role, providing methodological support, and/or reviewing and validating protocols initially formulated by the far-

45. Groupes d'Initative Communes (GIC) are common initiative groups, and in this case were representatives of local-breed chicken FOs.

mers themselves. This was notably the case in Madagascar, within the Pacific Islands projects (where innovation groups included researchers), and also in other countries. Although in some of these cases the term 'protocols' was not explicitly used, similar processes tool place in Brazil ('research projects'), Uruguay ('farm redesign plans'), and the Philippines ('prototypes').

→ The role of researchers in defining and validating protocols directly influences the role and level of participation of the farmers involved. This participation varies depending on the approach taken:
  - In the case of standard protocols, farmers' role in defining them is often limited, although they are sometimes given some leeway (e.g. in Tanzania/MVIWAARUSHA and Tanzania/TTGAU). In some cases, the identification of farmer-experimenters only takes place once the protocols have been defined. At that stage they are presented to farmers, and those interested or meeting certain criteria are selected to collaborate in their implementation (e.g., Burkina Faso).

"First, we identified 60 leading farmer-researchers. Then we brought them together with the research institution to strengthen their capacity to organize trials. Then we developed the research protocol, and this was discussed so that the farmers could be involved in the design. Another thing was to select the variety: the farmers were given the opportunity to propose local varieties that they preferred and that they use, and the programme came up with improved varieties." (Tanzania/MVIWAARUSHA)

"Once these protocols have been validated, we proceed to train the players, set up the experimental kits with the experimental growers who will be conducting the experiments, and select the sites and growers." (Burkina Faso)

  - In the case of locally adapted protocols, farmer participation is mainly functional. It often involves choosing the protocols they wish to implement and deciding on certain parameters (treatments, crops, controls, etc.) within an overall framework predefined by researchers (e.g., Burundi, DRC, and others).

"We visited farmers' farms according to the methodology. We worked with the farmers to identify their concerns and problems. Then we defined the themes together. From there, our researcher stepped in to help draw up the protocols. Once the protocol proposal had been drawn up, we moved on to the feedback and validation of these protocols by the farmers. The protocols focussed on the impacts of organic fertilizers, bio-pesticides and bio-fertilizers on potato production. The growers also thought it would be useful to carry out research on cabbage, which is a vegetable that is a significant crop for these villages. They have also agreed to carry out research into green manure, mucuna, maize and bean production. We have set up teams of producers who will take charge of the research activities in collaboration with the researchers." (DRC)

  - In the case of protocols developed directly by farmers, they play a central role in their design (e.g., Brazil, Madagascar, Philippines, and Uruguay).

"In our case, the farmers were really involved in the whole process, from the diagnosis stage onwards and even in defining the protocols. But first, the producers were trained by the research institution on the purpose of experimentation and the significance of the different stages in an experiment. Then it was the farmers themselves who chose the protocols to be implemented and the practices to be tested. They chose the number of repetitions, considering the minimum number proposed by the researcher. The protocols were then finalized by the researchers and the farmers implemented them on a voluntary basis." (Madagascar)

→ The selection of farmers to participate directly in action research activities in project areas was generally not driven by ideological reasons (related to agroecological transitions). Instead, selection focussed primarily on their interest in the themes addressed and their capacity to implement the planned activities (e.g., experiments or other tasks).

"The farmers themselves have a particular interest in participating. During the initial visit, they identified themselves as being part of the project. The selection of farmers/researchers by the local FO was then based on several criteria: the availability of farmers and land, their ability to allocate part of their land to research, and accessibility." (Pacific Islands)

"The selection of producers to commit to the ecological transition with the project is not a matter of producers saying, 'I want to be agroecological'. Each local organization invited 10 to 15 potentially interested people. They were then given a more direct explanation of what the project consisted of and then, using certain selection criteria, the participating producers were chosen from among those shortlisted. The people who were most interested were women and young people, and they were motivated by issues such as health (the negative effects on family health, especially in areas of intensive cover cropping with a lot of chemical products), the reduction in yields, the depletion of resources and pest management. When they no longer have sufficient resources to control pests, when there are no longer any pesticides to kill the pests they want to kill... there is an opening to see something different." (Uruguay)

3.4. Protocol implementation and data collection

3.4.1. Most protocols are based agroecological practice trials in farmers' fields, either individually or collectively

In line with the priorities and themes identified during the action research planning phase, implementation mainly involved experiments to assess the effects of agroecological practices on various variables (crop yields, pest incidence, soil fertility, labour requirements, etc.).

In almost all cases, the experiments were carried out in farmers' fields and managed by the farmers themselves. They were responsible for the entire process: land preparation, application of practices, crop monitoring, etc. The only exception was Senegal, where experiments were also carried out in parallel in research stations.

"For us, the difference is the two levels of experimentation that are carried out [on farms and in research stations]. In the end, we analyse which varieties are most productive. Traditional varieties are compared at each level with improved varieties developed by researchers. The varieties that are tested by farmers are also used by the research institute to develop controlled experiments. So, the experiments are carried out at the research station level, where everything is controlled, and at the level of the selected farmers' plots, which are also supervised by the researchers. So, everything is controlled by the researchers, who guide the farmers through the various stages." (Senegal)

→ In experiments follow fairly standard agronomic experiment schemes designed to ensure scientific and technical rigour. These include defining independent and dependent variables, setting up multiple treatments and a control, using random block designs, and standardizing experimental conditions (all else being equal). However, several projects opted to reduce the number of replications (usually to just one) and limit the number of treatments to ensure the experiments are understandable and easily adopted by farmers. In these cases, statistical validity achieved through repetition of the same experiments with several farmers.

Two main implementation approaches are used:

- Individual plots managed by farmers, where each farmer sets up their own experiment, as seen in Burundi, at certain sited in DRC, and in Madagascar and Tanzania/MVIWAARUSHA.
- Collective plots managed by farmer groups or FO, such as in Burkina Faso and in some sites in Burundi and DRC.

→ In most cases, these choices are usually strategic, made at the project level. For example: "to strengthen individual experimentation capacities"; **"**so that everyone can experiment according to their own interests and resources**"**; **"**to facilitate the implementation and monitoring of standardized protocols**"**; or **"**to facilitate and strengthen farmer-to-farmer exchanges around experimentation.**"**

"The grassroots cooperatives meet on the site to carry out experiments together, so that they can really share each other's experiences and, when they come back, share their experiences in the field with other members who did not attend. At each site, no fewer than 50 producers took part. We have an average of 50 producers per site, who were actively involved at the different stages of implementation and participated in the field sessions." (Burkina Faso)
In other cases, such as in DRC, farmers were given the choice to carry out experiments individually or collectively, depending on their preferences.

3.4.2. Alternative approaches to action research

In two projects, trials of agroecological practices were carried out without following the conventional agronomic experimentation model. This was for two main reasons:

- Operational constraints related to setting up a conventional model under local conditions and the type of crops involved (perennial or semi-perennial, with long production cycles:
  - Development and implementation of agroecological practice prototypes in banana plots, without control plots (Philippines):

"What we're doing is more like prototyping—exploring what we can do. We've tried setting up typical field trials (with random blocks, etc.), but it's just not feasible. There are so many variables (around capacity, management, etc.) that it becomes very stressful, especially without practical people on site. The difficulty when we're trying control banana experiments is that we don't know the age of the trees, so you need a larger space to carry out proper comparisons. You are working with one system that may be seven years old, and comparing it with another system that is decades old, which makes it difficult to ensure rigor. In terms of statistical rigour, we work with the University of Vermont and with a statistician who works mainly at the level of small farmers. But for us, rigour is more about participation and farmer leadership—those are the qualities we want to bring out. What we want is to create the necessary space to find out what is feasible given the fear and complexity of biodiversity, and to use farmer-to-farmer

exchanges as a way to open up minds and imagine other ways of farming." (Philippines)

- Comparative analysis of the productivity of existing agroforestry systems, to determine the productivity of different breadfruit tree varieties, planting patterns, spacings, and combinations with other crops in fruit tree agroforestry systems. No new experiments were conducted due to the length of the production cycle for this tree which would take too long to produce results. The following table presents an example of research topics, methods and results from the Solomon Islands:

Research themes	Implementation methods
Morphological characterization of local breadfruit varieties in three provinces to analyse tree-to-tree variations.	Establishment of germplasm collection of breadfruit varieties in three collection centres: • Identification, tagging and characterization of different breadfruit varieties • Collection of planting materials for storage, propagation and distribution to other farmers.
Evaluation of planting patterns, row/plant spacings, intercropping, mixed cropping, and alley cropping.	Selection of six growers (two per province) and analysis of their agroforestry systems (spacings, crop associations, etc.).
Evaluation of the effects of drastically pruning 20-year-old trees to assess survival and changes in growth and shape.	Drastic pruning of an old plantation at a training centre, with monitoring of survival rates and changes in growth and shape.

- **Inappropriateness of conventional methods** for monitoring the adoption integrated agroecological practices on farm, from a 'systems' perspective of agroecological transition.

"The process is developed in four stages for each family: characterization, farm diagnosis, redesign and monitoring. An agreement is reached with the family on the best way to redesign the farm in line with the family's goals, which not only include productive and economic aspects, but also social aspects, labour availability, family age, life plans, etc. It means defining and implementing a set of practices that will enable the family to make progress towards the agroecological transition, and then supporting and monitoring implementation." (Uruguay)

The following table gives a detailed example of research themes, methods and results in Uruguay:

Research themes	Implementation methods
Analysis of progress in the agroecological transition of conventional family horticultural farms, based on good horticultural practices validated in nationally between research centres and family production organizations.	Support the implementation of good horticultural practices in six family farms and one collective farm, using a co-innovation approach. Develop and use an index of good horticultural practices to assess the baseline and measure progress in agroecological transitions.
Determine the impact achieved on production systems, based on the implementation of good horticultural practices over a three-year period using the co-innovation approach.	Select (with farmers and research centres) and apply 61 indicators grouped into six key processes to assess and track production system changes over time.

→ These experiments are methodologically very interesting, as they open **new possibilities for action research to support agroecological transitions. They are particularly suited to studying the combined application of multiple practices and emphasizing the synergies between different components of farming systems.**

In line with identified challenges and priorities, **several projects also incorporated knowledge production activities into their action research processes, which proved useful in resolving issues in other parts of the agricultural value chain.**

"One aspect of action research involves market research, particularly warrantage and other issues. We are experimenting with warrantage practices." (Burkina Faso)

Implementation methods were adapted to suit the themes addressed:

Country/project	Themes	Implementation methods
Burkina Faso	Evaluation of different warrantage models to determine the most suitable for FOs.	• Scientific analysis of warrantage FO collective sales initiatives through: Θ Identification and characterization of existing initiatives Θ Analysis of strengths and weaknesses of these initiatives Θ Proposal for warrantage/collective sales models adapted to FOs (Income generating activity, inputs, mix) • Training of FOs to implement these models • Profitability and profit margins analysis of these models.
Pacific Islands (Solomon Islands)	Effects of different (traditional and modern) breadfruit processing methods on the efficiency of small- and medium-scale enterprises.	• Observation of post-harvest methods on existing trees. • Testing and development of new processing techniques and processes that meet national and international quality and trade standards.
	Identification and documentation of traditional and modern breadfruit-based recipes.	Consultation with producers and communities to develop and document breadfruit-based recipes.
	Study of existing marketing channels (local, provincial, national, export) for fresh, processed and diversified breadfruit products.	Collaboration with value chain stakeholders to compile or conduct studies on markets, suppliers, processors, gaps, and cost-benefits analysis of different marketing channels.

