agrihatura

Food and Agriculture Organization of the United Nations

DEVELOPING CAPACITIES FOR AGRICULTURAL INNOVATION SYSTEMS

Lessons from implementing a common framework in eight countries

CDAIS

Publications in this series

CDAIS manuals and guidelines

- *Capacity Needs Assessments – A trainers' manual (2nd edition)*
- *Innovation Niche Partnerships – A guide to the coaching process*
- *Organisational Strengthening – A guide to the coaching process*
- *Organising a Marketplace – A practical guide*
- *Organising a Policy Dialogue – A practical guide*
- *Monitoring, Evaluation and Learning – Concepts, principles and tools*

CDAIS stories and conversations

- *Building Competence and Confidence in Agricultural Innovation – Stories of Change*
- *Catalysing Innovation in Agriculture – Conversations of Change*

The manuals are intended as working documents. The project supported the development of the Common Framework on Capacity Development for Agricultural Innovation Systems of the Tropical Agriculture Platform, and tested it in eight pilot countries. One key finding was that the framework requires adaptation in each country situation, and as such the manuals are intended as general guides only.

https://cdais.net
www.tapipedia.org

DEVELOPING CAPACITIES FOR AGRICULTURAL INNOVATION SYSTEMS

Lessons from implementing a common framework in eight countries

Published by
Agrinatura and the Food and Agriculture Organization of the United Nations
Rome, 2020

Citation

Toillier A., Guillonnet R. Bucciarelli M. & Hawkins R., 2020. *Developing capacities for agricultural innovation systems: lessons from implementing a common framework in eight countries*. Rome, FAO and Paris, Agrinatura. https://doi.org/10.4060/cb1251en

Disclaimer

The CDAIS project is funded by the European Union. This document has been produced with the financial assistance of the European Union. The content of this publication is the sole responsibility of the authors and do not necessarily reflect the opinion of the European Union.

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) or Agrinatura concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO or Agrinatura in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of the authors and do not necessarily reflect the views or policies of FAO or Agrinatura.

FAO ISBN: 978-92-5-133375-4
Agrinatura ISBN: 978-2-35709-020-0

Agrinatura
The European Alliance on Agricultural Knowledge for Development
European Economic Interest Grouping
42 rue Scheffer
75116 Paris, France
secretariat@agrinatura-eu.eu
www.agrinatura-eu.eu

FAO
Food and Agriculture Organization of the United Nations
Via delle Terme di Caracalla
00153 Rome, Italy
tropagplatform@fao.org
www.fao.org

CONTENTS

Preparation of this document v
Abstract vi
Acknowledgements vii
Acronyms viii
Executive summary ix

PART 1. INTRODUCTION AND METHODOLOGY 1

1. Introduction
1.1. Purpose of this document 3
1.2. What is the TAP Common Framework (TAP CF)? 3
1.3. The need for transversal analysis and learning review 3
1.4. Questions for transversal analysis 6

2. The transversal analysis and learning process 7
2.1. Comparison of context-mechanisms-outcomes 7
2.2. A three-step process for developing guiding questions 7
2.3. Data collection and analysis 11
2.4. The presentation of findings in this report 13

PART 2. IMPACT PATHWAYS 15

3. Impact pathways at the niche level 17
3.1. Niches as temporary communities with evolving innovation agendas 17
3.2. Niche outcomes and CDAIS contribution 20
3.3. Common functional capacities developed across niches 31
3.4. Contribution of functional capacities in realizing innovation 36

4. Impact pathways at the system level 39
4.1. Overview of CD patterns at the system level 39
4.2. Functional capacities developed 44
4.3. A stepwise CD process from niche to national level 47
4.4. Improvements in the enabling environment of niches 50
4.5. Institutionalization of the AIS approach 52

5. Insights from comparing impact pathways 55
5.1. CDAIS *ex-post* impact pathway and refined Theory of Change 55
5.2. Catalyzing contextual factors 61
5.3. Hindering factors related to project implementation modalities 64
5.4. Actions that increased the transformative effects of the CDAIS project 64
5.5. Achieving impacts: combining project-based, country-based and global approaches 66

PART 3. RECOMMENDATIONS FOR UPGRADING THE TAP COMMON FRAMEWORK 69

6. Fine-tuning concepts and their operationalization 71
6.1. AIS concept and its operationalization 71
6.2. The niche concept and its operationalization 72
6.3. Functional capacities, technical capacities and other capacities needed for agricultural innovation 73
6.4. The 5-steps and the coaching approach 76
6.5. Innovation facilitators and coaching teams 76
6.6. From a dual to a triple pathway of change for scaling capacities to innovate 77
6.7. M&E for learning rather than M&E for accountability 77

7. Making the TAP CF more applicable 79

8. Increasing the use of the TAP CF 80

REFERENCES **81**

ANNEXES **85**
ANNEX 1. MEL tools for data collection 87
ANNEX 2. List of innovation innovation niche partnersips in the eight CDAIS pilot countries 89