→ **Action research is not limited to field experiments. It can take many forms depending on the local context, project objectives, and the specific segments of the agricultural value chain being addressed.**

3.4.3. Monitoring activities and data collection

While researchers generally played a significant role in defining research protocols, their involvement in monitoring their implementation and collecting data was often more limited—usually due to constraints in time and resources. In response to these limitations, and sometimes as a strategic choice to strengthen the capacities of FOs and/or farmers themselves, **different systems for monitoring and supporting action research processes was established.** These system differed primarily in terms of who was responsible for data collection:

- **By the farmers themselves,** often following specific training and with the use of tools such as data sheets or notebooks in which farmers recorded their measurements, observations and/or practices applied.

"In view of the experiments, they are aware of the data to be recorded during the experiments, and it is therefore they themselves who record the data during the experiments." (Madagascar)
"On-farm trials take place with farmers. In terms of monitoring and evaluation, we have records that have been provided to the farmers. The Kastom Garden Association (KGA) has a monitoring and evaluation officer who advises how the data should be collected. This is not collected daily, since cultivation is long-term, so most of the data is collected during field visits. Daily maintenance of the plots is carried out by the farmers, who also collect individual data, such as rainfall, manure application, watering and general daily observations." (Pacific Islands)

- **By FO technicians,** who are used to working with farmers.

"To monitor production, a monitoring system has been set up by FOs, composed of facilitators trained by the research institute. They follow various experimentation processes in farmers' plots, and from time to time the researchers go out into the field to check." (Senegal)

- **By students** on work placements or doing their final thesis work.

"On the research side, we saw that it was much simpler to work with Master's students conducting their thesis on these themes, and have them accompanied by researchers who were already there. These people are often more available to carry out experiments in the field. They are recruited by research institutes, because there are observations that need to be made during the growth phase, from transplanting to harvesting. However, the researcher in charge of monitoring this work cannot be mobilized on a daily basis to record this amount of data. This is why they have recruited Master's student, who are on site and can take these readings on a daily basis so that they can be analysed later." (Burkina Faso)
"To make the most of all of these processes and the expected results in the coming season, the researchers have proposed taking on a student who will follow the process from start to finish, as part of the preparation of their final dissertation." (Senegal)

→ **Even when not directly involved in data collection, the researchers nevertheless play an important role in this phase.** They defined what data needed to be collected, developed templates for the forms or notebooks to be filled out, and trained and supported farmers, FO technicians and students in data collection. From time to time, they also made field visits to see firsthand how the protocols were being implemented, support data collection and engage with other actors to reflect on the process.

Due to simplicity, and the nature of most experiments (which assessed the effects of specific practices on a limited number of variables), the volume of data to be collected were generally manageable. Most often, this data related to agronomic aspects (crop yields, soil fertility, pest incidence), but sometimes also included economic aspects (production costs, gross margin, etc.).

"It should be noted that the data collected is not limited to agronomic data, but also includes economic aspects. To be adopted by farmers, an innovation must be both agronomically effective and economically viable." (Madagascar)

A notable exception to this simplified data collection was the project in Uruguay:

- **To comprehensively measure the progress of agricultural transitions on farms, a horticultural good practices index was developed** with support from researchers and in dialogue with farming families. This index measures both baseline and endline conditions for implementing good horticultural practices in each farm, providing a way to track progress in agroecological transitions over time. It categorises good practices into four groups with corresponding maximum scores: soil management (35 points), water management (25 points), health management and crop protection (27 points), use of land registers (13 points).
- **To evaluate the effects and impacts of these practices, a comprehensive set of 61 indicators was established** and grouped into six key processes: nutrient biogeochemistry, carbon biogeochemistry, successful biotic regulation, hydrology, energy, and socio-economics and culture.

→ **This complexity was justified in the case of Uruguay by the comprehensiveness nature of the targeted practice changes** (based on a systemic perspecive) **and the strategic goal of producing robust scientific and technical evidence to inform advocacy efforts** (both with the government and with other farmers).

"If we want conventional farmers to see agroecology as an alternative, we need to connect agroecology with reality and then demonstrate how it impacts not only on the environment but also on people's quality of life. This has to do with economic aspects but also with health and practices that make work easier, because there are a lot of parameters that have an impact on decision-making. There's a lot of talk about agroecology, but few figures to demonstrate the reality." (Uruguay)

Moreover, **monitoring visits often served as more than just data collection exercises**; they became opportunities for formal and informal exchanges between farmers involved in action research, other farmers, and FO technicians, researchers (when present), and other actors.

"There is follow-up with guided visits, which enable farmers to come and see for themselves the effects of the practices, so that they can share those findings with their colleagues." (Burkina Faso)
"Technical departments of extension are involved in the implementation of experiments. They are invited to take part in all field activities. The aim is that, at the end of the trials, these innovations will be disseminated more widely and incorporated into advisory support systems. Facilitation activities are even chaired by the regional governor to help mobilize the technical services under his authority." (Burkina Faso)

→ **These peer and cross-actor exchanges throughout the experimental process are a vital part of building local innovation capacity and sharing results and learning.**

"We visit them and check that the farm is in order. Then we set up research trials. This was a phase during which the farmers worked and the researchers supported them on how to proceed. It was at this point that the farmers asked themselves a lot of questions: why this or that? The capacity-building process

therefore also took place as part of the trial set-up. Researchers visited at least once a month to check that the protocols were being followed. During these visits, many questions were resolved. The trials were carried out by the farmers themselves, in their own way, with the help of research institutes." (Tanzania / MVIWAARUSHA)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we are trying to democratize and fully involve farmers in their ability to be farmer-researchers." (Philippines)

3.4.4. Complementary activities to experimentation as integral parts of action research processes

In the implementation of action research processes, various complementary and integral activities, which are not strictly part of the experiments, are carried out:

- **Training for farmer experimenters** to enhance their ability to carry out experiments (and others in the future). This focusses on:
  - **Methodological aspects** related to defining and implementing experiments and/or data collection.

"In our case, the farmers were really involved in the whole process, from the diagnosis stage onwards, and even in defining the protocols. But before that, the farmers were trained by the research institution on the purpose of an experiment and the significance of the different stages of an experiment. As a result, 98 farmers were able to improve their action research skills: 15 lead farmers were trained directly by FOFIFA researchers on how to conduct experiments, and 83 farmers were trained by the lead farmers and took part in exchange visits." (Madagascar)

"The elements that we have put in place in terms of capacity building have been to provide training in soil health in the fields, so that they can be fully understood. There is also a social component in which

  - **Technical aspects,** such as the development of bio-inputs (in DRC, Brazil, Burundi, Mali, etc.) and more broadly, training on agroecological practices to be tested in the experiments:

"We trained 168 farmers from three provinces on planting material production (selection, seeds, vegetative propagation), ecological farming systems (alley cropping), farm management, soil management, tree pruning, general farm management, soil management, tree pruning and post-harvest treatment)." (Pacific Islands/Solomon Islands)

"We have built the capacity of farmers and FO staff in soil sampling, setting up and monitoring of experiments, beekeeping experiments, agroecological principles, biochar production, beehive management, fire management, etc." (Tanzania/TTGAU).

"Training has been provided, but by farmer trainers on agroecological practices, particularly the production of bio-pesticides and bio-fertilizers, and on seed production practices." (Mali)

→ **This training—both in methodological** (the application of experimentation principles) **and technical dimensions—not only enhances farmers' and FOs' capacity to conduct the experiments, but also helps sustain farmer-led innovation processes.** It is further reinforced by informal learning that occurs through practice and the many exchanges that accompany these processes.

- **Setting up multi-stakeholder consultation platforms. These platforms,** referenced in the Pacific Islands as a starting point for action research, were also implemented in other projects (e.g. Madagascar and Tanzania), running in parallel and in coordination with experimentation activities.

Country	Stakeholders	Objective	Activities
Tanzania/ MVIWAARUSHA)	Various actors in the sunflower value chain: farmer-researchers, FOs, TARIs, traders, processors, researchers, NGOs	To identify key challenges to across the value chain (production, pests and diseases, processing, marketing, gender, and research)	17 platforms at different levels were established: 12 local, three district level and two regional. Facilitated discussions, and compiling and sharing of innovative ideas
Madagascar	Mainly farmers (to enhance exchanges with researchers)	Capacity building and facilitation of exchanges between researchers and farmers	Two meetings a year, exchange visits, and training of 30 lead farmers on conducting experiments

- These platforms make it possible to cross-reference perspectives of different actors—on both the problems to be addressed and the possible solutions. As such, they represent valuable opportunities for mutual learning and capacity building.
  - In Tanzania and the Pacific Islands, platforms aimed to strengthen participatory identification of problems across the value chain (production, gender, processing, marketing, pests and diseases) and generate innovative solutions:

"The platform supports various experiments. For example, it has enabled us to start working with traders and processors. Normally, farmers only deal with production, but processors may know which variety is easy to process and traders may know which variety is easy to sell. So they also helped with the innovation. For example, the processors were saying that if you had a local variety, it would be easier for us to press it. This insight came from the innovation platform. With regard to post-harvest management and bird damage, extension agents offered advice, but so did farmers: some suggested installing nets over ripening sunflower crops. They also noted that mass planting of sunflowers reduced bird attacks. In one village with fewer farmers, the birds ate a lot of sunflower seeds, whereas in a village where many farmers planted sunflowers, there wasn't as much damage. Researchers and extension centres also shared ideas on how agroecological practices can be truly innovative. This platform also created synergies with NGOs and research institutions that promote agroecology, and by the second season a large number of farmers and villages had improved their production thanks to these ideas." (Tanzania/MVIWAARUSHA)

  - In Madagascar, the platform strengthened exchanges between farmers and researchers.

"An innovation platform has been set up, enabling researchers and farmers to exchange ideas, formulate and solve problems, and meet farmers' emerging needs for additional knowledge and skills." (Madagascar)

  - The cross-cutting implementation of gender transformative approaches remains a major challenge.

"In Africa, and particularly in Tanzania, women are present on farms, but when it comes to the market, no one is really involved, only the men participate." (Tanzania/MVIWAARUSHA)
This issue was addressed in different ways across the projects:

  - Considering gender from the outset, especially when selecting value chains in which women play a major role, such as market gardening and small-scale livestock farming.

"Local chicken farming is a traditional activity, largely run by women." (Cameroon)

"Onions are grown mainly by women: in our target group of 1,328 onion growers, there are 863 women, i.e. around 70%." (Burkina Faso)

    - Ensuring women's participation in the various activities carried out during the action research process.

"38 women (out of 60) took part in implementing the experiments, i.e. 63%." (Tanzania/MVIWAARUSHA)
"275 out of 364 farmers involved in the experiments were women, i.e. 76%." (Burkina Faso)

    - Providing specific training on issues related to reducing gender inequality

"We are also interested in the issue of gender equality. This is one of the capacity building elements that we want to integrate at all levels, in order to create the conditions for a participatory process in terms of gender equality." (Philippines)

  - Actions to enhance the market value of agroecological products:
    - By setting up a participatory certification mechanism (Madagascar):
      - ***Online survey to assess consumers' needs in terms of agroecological products (40 responses analysed).***
      - ***Validation of the specifications for the Participatory Guarantee System in the Vakinankaratra region.***
      - ***Setting up a sales outlet for agroecological products.***
    - By carrying out additional studies to feed into action research (Cameroon): linked to market access and the use of local resources for food and medicine.
  - Actions to improve access to seeds and/or financing to facilitate the agroecological production of local varieties:
    - Organization of workshops to bring together players in the onion value chain to improve access to financing and marketing (Burkina Faso). These involved producers, infrastructure owners and microfinance institutes, resulting in contract agreements between actors for onion storage and access to credit.

"Most farmers take out loans with microfinance institutions, and the problem between producers and microfinance institutions is the interest rate charged to producers. So, as part of the FORI project, we organized introductions, which involved bringing in microfinance institutions. At the workshop, the producers were able to convince their partners, who made commitments to finance their production. At the last evaluation meeting, we realized that many producers had benefited from credit facilities with these microfinance institutions. The discussions enabled the microfinance institutes to gain a better understanding of onion growing and the technical processes used, and to realize that it was a less risky crop than they had thought. This made it easier for grassroots cooperatives to receive financial support." (Burkina Faso)

- Storage and multiplication of different breadfruit varieties (for distribution to farmers) in the three germplasm collection centres of Temotu, and West and Guadalcanal/Honiara. Currently, 1,200 collected plants are currently being propagated in nurseries using polythene bags or direct planting.
- Participatory selection of varieties to test, support for on-farm conservation and the creation of community seed banks (in Brazil).
- Identification, training and support for 150 market garden seed multipliers (Madagascar).
- Support for the local seeds production of traditional varieties (Mali):

"With the research team, we have started to monitor the production of individual seed plots in the various project zones, in a total of 10 villages with 10 producers per village, making a total of 100 producers. Five key crops were selected during the diagnosis: chillies, onions, African aubergines, tomatoes and okra. These five crops were the focus of production activities in the first year. Monitoring was put in place, which revealed areas for improvement in the management of the seed plots, and led to increases in production. Some growers have also been able to produce seed on their own, without the support of researchers. This has given us a large quantity of seeds, which will enable us to plant onion production plots for the coming season. These initiatives were all put forward by the growers themselves, with technical support from the project and the involvement of researchers." (Mali)

  - ***These activities are important to the implementation of action research processes because they either address problems identified during the initial phases of the process that cannot be resolved through experimentation alone (e.g. market access), or they help solve problems that even positive experiments cannot fully resolve (e.g. seed access).***
- Organizing and running thematic workshops to encourage reflection and strengthen the link between theory and practice.

"It's linked to a principle of Paolo Freire's called praxis. In the stages of the research process, we have practice. But we also combine study and theory. We organise thematic meetings to carry out studies related to the practices we are working on, which will feed into the process of transforming their practices. First practice, then theory, then back to practice." (Brazil)

- Finally, actions to systematize and capitalize on action research processes (Brazil, Burundi, and DRC among others) enable reflection on practice and generate learning to improve future processes.

3.5. Processing and analysis of results

The processing and initial analysis of data collected through the action research processes are generally carried out by researchers.

"The data recorded by the farmers is collected and summarized by CEFFEL technicians and sent to researchers for analysis." (Madagascar)
"From the identification of concerns, to the selection and validation of research themes, and the formulation and validation of experimentation protocols, farmers were fully involved. All of this was done jointly with farmers, up until the implementation of the experiments and data collection. But when it came to processing and analysing the initial results, this was done mainly in collaboration with researchers." (DRC)

These analyses are mainly based on quantitative variables identified when the protocols were formulated and measured during their implementation. **They enable comparisons of the effects of different tested practices aspects such as soil fertility, crop**

yields, pest incidence, production costs, and labour requirements. In the case of non-experimental action research setups, comparisons were made between existing situations (as in the Pacific Islands), or between initial and current conditions (as in Uruguay).

While many of these experiments are still ongoing, preliminary results have already been obtained, processed, and analysed in several projects:

Project	(Preliminary) Results
Burkina Faso	• Manure: its use combined with 350 kg/ha of NPK 15-15-15 gave the best results (32 t/ha) (researchers practice). • Phytosanitary treatment: Neem oil performed best (27 t/ha) • Cultivation practices: Mulching yielded the best results (38 t/ha). Research-based practices were the most popular (23.5%), followed by mulching and hoeing (15.84%), and traditional farming practices (15.3%): • "The AGR (income generating activity) model offers the greatest potential for obtaining credit from institutions." • "Investment group sales are more productive than multi-component group sales."

Tanzania (MVIWAARUSHA)	• Manure application led to higher yields and good plant vigour.
	• When compared with improved hybrids, local/traditional varieties were shown to have:
	  ⊖ Lower germination rates.
	  ⊖ Earlier maturity in some local varieties.
	  ⊖ Higher oil content in some local (white) varieties.
	  ⊖ Lower yield overall.
	  ⊖ Less bird damage (because the seeds were less tasty).
	• Local varieties were easier to process (shell).

Tanzania (TTGAU-NADO)	• Biochar combined with other fertilizers gave the best results—they complemented each other. • Crop rotation under trees helped maintain or increase potato productivity. • The application of biochar and manure had no effect on tree mortality. • Annual manure application maintained the same avocado tree height and crown size as those treated with chemical fertilizers, yet tree diameter was smaller. No information on fruit productivity is available at this stage.
Pacific Islands	• Over 75 local varieties were characterized by over 350 farmers in 40 communities. • Data included characterization of the phenotype, age, seasonality, environmental conditions, and maintenance. • A book of recipes (traditional and contemporary) from the Solomon Islands is being produced, with posters on breadfruit also planned.
Uruguay	• Some families were already applying certain practices before the project began. • Within one year, progress was noted in the adoption of certain practices across seven7 farms (measured on a 15-point index).
Burundi	• Weekly application of a sand/ash mixture effectively limited the incidence of armyworm. • Weekly application of Tithonia purin (1 L per 9L) effectively limited the incidence of various insect pests. • Using Tithonia Purin as green manure (24 kg per treatment) significantly increased yields of maize and rice.

Project	(Preliminary) Results
DRC	• Best results in controlling fall armyworm were obtained using nettle leaf extract, followed by chilli extract, tobacco extract and Bidens Pilosa leaves. • Trials with three ingredients (goat manure, rabbit manure and rabbit slurry) revealed goat manure as the best option, which produced a higher yield than the other two ingredients and the control, which resulted in a much lower yield. • The ranking of potato tuber yields and treatments by decreasing values is as follows: ⊖ Lukanga: T2 (8,674 kg/ha) > T1 (7,918.7 kg/ha) > T0 (6,154.3 kg/ha) > T3 (5,073.3 kg/ha) ⊖ Luotu: T2 (7,541.7 kg/ha) > T1 (7,211.7 kg/ha) > T0 (6,956.7 kg/ha) > T3 (6,956.7 kg/ha) ⊖ Where: **T0:** Control (no fertilizer) **T1:** Plots enriched only with solid compost **T2:** Plots enriched only with animal manure **T3:** Plots enriched with liquid compost

In most cases, **meetings to present and discuss the results were held with leaders and technicians from partner FOs (and agri-agencies), other stakeholders** (particularly within the multi-stakeholder platforms), and the farmers directly involved. The purpose of the meetings was to share results and jointly analyse and interpret them.

"We hold review workshops (with meetings between FOs and researchers, for feedback on the analyses we have carried out)." (Burkina Faso)
"Feedback sessions on the results of the analyses are held using data collected by the farmers themselves." (Madagascar)

→ **Review meetings with farmers directly involved in action research are particularly important:**
- They make it possible **to supplement analysis based on quantitative data with farmers' qualitative assessments of the practices and observed results. These assessments are also important because they often take into account other criteria, not included in the formal protocols, which are crucial for farmers** when deciding on whether to adopt a practice or not, as seen in Burundi:

Action research theme	Action research theme
Sand/ash application	• Effective if applied once a week. • The ash may blacken the leaves on the first application, but this does not harm the plant. • Labour-intensive and painful; only feasible on small plots or with ample family labour.
Tithonia purin application	• Effective at the dose of 1 L per 9 L when applied weekly. • Acts as a bio-fertilizer. • Access to the sprayer is limited, as is access to the barrels used for preparing the plant-based liquid fertilizer
Burying tithonia	• Effective when 24 kg is used. • Burial helps combat pests. • Requires large amounts of raw material (Tithonia), which is not always available locally.

⊖ Experiences in Burundi and DRC highlight the importance of review meetings to go beyond analysing experiment results. They should also **analyse the extent to which the results of these experiments resolve farmers' original problems:**
- ***Although experiment results are useful references, they do not automatically tell farmers what to do.***

"I've noticed that applying 4 L of Tithonia purin gave better results than 2 L, but I'll apply 2 L on my fields. The results are acceptable and in this way I can also optimize the use of my limited supply of raw materials." (Burundian experimental farmer)

- ***Farmers may encounter difficulties and not have the resources required to apply these practices.***

Tested practices	Constraints or challenges reported by farmers
Sand application	Arduous nature of the work and the lack of manpower to carry it out: • "It's very labour-intensive to apply. It's very tiring." • "On a small plot it's feasible but it becomes difficult on large plots." Transporting sand is difficult and costly
Tithonia purin application	Insufficient availability of materials and equipment (sprayer) for carrying out treatments: • "We take it in turns to use the equipment, but it's not enough." • "Doing it by hand with straw is possible on small plots, but not on large ones, and it's also very difficult on fruit trees which are high up." • "You also need buckets to prepare the liquid manure."
Burying Tithonia Purin	Insufficient quantities of Tithonia Purin available to bury it in large areas: • "24 kg for the small experimental plot is a lot. How am I going to fertilize 1 ha?" Propogation of Tithonia Purin is difficult • "I have tried to propagate Tithonia, but very few have sprouted."

These challenges vary, depending on farmer's resources and available family labour. Some farmers apply the techniques despite the constraints, but for others these obstacles prevent broader adoption. **These issues often surface during review meetings and can lead to new rounds of experimentation or additional support to resolve them**

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3.6. Dissemination and utilization of results

Although the action research is still underway, some activities have already been carried out to **promote the and share the initial results**, beyond the actors and stakeholders directly involved:

- **With other farmers** not directly involved in the action research processes. These included training sessions, field visits, experience-sharing events, and practical demonstrations, often with the participation of the farmer involved in the experiments:
  - In Brazil, a farmer-to-farmer approach was used.
  - In Madagascar, "300 producers were trained on the results of the experiment."
  - In Burundi and DRC, other farmers—members of FOs or neighbours of the action research farmers—were invited to end-of-season review meetings, where the experiment results were presented and discussed.
- **With other stakeholders** such as NGOs and government technical services. This was done through multi-stakeholder platforms and/or specific initiatives.