FIGURES

1. *Ex-post*-theory of change of the CDAIS project xii
2. Guiding questions for a learning review of the TAP Common Framework 6
3. *Ex-ante* impact pathway of the CDAIS project 8
4. Times of MEL data collection in the CDAIS project 11
5. Types of niches, contributions of CDAIS to the main impacts and expected next steps 22
6. Origins of niches and initial purpose of the niches 23
7. Dimensions of innovation addressed by the niche actors and the nature of their relationships 24
8. Capacities for joint innovation: the key common functional capacities for innovation, across niches and countries 31
9. Steps of engagement and refinement of capacity demands of niche actors 32
10. The engagement wheel 34
11. Coupled trajectories of development of functional capacity and progress in the development of innovation, resulting from the CDAIS project 36
12. The empirical dimensions of capacity development for innovation at the system level across the eight pilot countries 39
13. Institutional affiliation of individuals and organizations mobilized as actors of change for CD at the system level across the eight countries 41
14. Types of NGOs 41
15. Main domains of activity of the organizations mobilized as actors of change for CD at the system level across the eight countries 42
16. Distribution of activities in the 'Research-Extension-Education' domain 42
17. Institutional affiliations of NIFs across the 8 countries 42
18. Typology of CD pattern at the national innovation system level 43
19. Capacity development processes that led to the strengthening of the national AIS across the eight countries 48
20. CDAIS *ex-post* impact pathway (top diagram) and theory of change (bottom diagram) at the country level 56
21. From outputs to outcomes 57
22. From outcomes to impacts 57
23. *Ex-post*-theory of change of the CDAIS project 60
24. Catalyzing contextual factors of the CDAIS impact pathway at the country level 61
25. Hindering factors of the CDAIS impact pathway at the country level 63
26. Strategies that made the CDAIS project transformative 64

TABLES

1. Theoretical background of the TAP Common Framework 5
2. Assumptions about factors that possibly influenced project outcomes at the country level 10
3. List of data sources and available documents for the transversal learning and analysis 12
4. Mapping of CDAIS niches per country 18
5. Examples of innovation agendas per type of niche (solution-focused, problem-focused or opportunity-focused) 21
6. Nature of relationships among niche actors 23
7. Mapping of niches according to the initial purpose of niche actors: solution-focused, opportunity-focused and 26
8. Capacity for what? Core issues addressed at the national innovation system level by policymakers across the eight countries 40
9. Contribution of CDAIS activities to capacity development at the system level 48
10. Strategies for implementing a transformative CDAIS project 65

BOXES

1. Limitations of the CDAIS project in tackling a niche's problems – Example from Ethiopia 25
2. Challenges in the national AIS and agricultural policy development – Example from Bangladesh 44
3. The transformation of public research, education and extension organizations as a key expanded outcome toward sustainable systemic changes – Example from Ethiopia 59

PREPARATION OF THIS DOCUMENT

The Capacity Development for Agricultural Innovation Systems (CDAIS) project, financed by the Directorate-General for International Cooperation and Development of the European Union (DG-DEVCO), was implemented jointly, from 2015 to 2019, by Agrinatura (the European Alliance on Agricultural Knowledge for Development) and the Research and Extension Unit (OINR) of FAO (The Food and Agriculture Organization of the United Nations). It provided support to the Tropical Agriculture Platform (TAP), a G20 initiative the main focus of which is the development of national capacities for agricultural innovation in the tropics. The CDAIS project was designed to strengthen TAP through the development of a common framework for Capacity Development for Agricultural Innovation Systems (CD for AIS) which sets concepts and guidance for the promotion of agricultural innovation system (AIS) thinking and collaborative learning, and for the strengthening of capacities for AIS in tropical countries. The project tested this common framework (or so-called 'TAP CF') in eight pilot countries,[1] offering a variety of situations across three continents.

A transversal analysis of the project outcomes therefore intended to 'validate' the common framework, meaning to verify hypotheses underpinning the TAP CF and to verify how changes happened in the eight countries in relation with the mode of operationalization of the TAP CF by the CDAIS project. In other words, the transversal analysis sought to understand how the project produced outcomes, what these outcomes were in each country, so as to propose recommendations for upgrading the TAP Common Framework across its theoretical and practical dimensions.

The transversal analysis started in early 2020, once project activities were completed and reported in the eight countries. It was conducted by a core team of four individuals who led the design and implementation of the MEL (Monitoring, Evaluation and Learning) system during CDAIS project implementation. The publication of the transversal analysis report was financially supported by CIRAD and FAO.

[1] Angola, Bangladesh, Burkina Faso, Ethiopia, Guatemala, Honduras, Lao PRD and Rwanda

ABSTRACT

This document provides a transversal analysis of the outcomes of the application of the TAP Common Framework (TAP CF) across the eight pilot countries of the CDAIS project (Angola, Bangladesh, Burkina Faso, Ethiopia, Guatemala, Honduras, Lao PDR and Rwanda): whether and how the TAP CF was used, and how usable and useful it proved to be.