"All of the results were compiled and disseminated to government technical departments and NGOs to build synergies with other programmes and projects operating in our intervention areas." (Burkina Faso)

- **Through broader disseminating** (of activities and results), primarily through digital channels, such as social networks and online training platforms.
- **Through advocacy initiatives,** including the de-

velopment and implementing of action plans, and engagement with decision-makers.

"To identify policy issues, [we] consult members and stakeholders, propose solutions, and advocate with decision-makers. These actions have different purposes:

- *Obtain government commitment to allocate more financial resources to farmer-managed seed systems, and agroecology research.*
- *Push for the publication of a national agroecology strategy.*
- *Address problems identified in multi-stakeholder platforms, especially those related to public policy" (Tanzania/MVIWAARUSHA).*

"Through our social organization, we conduct action research processes that aim to build knowledge in response to specific demands. But the overall effort, from a systemic agroecology perspective, is to build knowledge to support public policy advocacy, so we have public policies that help us. In Brazil, we have half a trillion reals (R$) for sugar cane, but nothing for agroecology." (Brazil

04. Main results and difficulties encountered in implementing the action research process

4.1. The main results obtained

The achievements and specific results of the various stages of the action research processes, implemented as part of the FORI programme, were presented in the previous sections.

More generally and across the board, **the main results, advances, and/or initial effects highlighted by those involved** are as follows:

- **Enhanced capacity and legitimacy of FOs to provide leadership in defining and implementing action research initiatives** in partnership with other players, especially those involved in research. In particular, this leadership will enable them to ensure that:
  - That the themes defined and implemented effectively address the issues they consider to be priorities (in relation to the agroecological transition).
  - The effective participation of farmers (generally FO members) in the implementation of these processes.
  - That the results obtained are used to support concrete WT processes (and not just used for scientific publication).

"The Pacific Island Farmers Organisation Network (PIFON) and its member FOs are very satisfied with the set-up and the approach, which has given the FOs a real leading role in identifying research priorities and convening other stakeholders around this process, led by the FOs in the innovation hubs set-up." (Pacific Islands)

- **Very strong interest among and participation among the farmers involved in implementing the action research processes, with strengthened capacity to conduct experiments on topics of their choice**. This outcome can be seen through the large number of farmers directly involved in these processes (often several dozen or even hundreds in each project, see section 3.3).

"Farmers and tree owners were successfully involved and were open in sharing their knowledge and demonstrated a positive attitude towards their participation in the project." (Pacific Islands/Solomon Islands)

→ The very strong interest among **the farmers can be largely explained by the fact that the themes were defined in relation to specific, very concrete problems which affect them and that they wish to resolve**, the questions they ask themselves, their aspirations, and so on.

"Farmers are very interested in reducing the cost of expensive external inputs, particularly through bio-fertilizers and bio-pesticides." (Madagascar)

→ **Similarly, the effective participation of farmers in decision-making at various stages, particularly when research topics and protocols are being defined, helps ensure the processes effectively address the problems they face.**

"The project's emphasis on farmer leadership and participation at all stages of the research and innovation process ensures that solutions are relevant, adapted to local contexts, and more likely to be adopted." (Brazil)

- **The degree of capacity building among the farmers in conducting experiments** on their farms is determined by two main factors:
  - The specific training and capacity-building activities that have been carried out to this end
  - The level of effective participation in decision-making and implementation of the various stages of these processes.

- Capitalizing on the Burundi experience goes even further, **highlighting the strengthening of 'local innovation capacities and dynamics**'. This statement is based on the observation that not only the **experimental farmers**, but also other farmers (neighbours, members of the same cooperatives), have carried out **informal experiments,** in addition to the formal experiments conducted with the support of researchers. These experiments have enabled them to:
  - **Test adaptations in applying these practices**, particularly in terms of doses and frequency. For example:

"One capful of December sand per plant seemed like a lot to me, so I made one capful for two plants and that was enough." (Burundian experimental farmer)

  - **Test other alternatives for pest control**

"I tested another grass that looks like cassava to control the pest and it worked just as well." (Burundian experimental farmer)

  - **Test the products used (in this case Tithonia) in experiments to control other pests**

"I used Tithonia powder when ploughing and the snails disappeared." (Burundian experimental farmer)
"I used Tithonia to control tomato pests and it worked well." (Burundian experimental farmer)

  - **Innovate new practices;** for example:

"I have used rabbit urine to control certain pests." (Burundian experimental farmer)
"I used a mixture of Tithonia with chilli pepper, the effect is much faster." (Burundian experimental farmer)

- **This type of process, in which informal exchanges between peers (farmers) play a central role, has undoubtedly occurred on other projects – even if they have not been formally recorded, as they are not generally monitored.**

- **A concrete result of the farmers' participation in the action research process is that certain practices are beginning to be applied beyond the experiments.** This is being done by both experimental farmers and other farmers – with already noticeable results in terms of yields, incidence of diseases and pests, and so on.

"657 farmers, including 288 men, 289 women, and 302 young people, have adopted innovations developed as part of local experiments: fertility-enhancing plants and living hedges; biopesticide plants; support for the construction of composting basins; vermicompost production units." (Madagascar)
"The Tropical Race 4 (TR4) disease has been reduced in all the agroecological trials we have carried out."(-Philippines)

- Capitalizing on the experience of Burundi, we see that **some farmers have started to apply these practices on a large scale on their plots, without waiting for the experiments to be completed.** This is because, on one hand, they can see the benefits and, on the other, they are less expensive than using chemical pesticides:

"When I saw the results of applying Tithonia to control pests, I applied it to the whole plot." (Burundian experimental farmer)
"I used to use chemical products, but now I use natural products, which allows me to reduce production costs." (Burundian experimental farmer)

  - **Another concrete result highlighted by several projects is the readoption and redevelopment of traditional practices and knowledge, as well as traditional/indigenous varieties of seeds and/or trees:**

"Traditional knowledge is really being lost, and we're trying to recapture this. We try to talk to the elders to be able to document it." (Pacific Islands)
"It was they (the farmers) who realized that, in their locality, where traditionally there were varieties that they were losing, they came to ASPRODEB with the idea that we would help them to restore those varieties." (Senegal)

  - Although researchers do not generally play a leading role in these processes, they play a very important role in their implementation, at several levels:
    - Building capacity among other players to implement various stages of the research process with a sufficient level of rigour, so results can be used in a scientific-technical manner.
    - They offer scientific/technical input on the most relevant agroecological practices to be tested, possible solutions to various problems, etc. Their input considerably enriches exchanges with other stakeholders, particularly the farmers directly involved, on research topics, treatments to be tested, etc.

- **The experience of action research in Burundi particularly highlights the importance of exchanges between the researchers and farmers directly involved.** It shows that both parties easily go beyond the strict framework of the research topics addressed (e.g. farmers take advantage

and ask the researchers many other questions), which feeds their thinking on solutions to other problems and other practices to be tested (often informally at home, etc). Such actions reinforce the 'local dynamics of innovation', mentioned above. This is also what is occurring, for example, in the 'researcher-farmer' platforms set up in Madagascar, and no doubt elsewhere, too.

- ⊖ **We should support and monitor the implementation of the various stages,** with the aim of ensuring sufficient rigour.
- ⊖ **We should process and analyze the collected data**, as FOs often still have major weaknesses in this area.

- Finally, an important outcome of these processes is **the production of references that are valid from a scientific-technical point of view and therefore potentially useful to other actors. These references are most often technical or economic in nature, and directly linked to the results of the experiments**. However, they can also be methodological; for example, how to measure the effects of the agroecological transition in Uruguay.

"Another important result is the creation of methodological references for measuring farmers' progress in the agroecological transition (using the indicators defined in the project in Brazil), which has been taken up in other programmes and projects as part of Uruguay's national agro-ecology plan. In fact, one of the farms supported by the project, at the request of the Ministry of Livestock, has been taken as a reference for the implementation of this public policy." (Uruguay)

- Similarly, agri-agencies – partners of the FOs – play a very important role in the implementation of the action research processes. Among the elements highlighted, the following stands out:
  - ■ **They facilitate contact and interactions and, in some cases, even mediate, between the various stakeholders in these processes, particularly FOs and researchers.**

"As an FO, we are on the ground, working with farmers. As for the agri-agencies, they coordinate a number of platforms and establish links with various external stakeholders." (Tanzania)
"They [agri-agencies] helped to mediate between the research institutes and the FOs, by taking part in discussions, because sometimes a power struggle can develop around action research." (Burundi)
"They [agri-agencies] help ensure that relations with researchers in the country are balanced, but also to put people in touch with researchers in other countries." (Madagascar).

- ⊖ **They provide technical expertise on how to implement these projects, from an action research perspective, and support capacity building to implement processes.**

"The other thing we get from the agri-agency is technical expertise. They guide us by saying: 'OK, guys, we have to do one, two, three this time'. And, as players on the ground, we also have to share with them what's going on and exchange our experiences. They also provides input on how to do or implement the project from a research perspective. So, we're taking advantage of this, and we think that the agricultural agencies have a lot to do and provide as part of this project. They represent considerable potential and resources for the FOs." (Tanzania)

- ⊖ **They support the administrative and financial management of projects**: formulation of action research projects, production of technical and financial reports, etc.
- ⊖ **They offer support in finding and obtaining funding:**
  - ■ ***For action research programmes such as FORI, to which they would have difficulty gaining direct access.***

"In our case, we do political lobbying work that is more closely linked to governments and international organizations, but sometimes we stay out of the lobbying business to capture financial resources. Partnership between FOs, agri-agencies, and AgriCord is very important for us in terms of attracting financial resources, as was the case for FORI."

  - ■ ***For actions complementary to the action research activities.***

"One thing we've done together is look for additional funding for things that aren't necessarily linked to the project, but which complement it. This has also worked well with NADO and TTGAU. Together, the three of us have managed to get different projects to complement each other." (Tanzania)

  - ■ **They facilitate exchanges between countries, so that experiences developed in one country are useful to others that also have partnerships with FOs.**

"There was an effort in the project to encourage exchanges between countries on the different techniques of co-research, innovation, and agro-ecology, in order to connect countries with different methodologies." (Brazil-Uruguay)

- ⊖ **They support the dissemination – particularly through virtual means – of locally-generated information** within the action research process.

"As an agri-agency, we are not going to generate new knowledge, but rather [we] share the knowledge generated by the organizations and their producer groups. To do this, we have chosen virtual tools. Farmers are not used to using them. So, we need to train them to use them, to include them in the virtual platforms, so that they can use these resources, which are free, [and] they can find out what other groups and other countries are doing." (Brazil-Uruguay)

4.2. Difficulties encountered

There were many, varied difficulties encountered during the implementation of the action research processes. The main ones mentioned by those in charge of their implementation are as follows[46]:

- **Identifying and prioritizing the problems to be addressed by action research, particularly because of the scale and diversity of challenges faced by farmers in most of the project areas.**

"A large number of agroecology issues were identified, which made it difficult to prioritize (issues adapted to the local context were selected and prioritized)." (Tanzania/ MVIWAARUSHA).

➔ **Similar difficulties were encountered by projects that took into account endogenous practices or the local varieties that farmers choose to work with.**

"The first research question is what agroecological innovations should be developed on the basis of farmers' practices. The study revealed a whole host of farming practices in the field, and we had to be able to agree on which practices should be used. There was a huge variety of manure types and many different things being done in the field. The choice of practices required lengthy discussions between farmers, through UNAPROB, the CPF, and the research players, in order to establish which practices should be used." (Burkina Faso)
"One of the problems was identifying local varieties. We have a lot of them, and farmers have identified different local varieties, so it was a question of which one we really needed to test." (Tanzania/MVIWAARUSHA)

➔ **This raises the question of how to prioritize such challenges, and who decides which issues to address (e.g. from which point of view) and how. From there, action research themes are defined:** the perceived importance of the problem to be resolved, the prospects for scaling up the practices tested, the capacity and means to address them, etc.

"These are the most widespread practices and for which the inputs needed for them were most available; we start with farmers' practices to check their quality so that we can scale them up. If we took practices that were very selective or very specialized, it would be more difficult for a large proportion of farmers to implement them than if we started with the most popular practices. These techniques have to be technically feasible, socially acceptable, and economically accessible." (Burkina Faso).
"The budget was a limitation, and soil analysis issues were not taken into account in the experiments for this reason. The budget also meant that the choice of practices had to overlook certain aspects. It was not easy to take into account the diversity of storage infrastructures because of budget constraints at the outset. The budget didn't allow us to do certain things, which explains why some practices were not included in the experiments." (Burkina Faso)

➔ **The meetings and discussions on the range of difficulties or constraints sometimes gave rise to major expectations** which the project will help to resolve

"The project has raised expectations beyond the project's capacity." (Tanzania/MVIWAARUSHA)

➔ Although it was not possible to address all the problems through action research, and choices had to be made, **in several cases, problems that were not selected to be focused on were still addressed through other methods (training, advocacy, exchanges of experience, etc.)**, to try to meet expectations as much as possible.

"On the production side, it involves pest control, particularly birds, and also knowing when to harvest and handle the fruit before taking it to the press, because they pose a lot of problems for oil extraction. Farmers do not manage practices such as drying, cleaning, etc., but rather post-harvest practices. Most of these problems are solved through platforms, because traders and processors have this knowledge and share it. On the production side, we also provided training in agroecological practices. Some social issues are still ongoing – for example, gender issues – but we are working on them and have made progress." (Pacific Islands)

- **For projects that sought to formulate a limited number of harmonized protocols, achieving harmonization was generally not easy – particularly given the diversity of local situations.**

"It was difficult to harmonize the experimental protocol because of differences in agroecological zones and farm sizes. So, we agreed with the local FO to work with farmers who had around 1.5 acres of land with more or less the same conditions, and to organize trials so that we could easily standardize and duplicate the research trials. It hasn't been easy, but TARI has been very helpful in solving these problems." (Tanzania/MVIWAARUSHA)

46. They are presented in chronological order of their appearance in the implementation of these processes, rather than in order of importance.

- **A number of operational difficulties, of various kinds, were mentioned in relation to implementing the experiments and/or carrying out monitoring visits.**
  - ⊖ Difficulties in accessing the experimental sites due to safety reasons and/or damage to access routes following extreme climatic events.

"Insecurity at the sites makes access – and therefore monitoring – more difficult, meaning it cannot always be carried out on a regular basis." (Burkina Faso)
"Some areas were not accessible due to bad weather, which blocked some roads." (Tanzania/ MVIWAARUSHA)
"In Haiti, a major difficulty is the lack of security, which means that we have not yet been able to start research into biofertilizers. But also, [another difficulty is] the non-availability of certain species associated with cocoa." (Haiti)
"The Western Province was affected by heavy rain and rough seas with large swells, which made it difficult to carry out the planned field visit." (Pacific Islands)

→ **Overall, the security situation in some countries makes it more difficult for experts from partner organizations** (Burkina Faso, DRC, Haiti) to provide on-site support and assistance. To compensate for this, alternative online methods have sometimes been established to facilitate their contributions and assessments.

- The availability of means, raw materials, and resources required for farmers to carry out the experiments.

"One of the major difficulties in setting up experiments is the availability of water. There is also the problem of the availability of semi-industrial organic fertilizer. For instance, the organic manure produced is marketed, but we needed to have enough of it to be able to test its application in the experiments. Another challenge was the availability of seeds." (Burkina Faso)
"On the sites where we are carrying out experiments, there are internally displaced people, and this causes pressure on natural resources, particularly water." (Burkina Faso)
"The plots we have identified at the various sites have difficulty accessing water and are not fenced in at the moment. The security situation has forced us to choose plots close to Bamako, which has limited the possibilities of finding plots in satisfactory conditions." (Mali)

- Climatic conditions affecting the progress of experiments.

"Adverse weather conditions affect the implementation of planned activities, and cyclones can damage consolidation sites." (Pacific Islands).

→ **The difficulties and problems linked to the lack of resources and poor availability of water/organic fertilizer, etc., as well as the increasing climatic variability, impact farmers' application of experimental practices.** This raises the question of whether **these aspects should be considered integral to the problems and questions addressed in action research** (e.g. "How can we apply agroecological practices in these conditions, and which ones?").

"One question that arises is what minimum water conditions are required to produce quality onions that can be kept for a long time and fetch a good price for our growers. Water availability is a factor that we need to take into account in our experiments, as it is becoming increasingly critical. It's a general problem for the area to know how to deal with these conditions." (Burkina Faso)
"Agroecology is only feasible on a relatively small scale; for example, the availability of biomass is a constraint, and biomass also competes with animal feed. Also, access to land is not guaranteed, so it is difficult to invest in soil improvement (in agroforestry, for example)." (Madagascar)

- **Organizations face internal difficulties, linked to administrative, contractual, or other issues, or to specific contextual elements.**

"We have had difficulty in obtaining services for some of the project's interventions – for example, the power supply for the treatment units set up for the research." (Tanzania/ MVIWAARUSHA)
"We have been delayed in implementing timetables due to issues relating to the administrative and financial management of these partnership projects (transferring financial resources from one partner to another)."
"Due to a delay in the arrival of the hangar fabric and larger poly bag, a temporary nursery has been set up to raise root cuttings at the CRT of Lue Salo. The inter-island transport of materials and project teams is affecting implementation." (Pacific Islands).
"Last season, we were unable to carry out any experiments. The main difficulties we had were delays in contracting with research , but also the diagnostic study that was supposed to give us results on technical itineraries and endogenous practices was not as conclusive as expected." (Mali)

- **A recurring difficulty in implementing and monitoring these experiments relates to gathering reliable data:**
  - ⊖ **Difficulties linked to the lack of frequency** when data collection and reporting is done by farmers.

"Farmers were not in the habit of reporting every activity." (Cameroon)

  - ⊖ **Difficulties linked to the availability and time constraints of researchers and/or FO technicians.**

"The technicians are used to working on the farm but, as they have so many other activities outside the field, they are not always close to the farmers to follow them on a day-to-day basis as they collect data." (Tanzania/MVIWAARUSHA).

- Some also point to **difficulties in getting farmers to comply with defined protocols, which impacted the technical scientific rigour of the experiments.**

"Four farms did not comply with the research protocols. In some cases, they placed the manure trials where water flowed, so the manure also ended up on plots that were not intended to receive it. Another problem is record-keeping: some farmers don't report their activities." (Tanzania)
"In trials of biopesticides against pests, when a grower sees that a product works, at some point he will apply it everywhere, even on the control plot, so as not to lose his harvest." (Burundi)

→ A common difficulty has been **obtaining valid references from a scientific-technical point of view**. In addition to the difficulties associated with collecting data and compliance with the 'standardized' protocols, there were other challenges involved – for instance, with the diversity of the protocols implemented or with the practical or operational difficulties in guaranteeing equitable experimental conditions.

"In Madagascar, the diversity of protocols causes problems. For example, on the question of fertilization, it is necessary to quantify the production obtained. It was on the production of green salad that a producer had a problem: he was afraid that he would no longer be able to sell the salads produced on the experimental plots and he started to harvest, which meant that we couldn't keep the results of his experiment. We then did a new training course on the aspects we had problems with." (Madagascar)
"We left the choice up to the growers on the control plot, and told them to do what you normally do. So, some used chemical fertilizers, others compost, and others didn't use anything at all. As a result, we don't have many replications with the same points of comparison, which makes it impossible to use the data statistically." (Burundi)
"We tested the effect of the practices on the quality of the onions, while retaining the traditional techniques for preserving them. At the same time, we designed shelves to allow the bulbs to breathe, so that each site would have the same system as far as possible."(Burkina Faso)

→ In light of the difficulties associated with achieving sufficient scientific-technical rigour, some emphasize **'rigour' in implementing participatory processes and the positive results they can achieve** (particularly in terms of capacity building and local innovation dynamics).

"Our rigour lies more in the participatory nature, in the fact that the farmer is at the head of the project. These are the qualities we want to bring to the prototyping. Every three months, we re-evaluate and modify the designs along the way; it's the rigour in the thought process, the rigour in the way we really document and ask and try to bring in more and more diverse points of view along the way. I think those are the [crucial] components." (Philippines)
"One of the limitations of the process was the limited availability of information and family registers for drawing up diagnoses and basic indicators for each farm. To improve access to and analysis of key information, it was agreed to use basic economic and production records, prepared for periodic use by farm families, as a basis for analyzing impact indicators in key areas. The format was agreed beforehand, so it would be simple to fill in, and would be completed during the visits, with dialogue and joint recordings carried out." (Uruguay)
"We believe that scientific rigour lies in the concrete results of the practice that is carried out. Scientific rigour is not a number of repetitions of a given practice under certain conditions. We believe that scientific rigour is achieved through the methodology we use, which lies in the concrete reality of the families that generate the transformation. Our challenge is to be able to produce an interpretative synthesis of the knowledge that is generated." (Brazil)

→ **These difficulties are largely linked to the desire by researchers and farmers to implement participatory research processes, which present their own difficulties** in terms of the need for support and guidance. However, they are also due to the fact that **the processes involved activities which various stakeholders are not necessarily accustomed to:**
- **Researchers**

"One difficulty has involved needing to adapt the purely basic research vision to the needs of action research, where producers are at the centre of the process."

- **Farmers**

"Participatory processes take time and are slow. There are issues of support for methodological tools and financial administrative procedures: 34 local groups are formulating and implementing their own research programmes, but there are limited financial resources to share between them. Providing monitoring and support for geographically dispersed initiatives was also difficult, and was often done from a distance." (Brazil)
"One of the challenges has been turning the idea of conventional research on its head. For most FOs and farmers, their experience of research is that they own the land and companies or academics come in to use their land and tell them what to do. The thinking is that FOs and their farmers are not capable of doing research themselves and solving technical problems. So, for some time at the start of the FORI project, FOs and farmers waited for instructions from FARMCOOP technicians. Reversing this trend is an ongoing challenge." (Philippines)
"Another problem related to involving women: men are pushed to be the farmers responsible for research, whereas we wanted a mix of men and women, and it took time for this to be understood. Another problem was farmers' lack of knowledge about research. It took time for them to understand why such and such a protocol was used, why you treat this and that, etc." (Tanzania/MVIWAARUSHA)

- The final difficulty mentioned was **that the agroe-**

cological practices proposed for experimentation were outside, sometimes radically so, what the farmers knew and were used to doing. This caused them a great deal of uncertainty when it came to applying practices.

"One of the difficulties was the uncertainty of producer families when it came to investing resources in practices that they did not know the potential impact of. This is why the project financed small investments aimed at integrating the agreed good practices, to encourage them to try out certain practices without having to take money out of their own pockets." (Uruguay)

"It's difficult to change people's views." (Cameroon)

"We work with farmers who have been told not to grow anything else with bananas, which is part of the challenge we face. We work with some cooperatives that have learned to grow bananas as a monoculture, and that's all there is to it, and they use very high levels of pesticides and fertilizers. The idea of diversification is somewhat foreign to them." (Philippines)

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05. Lessons learned and recommendations

All the projects share the same desire to place FOs and farmers at the core when implementing the various stages of the action research process. They also advocate for a comprehensive understanding of the issues involved in supporting the agroecological transition.

"FORI allows us to involve the farmers themselves, to check what agroecology problems are linked to the value chain that we have and how they can remedy them. Another important thing is that agroecology also involves a number of socio-economic issues that are not discussed in any platform. People mainly look at agroecological practices in production rather than thinking about the socio-economic perspective. This gives us the opportunity to show the farmer that, yes, we are not only talking about agroecology in production, and we also need to think about how farmers can benefit from this type of agriculture." (Tanzania/MVIWAARUSHA)

As shown in the previous sections, the implemented approaches and activities varied between projects, as did the progress made and difficulties encountered. Moreover, some researchers consider that, **at times, strengthening farmers' participation in these processes remains a challenge.**

"The current research approach needs to be strengthened to put producers more at the centre of the action. It is clear that the process requires the knowledge of researchers from the experimental design stage onwards. However, the essence of farmer-led research is that the research programme is defined by the farmers and that they are at the heart of every stage." (Fetien, Abay ABERA, South Carolina State University)

By discussing and analyzing the diverse range of experiences, it has been possible to identify **a set of lessons learned on how to practically implement the various stages of this type of action research carried out by FOs and farmers**. These lessons, which were developed, presented, and/or discussed at various times (during an exchange seminar in November 2023 in Belgium and then during webinars held between July and October 2024), are presented in this final part of this document.


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5.1. Consult the farmers directly involved in the action research process on problems that need to be addressed

1. **It is important to recognize and validate the problems that require tackling with the farmers directly concerned**, as they are the ones most familiar with "local concerns". From there, experiments should be conducted with the farmers directly involved in solving these problems. To do this:
    - It is essential to explore and define expressed concerns as precisely as possible, taking into account farmers' points of view (e.g. considering their way of analyzing situations).
    - **Draw up a list of all the problems and** issues of concern to farmers, and validate it with them.
    - **It should be discussed with farmers which problems need to be tackled first**, taking into account their point of view before FOs make contact with researchers.

"You have to understand not only the description of the situation, but also their own analyses of what works well or not and what their problems/concerns are. Sometimes, we carry out surveys in which we make a descriptive analysis of the situation, yields, and soils, and we analyze this from the outside and draw out the problems. In action research, it's really about taking the farmers' point of view into consideration." (FORI workshop, Gembloux, 2023)
"It is important to work with the process of starting with producers' observations and then bringing them to research topics." (FORI workshop, Gembloux, 2023).
"It's only once we've validated the problems that the FO can get in touch with the researchers." (FORI workshop, Gembloux, 2023)

> ***"Identifying** the nature of the problems, their extent in relation to other factors, and their seriousness, is crucial. For instance, should we should act eradicating fall armyworms or take steps to prevent them in the first place? Will the farmer focus on this problem, if he has other, more urgent issues to resolve? Rather than focusing on productivity, perhaps the farmer should focus on something else that could be less of a problem." (FORI Workshop, Gembloux, 2023)*

→ **What do we do in practice?**
- **While the methods used may vary (interviews, meetings, etc.), it is important to take into account the farmers' point of view, their way of analyzing situations, and the questions that this raises for them – not just describe situations and draw our own conclusions or analyses.**
- **It is important to analyze the different elements of the problems and their importance, etc., with the farmers. This process will be done with the FOs and its members**, with the support of the AA, but without the researchers.

2. **After recognizing the problems to be tackled as a priority**, we must understand **which issues action research can contribute to resolving.**
    - **Not all problems are necessarily treatable or fall within the scope of what can be supported with the available resources:**

"Problems such as insecurity and barriers which are not agricultural – it is not the role of the FO to work on this, even if their existence is recognized." (FORI workshop, Gembloux, 2023)

→ **Some problems cannot be addressed by FOs.**

- **Not all the problems that can be tackled translate into action research themes.**
    - ⊖ **Some of them are not technical:**

"When we talk about problems, we find very different things from the farmer's perspective: some problems are related to the means of production, the number of training courses, or various other issues." (FORI Workshop, Gembloux, 2023)
"Sometimes it's broader: for example, how do I manage a chicken coop? Problems can relate to access to buy equipment, or to things that may already be known from a scientific or technical point of view. But, more often, it's a question of training, ability,

and other aspects where science may not have the answer." (Cameroon)
"Not all problems can necessarily be solved in the same way. They should be solved, for example, by finding funding, lobbying, etc." (FORI Workshop, Gembloux, 2023)

→ **Problems can require other types of action that go beyond the technical domain.**
  ⊖ For other problems, science does not have anything new to contribute; useful technical scientific references already exist.

"We know from a scientific and technical point of view the possible solutions. In this case, we are not involved in action research because we will be involved in dissemination, training, and scaling-up activities." (FORI Workshop, Gembloux, 2023)
"A question also arises in cases where the solution is already known: is it just a matter of implementing this solution? Is it really adapted to the local situation? We need to take this into account." (FORI Workshop, Gembloux, 2023)

→ **Problems can refer to training activities, technical advice, etc., but it is important to take into consideration the relevance of scientific references in the specific local context.**

- Finally, some problems relate to themes that are not very well covered by agroecologocial research, and for which very little technical scientific knowledge exists.

"A solution exists but is outside the scope of the project: a solution outside the agroecological framework, such as a chemical input/no known solution for the moment." (FORI workshop, Gembloux, 2023)
"When dealing with little-known practices with no existing solutions, you have to work in an experimental station. You can't experiment from scratch on farmers' fields and make them bear the risks of research." (FORI Workshop, Gembloux, 2023)

→ **Problems may require fundamental research activities to first be carried out in an experimental station.**

"We have ideas for solutions, research has been carried out, results exist, and ideas for solutions exist, but we need to check their applicability and implementation in the context of parameters and variables." (FORI Workshop, Gembloux, 2023)

> *"Action research takes place in an intermediate space, where technical references exist but need to be tested in the field, adapted, and examined, to see how they can be adjusted to local conditions (doses, quantities, etc.)."*

5.2. Formulate action research themes that can provide useful knowledge for solving jointly identified problems

It is important to bear in mind that, even if the **problems identified** refer to action research themes, they do **not in themselves constitute research themes:**

- **We need to move on from the practical problems faced by farmers** (**"**How do I control this or that pest?**")** **to research themes which involve the production of scientific and technical knowledge** (**"**What are the effects of this or that bio-pesticide on...**")**.

"In the types of problems to be solved – for example, 'How do we control a particular pest?', these are the questions we can formulate with the farmer. This is the end of the problem identification stage. They are not research theme problems." (FORI Workshop, Gembloux, 2023)

- It is necessary to **take into account/discuss with farmers which criteria they will use to analyze the technical alternatives being tested**, and these may differ from those used by researchers.

"Research often looks at things from an agronomic point of view – fertility, yield, etc. – but the farmer will choose criteria that take into account workload, arduousness, etc. This is why it's important to work together to choose the themes. A good example of a theme: the effects of different doses of xxx on the incidence of Legionnaires' caterpillars." (FORI Workshop, Gembloux, 2023)

- **It is important to define action research themes and protocols by combining local knowledge with that of facilitators and researchers**, and with the active participation of farmers. This makes it possible to:
  - Select problems to be addressed/themes for experimentation that are of interest to the majority of farmers
  - Take into account the local availability of the products to be tested
  - Ensure farmers' ownership of the experimental protocols and therefore enhance their commitment to implementation
  - Identify other possible solutions to problems that the moderators/researchers might not have thought of.

→ **It is at this stage that the role of researchers becomes necessary and important**, and in-depth discussions need to take place between farmers and researchers specializing in the issues addressed.

"Once the problems have been identified, the priority (clear and common) problems can be reported and validated, and researchers can intervene." (FORI Workshop, Gembloux, 2023)
"Which researchers should be asked questions? We could present these problems only to researchers specializing in the relevant field." (FORI Workshop, Gembloux, 2023)
"It is important to take the time to discuss and analyze things together before embarking on action research which takes time - especially if, in the end, we're not sure it's the right area to focus on." (FORI Workshop, Gembloux, 2023)
"There's an important point in this phase: helping farmers think about the problem and find solutions. It's in these discussions that we integrate thoughts on whether it's better to fight directly or engage in prevention. For example, in an extreme case, if it's not possible to fight the pest, it's better to change the crop. Really broaden the discussion." (FORI Workshop, Gembloux, 2023)

→ **Setting up consultations between farmers and researchers to define the relevant action research topics (e.g. those that can provide useful information to effectively solve farmers' problems) is central to this stage**. Discussions should enable both parties to think more deeply about the problems that require tackling and the research topics that can be established to contribute to doing so.

→ In this consultation process, it is **important to take into account the points of view of all stakeholders, and particularly avoid researchers imposing their points of view on farmers.**

"We know that researchers have a duty to evolve and have their own research mandate. When we contact them about research topics, do they not sometimes impose their point of view so that it corresponds to their research topic? How can we ensure that producers can change this balance of power and that researchers don't take over?" (FORI workshop, Gembloux, 2023)
"Is there a bias in the prioritization of subjects linked to the fact that the subject, e.g. entomology, may or may not be available in the country concerned? Is there a preference for subjects where the local research institution can make a contribution?" (FORI Workshop, Gembloux, 2023)

> *"In practice, there are always biases and conflicts of interest. You have to be aware of and take into account conflicts of interest at the level of donors, agri-agencies, FOs, farmers, and the private sector. We need to find a synergistic dynamic where everyone is trying to move forward together.* ***Each player needs to take a step back and understand others positions in the process****. Otherwise, there is a risk that action research will become a tool for manipulation." (FORI Workshop, Gembloux, 2023)*

5.3. Consult and implement action research protocols that strike the right balance between scientific-technical rigour and the 'participatory' dimension

1. Farmers do not always strictly adhere to the defined protocols, which reduces the scientific rigour of the experiments carried out. However, they are not necessarily the only ones to blame. This lack of adherence sometimes occurs due to the way in which the protocols are defined (not very flexible, not enough consultation with farmers, etc.). Furthermore, scientific rigour also requires appropriate resources.

"How can we have solid data if the plots and protocols are not respected? The neighbour's plots will serve as controls." (FORI Workshop, Gembloux, 2023
"We've found that there are difficulties with harmonization at plot level, especially when it comes to repetition. Additionally, when farmers have already heard about protocols, such as for pest control, they tend to include everything and not follow the experimental protocol." (FORI Workshop, Gembloux, 2023)
"Farmers sometimes don't follow the steps and change their minds during the process. But sometimes we forget the workload, the arduousness of the work required, and the feasibility of the solutions proposed." (FORI Workshop, Gembloux, 2023)
"Researchers sometimes complicate things, particularly when it comes to harmonizing the size of experiments/plots. They are sometimes too inflexible." (FORI Workshop, Gembloux, 2023)
"We discussed experiences where producers tested a single solution rather than the several proposed, to overcome the issue of space." (FORI workshop, Gembloux, 2023)
"We came back to the question of scientific rigour and thought it might be better to involve students in this work, as they have the time and can spend one or two months setting up, including additional plots. They could then help ensure this aspect of scientific rigour. But all this requires resources." (FORI Workshop, Gembloux, 2023)

> *"**It may be necessary to refine what we mean by scientific rigour in action research, without adding too much complexity**. We need to find a balance between the conditions faced by farmers (considering concepts such as randomization, replication, etc.) and the resources available to us." (FORI Workshop, Gembloux, 2023).*

2. **Considering the risks that farmers (and FOs) face in conducting experiments is central in defining and implementing action research protocols**. This relates to several points:
   - **Identifying action research themes that do not require starting from scratch from a scientific and technical point of view, but which instead involve adapting technical reference systems, considering the local conditions, and so on.**

"We have groups with different crops and no complete solutions and, on the other hand, we have FOs that are very cautious and want to engage in activities with guarantees and are likely to favour activities that have a higher chance of yielding results." (FORI Workshop, Gembloux, 2023)
"When it comes to agroecology, we shouldn't be trying to reinvent the wheel. There has been a lot of experimentation going on since the Neolithic period, so a huge amount of knowledge exists. However, FOs are not always aware of what researchers have, and often, farmers can connect more quickly with researchers because they can identify what interests them from the list of proposed innovations. There is a temptation to focus on one or two. It's an interesting dynamic." (FORI workshop, Gembloux, 2023)
"What I've experienced is that farmers are keen if they have guarantees that it can work." (FORI Workshop, Gembloux, 2023)

→ **See the section on the consultation of action research themes:** conducting experiments with farmers vs. conducting experiments in experimental stations.

- **It is vital to make protocols more flexible so they take risk factors into account, especially when working with farmers in survival situations** who have little-to-no room for error.

"For caterpillar control, if we tell them to put gravel

and soil, they're not going to say, 'No, I'll put that on just one part and not my whole crop' when they see that it works. That's where flexibility is needed." (FORI Workshop, Gembloux, 2023)
"In the burial of green manure, there's a risk in using a plot for experimentation, and there's also the issue of securing the plot. Initially, what the farmers wanted was to do this on a community field. After three months, the highest dose resulted in threefold tillering. Now, we're going to adjust the focus of the observation." (FORI workshop, Gembloux, 2023)
"This raises the question of the untreated control plot. We hear the farmer say he can't afford not to fertilize part of his field." (FORI workshop, Gembloux, 2023).

- **Farmers will have to be careful to limit the risks they take in these experiments:**
  - **We must ensure we define the control plots, the treatments to be applied, and what data will be collected and until when** (For example, once we have observed the impact of a treatment on the presence of pests, we can stop the experiment without going so far as measuring the yield and treating the whole plot).
  - **If necessary, we should plan for compensation in** the event of losses – e.g. certain material support, possible payments, etc. – from the moment the protocol is developed.

3. **The collection of (reliable) data represents a specific challenge, <u>both in terms of the type and complexity of the data to be collected and who will be responsible for it.</u> Similarly. It is important that <u>this collection combines quantitative and qualitative data.</u>**

"In terms of monitoring the protocols implemented in the field, farmers fill out forms to monitor the implementation of experiments. Grassroots organizations (cooperatives or FOs) are responsible for overseeing the experiments. In some cases, based on discussions, trainees are involved in data collection, including quantitative data. Monitoring is also carried out by facilitators and technicians, as well as by the researchers during follow-up missions, and through sharing sessions focused on monitoring and the data collected." (FORI workshop, Gembloux, 2023)
"We had discussions, and there were doubts about the quality of the data collected by the farmers. The basis of the approach is that the farmer takes ownership of the technique. But there is also the role of the action research group, which can help with day-to-day monitoring. One interesting thing that came out was that, in Benin, there are two types of protocol: a scientific protocol from the researchers' station, and a farmer's protocol with the support of the researcher." (FORI workshop, Gembloux, 2023)
"It is important for researchers to listen to farmers' observations about the trial, even if they are shared informally and not part of the initial data to be collected, as they may reveal positive or negative aspects." (FORI Workshop, Gembloux, 2023)

- **What data will be collected and who will be responsible for it must be carefully and realistically considered in each protocol – taking into account the capabilities of the various players, the time and resources available, and the quality of the data required.** A variety of innovative solutions can be found:
  - Rely on trainee students doing their final year work, etc;
  - Define different levels of monitoring: more rigorous with a smaller number of farmers or more empirical with other farmers.

- **It is also very important to collect qualitative data/assessments alongside quantitative data,** as it can sometimes 'compensate' for difficulties in collecting rigorous quantitative data.

4. **Rigorous scientific monitoring is not always feasible or relevant for all the conducted experiments.** At the same time, it is not appropriate for the demands associated with implementing and monitoring protocols to limit the ability of experimenter farmers to flexibly test alternatives that interest them. To combine these two aspects, we need to:

- **Increase the flexibility** with which farmers can define the experiments they wish to carry out.

- **Identify the plots on which rigorous quantitative monitoring will be carried out,** once the farmers have defined the experiments they wish to carry out.

- **Plan to include enough farmers from the outset,** allowing for possible losses along the way.

5. Finally, **we must not forget that defining and implementing action research protocols is very context-dependent. There are two distinct challenges that need to be reconciled**: the scientific objective of the researcher, which requires a certain amount of rigour, and the perspectives of the farmers, who, above all, are focused on finding practical answers to their problems.

- **How can we ensure these two stakeholders work together and take a step forward towards both greater flexibility and rigour? There is no ready-made answer to this question:**
  - It is important to take the time to find this balance and ensure that protocols are as close as possible to the farmers' real conditions.
  - These discussions are important and, ultimately, we mustn't forget that "perfect is the enemy of good".
  - We need to move forward and start experimenting – capitalizing on experiences to learn and improve processes.

5.4. Analyze the results of the action research with the farmers and assess the extent to which the results enable them to resolve the identified problems

Experiments carried out with the support of researchers can demonstrate the positive effects of applying the tested agroecological practices on soil fertility, yields, the incidence of pests, and so on.

However, just as farmers' problems do not automatically constitute action research topics (see 5.2), **the fact an experiment shows positive results (according to certain criteria defined in the experiment protocols) does not necessarily mean a problem has been solved from the farmers' point of view:**

- Farmers may have criteria for analyzing these results, other than those applied during the experiments (such as arduousness or access to raw materials and/or the tools and equipment required to implement them, etc.).
- Farmers may not have the means to implement the experimental practices (on a large scale) on their plots.

→ Therefore, **review meetings** play a critical role. Such meetings should make it possible to:

- Present and discuss the **experiments** carried out and **the results obtained;**
- **Gather and exchange information on what farmers have learned from these experiments in relation to the problem(s) to be solved**, any difficulties (in implementing the practices tested), and further questions, etc.
- Gather **feedback and suggestions from farmers** on how to define and implement experiments.

In line with these objectives, the suggested participants for these meetings are as follows:

- Experimenter farmers directly involved in the implementation of the experiments
- Other farmers (members of FOs or others) interested in the problems addressed
- Facilitators/technicians/managers of the FOs who support/facilitate the process
- Researchers involved in carrying out the experiments.

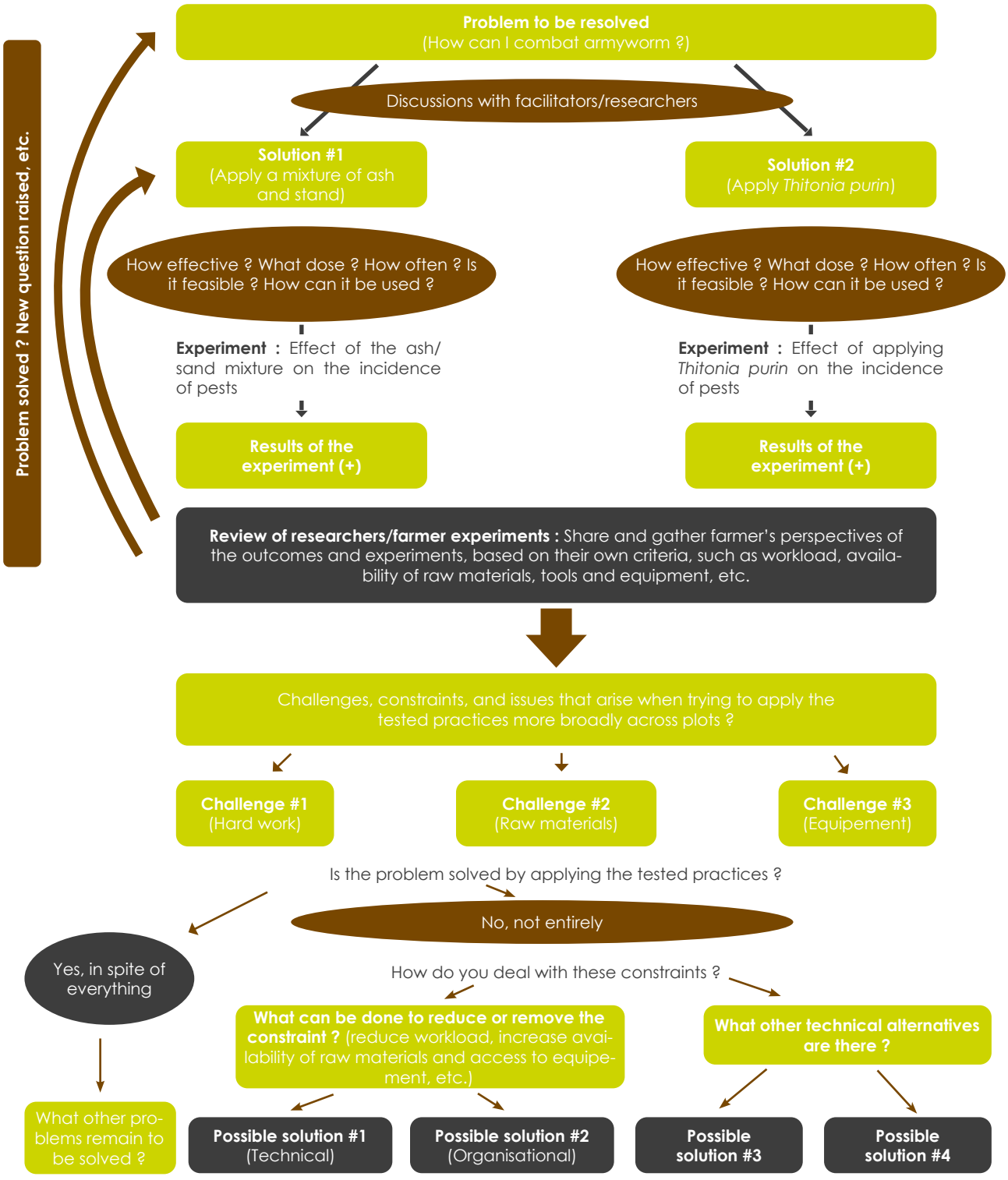
→ **For the potential of these review meetings to be fully realized**, it is important that:

- **Discussions do not focus solely on the results obtained from the experiments, but also question whether or not the results enable farmers to satisfactorily resolve the problem on their plots.** If not, what difficulties are they encountering, what problems have arisen, and what still needs to be dealt with?
- **Farmers – other than experimenter farmers – also attend the meetings to give their point of view on this subject.** Farmers who carried out the experiments may have received support that is not available to other farmers, or they may have conditions on their farm plots that are not the same as in others.

5.5. Turn the difficulties and constraints related to the application of the tested agroecological practices into action research themes

The action research process does not end with the completion of the experiments, even if the results appear to be positive. It must go continue until the problems identified and validated with the farmers at the outset are effectively resolved.

Effective problem-solving involves identifying, formulating, and, if necessary and relevant, dealing with the difficulties, constraints, and problems that arise when applying the tested practices more widely in the plots. Dealing with these problems can be the starting point for a new action research cycle, as shown in the diagram below, taken from the capitalization of the action research project implemented in Burundi:



- **Action research should not be limited to experimenting with farming practices.** Given the nature of some of the problems raised during the initial phases (or at these review meetings, in connection with constraints or difficulties that limit the application of practices on a wider scale), it also seems important to work on action research themes that do not involve 'classic' experimental set-ups (with treatments and repetitions).

- **To resolve jointly identified problems, we should combine the definition and implementation of action research protocols with other necessary types of complementary actions.**

- **We should move further towards more systemic, holistic approaches to agroecological transition processes that take into account all the characteristics of production systems.**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5.6. Strengthen the involvement and capacity building of various stakeholders to ensure long-term viability of the action research process

- As much as possible, research institutions should be involved in action research processes based on issues identified by FOs and farmers, not just individual researchers.

"You have to mobilize the entire institution around a problem, even if it's just one problem. It's important to look at problems more broadly with the research institution and determine what needs to be dealt with."(FORI Workshop, Gembloux, 2023)
"It's ideal to work directly with research institutions, but it's important to consider the different realities between countries. Sometimes, researchers aren't interested in certain topics because they have major priorities elsewhere. For example, they may say that their institution will not intervene for amounts of less than €50,000, and this is formalized in their collaboration document. Another example: work had begun on formulating a project on farmer-managed seeds. This concept does not exist in their context; so are farmer seeds the same as indigenous seeds? We sometimes rely on researchers who have the same sensitivities as us and have already worked on issues that interest us." (FORI workshop, Gembloux, 2023)

While obtaining institutional collaborations with research centres is fundamental to the sustainability of the processes, it is not always possible – so we need to be pragmatic. One strategy is to rely on 'allied' researchers within these institutions.

> *"If we have collaborators among researchers, we have to go with them to the institution because sustainability lies with the state.* ***An important element, which is why we exist as FOs, NGOs, etc., is to apply pressure so that things change. You can't just stick to a project and push it forward. The collaborating researcher is capable of taking our cases to the institutions.*** *That's the objective we must not miss. If the institution is open, there's no problem; but, if not, we also have to go through the ministries. We should always be convinced that what we need to achieve can only be done through the state. It's going to be hard and difficult, but there's no alternative. Even the European Union can't intervene if the state doesn't agree. We try to adopt the strategy of the snake: when there's noise, it quiets down. When the noise stops, continues on its path." (FORI Workshop, Gembloux, 2023)*

- **Setting up an action research process (i.e. the co-construction of knowledge) takes time and requires learning among the various players involved. From this, they can better understand each other's rationale for action and set up productive collaborations that meet everyone's interests. The effective implementation of a stance and approach for supporting farmers is particularly crucial.**

"The experiments are not conducted over a single season, so any biases observed are corrected as we go along." (FORI Workshop, Gembloux, 2023)
"These are time-consuming processes. It takes time to explain the type of project we are setting up, both to farmers and to researchers. We're working in Burundi with two researchers who don't have identical visions, and we need to be able to explain and exchange ideas in order to coordinate and have a shared vision." (FORI Workshop, Gembloux, 2023)
"One of the research advisers who worked with us said: 'You want to manage this action research like

a logical framework for a project. You want clear indicators from the outset, but from the outset you may not have the same indicators as when managing a project. So, there are criticisms to be made on both sides." (FORI Workshop, Gembloux, 2023)

> *"It is necessary* ***to train the agricultural technicians who work with farmers in the field in this approach, so they can think in a farmer's place, not go too fast, and manage things – but also take the time to listen to the farmer, give him time to think, understand his positions, and not try to replace him."*** *(FORI Workshop, Gembloux, 2023)*

- **It is important to strengthen/stimulate the experimentation capacities of experimenter farmers. To do this, it would be necessary to:**

→ Reinforce their understanding of experimental principles
→ Explain the principles behind the practices more clearly, so they can adapt them more easily
→ Further diversify the possible solutions and experiments to be implemented.

- **It is important to strengthen the quality/intensity of exchanges between experimenter farmers and researchers/technicians. This can be achieved by:**

→ Organizing workshops to discuss problems and questions raised by farmers and provide references and possible solutions:
  - At the time of review/analysis of the results of the trials
  - When defining new themes/experimentation protocols

→ Reinforce reflection-supporting approaches rather than prescriptive approaches when running these workshops.

- **It is important to recognize the synergies and complementarities between the 'empirical' experiments carried out by the experimenter farmers and those subject to more 'rigorous' monitoring – with both being integral parts of the process.**

→ Monitor and support both types of experiment (with different levels of intensity)

→ Strengthen the links between the two types of experiment: one can feed into the other.

ACRONYMS

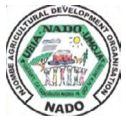
Acronyms		Definition
AGR	:	Activités Génératrices de Revenus
AFDI	:	Agriculteurs Français et Développement International
AJAC	:	Association des Jeunes Agriculteurs de Casamance
ASPRODEB	:	Association Sénégalaise pour la Promotion du Développement à la Base
CAPA	:	Centro de Apoio e Promoção da Agroecologia (Brésil)
CAPAD	:	Confédération des Associations des Producteurs Agricoles pour le Développement
CEFFEL	:	Centre d'Étude et de Formation en Fertilité de la Terre
CFNR	:	Comisión Nacional de Fomento Rural
CIRAD	:	Centre de Coopération Internationale en Recherche Agronomique pour le Développement
CNCR	:	Conseil National de Concertation et de Coopération des Ruraux
CNOP	:	Coordination Nationale des Organisations Paysannes (Mali)
CNOPCAM	:	Concertation Nationale des Organisations Paysannes au Cameroun
COOCENKI	:	Coopérative Centrale du Nord-Kivu
COPROFAM	:	Confédération régionale d'organisations de producteurs familiaux en Amérique latine, partenaire au Brésil-Uruguay.
CPF	:	Confédération Paysanne du Faso (Burkina Faso)
CRESOL	:	Cooperativa de Crédito
CSA	:	Collectif Stratégies Alimentaires
ECOVIDA	:	Ecovida Agroecology Network
FAMVE	:	Faculté d'Agronomie et de Médecine Vétérinaire d'Haïti
FAO	:	Organisation des Nations Unies pour l'alimentation et l'agriculture
FARMCOOP	:	Cooperative for Assistance and Relief Everywhere (aux Philippines)
FECCANO	:	Fédération des Coopératives Cacaoyères du Nord
FERT	:	Fert – entreprise associative de coopération
FFD	:	Finnish Agri-agency for Food and Forest Development
FIFATA	:	Fédération Interrégionale des Organisations Paysannes
FOC TR4	:	Fusarium Oxysporum Cubense Tropical Race 4
FOFIFA	:	Centre National de la Recherche Appliquée au Développement Rural
FONGS	:	Fédération des ONG du Sénégal
FOPAC	:	Fédération des Organisations de Producteurs Agricoles du Congo
FORI	:	Farmers' Research for Impact (Programme de recherche-action financé par l'UE et exécuté par AgriCord)
GERDAL	:	Groupe d'Expérimentation et de Recherche : Développement et Actions Localisées (www.gerdal.fr)
GIC	:	Groupement d'Intérêt Communautaire
IER	:	Institut d'Économie Rurale
IIBPH	:	Indice de mise en œuvre des bonnes pratiques horticoles
INERA	:	Institut de l'Environnement et de Recherches Agricoles

Acronyms		Definition
INERA (RDC)	:	Institut National pour l'Étude et la Recherche Agronomiques (RDC)
IPAR	:	Initiative Prospective Agricole et Rurale
IRAD	:	Institut de Recherche Agricole pour le Développement
IRSAT	:	Institut de Recherche en Sciences Appliquées et Technologies
ISRA	:	Institut Sénégalais de Recherches Agricoles
LARNAH	:	Laboratoire de Recherches en Nutrition et Alimentation Humaine
LOFEPACO	:	Ligue des Organisations de Femmes Paysannes du Congo
MVIWAARUSHA	:	Mtandao wa Vikundi vya Wakulima Arusha (Réseau des groupements de producteurs d'Arusha)
NADO	:	Network of Agriculture Development Organisations
OA	:	Organisation d'agriculteurs
OP	:	Organisation paysanne
PFO	:	Pacific Farmer Organisations
PNPCH	:	Plateforme Nationale des Producteurs de Cacao d'Haïti
RA	:	Recherche-action
SPG	:	Système Participatif de Garantie
SUA	:	Sokoine University of Agriculture
SYDIP	:	Syndicat de Défense des Intérêts Paysans
TAE	:	Transition agroécologique
TAPE	:	Tool for Agroecology Performance Evaluation
TARI	:	Tanzania Agricultural Research Institute
TRIAS	:	Organisation belge de développement
TTGAU	:	Tanzania Tree Growers Association Union
UAS-Z	:	Université Assane Seck de Ziguinchor
UCG	:	Université Catholique du Graben
UCNH	:	Université Chrétienne du Nord d'Haïti
UCOCAB	:	Union des Coopératives de Café de Baptiste
UDELAR	:	Université uruguayenne
UE	:	Union européenne
UNAPOB	:	Union Nationale des Producteurs d'Oignon du Burkina
UNCPM	:	Union Nationale des Coopératives de Producteurs de Maraîchage
UNIGOM	:	Université de Goma
UPA-DI	:	Union des producteurs agricoles - Développement international
We Effect	:	Organisation suédoise de coopération au développement

IMPLEMENTING PARTNERS








Acknowledgments

We would like to express our deep gratitude to all the implementing partners and stakeholders of the FORI programme for their unwavering commitment and valuable contributions to this capitalization initiative.

Special thanks to the farmers' organizations, researchers, and research institutions, as well as the Agri-agencies, whose experiences and perspectives have enriched this document.

We are also grateful to the facilitators and trainers who supported the producers in local experiments.