The analytical framework is grounded in the principles of realist evaluation, which recognizes that projects work differently in different contexts and through different change mechanisms. We compared 'context-mechanisms-outcomes' configurations across the 34 innovation niche partnerships and the eight countries, using mixed-method approaches and the data collected through the CDAIS MEL (Monitoring, Evaluation, and Learning) system.
The comparative analyses consisted in drawing impact pathways, merging common patterns and refining the initial rough Theory of Change of the CDAIS project.

A first set of results gives empirical insights into agricultural innovation agendas and processes in these countries, the capacities needed to successfully achieve demand-driven innovation initiatives and the capacities needed to set up a well-functioning agricultural innovation system at the country level.

A second set of results identify the hindering and catalyzing factors of the project's impact pathways in the countries, exploring contextual features (maturity of the AIS, diversity of innovation niche partnerships) and project implementation modalities (AIS-embedded and participatory architecture, demand-led approach, multi-level and process-led approach).

The report ends with recommendations for upgrading the TAP CF across its theoretical and practical dimensions, and for designing interventions and future investments based on demand-led capacity development approaches for strengthening agricultural innovation systems.

The report is intended for a specialist audience of development professionals and academia working on approaches to support agricultural innovation and to develop capacities for agricultural innovation systems.

ACKNOWLEDGEMENTS

The authors acknowledge the technical and administrative support provided by Agrinatura and by the Research and Extension Unit (OINR) of the Food and Agriculture Organization of the United Nations (FAO) in the preparation of this report.

The report's authors extend their thanks to all those who contributed their time, at various stages, towards this learning review of the implementation of the CDAIS project.

Special thanks go out to the MEL country teams, which did an amazing job in learning, implementing, refining and delivering the MEL approach, tools and reports.

In memory of Amanuel Assefa, Country Project Manager for the CDAIS project in Ethiopia, and who dedicated himself to improving innovation processes in his country.

ACRONYMS

AO	Angola
AIDA	*Asociación Integral de Desarrollo Agrícola* (Guatemala)
AICS	*Agenzia Italiana per la Cooperazione allo Sviluppo* (Italy)
AIS	Agricultural Innovation Systems
ATT	Agrinatura Task Team
BAPA	Bangladesh Agro-Producers' Association
BARC	Bangladesh Agricultural Research Council
BARD	Bangladesh Academy for Rural Development
BF	Burkina Faso
BD	Bangladesh
CIPAC	Guatemala
CIRAD	*Centre de cooperation Internationale de Recherche Agronomique pour le Développement* (France)
CNA	Capacity Needs Assessment
CONADEA	*Consejo Nacional de Desarrollo Agropecuario* (Guatemala)
CONAPI	*Comisión Nacional De Apicultores* (Guatemala)
CD	Capacity Development
CDAIS	Capacity Development for Agricultural Innovation Systems (project)
CF	Common Framework (for Capacity Development for Agricultural Innovation Systems)
CNA	Capacity Needs Assessment
CPM	Country [CDAIS] Project Manager
DAM	Dhaka Ahsania Mission (Bangladesh)
DGFOMER	*Direction Générale du Foncier, de la formation et de l'Organisation du Monde Rural* (Burkina Faso)
DGSRI	*Direction Générale de la Recherche Scientifique et de l'Innovation* (Burkina Faso)
DOPLA	Department of Policy and Legal Affairs (Lao PDR)
EIAR	Ethiopian Institute of Agricultural Research
ET	Ethiopia
FAO	Food and Agriculture Organization of the United Nations
FO	Farmer Organization
GRAF	*Groupe de Recherche et d'Action sur le Foncier* (Burkina Faso)
GT	Guatemala
HN	Honduras
iCRA	The iCRA Foundation (The Netherlands)
ICT	Information and Communications Technologies
ISA	*Instituto Superior de Agronomia* (Portugal)
ISS	Innovation Support Services
ISSP	Innovation Support Service Providers
KAP	Knowledge-Attitude-Practice
LA	Lao People's Democratic Republic (Lao PDR)
MAF	Ministry of Agriculture and Forestry (Lao PDR)
MAGA	Ministry of Agriculture, Livestock and Food (Guatemala)
MEL	Monitoring, Evaluation and Learning
MESRSI	Ministry of Higher Education, Scientific Research and Innovation (Burkina Faso)
MoIC	Ministry of Industry and Commerce (Lao PDR)
NAFRI	The National Agriculture and Forestry Research Institute (Lao PDR)
NIFs	National Innovation Facilitators
NICT	New Information and Communications Technologies
NPC	National [CDAIS] Project Coordinator
NRI	National Resources Institute (United Kingdom)
PGS	Participatory Guarantee System
RTCF	*Réseau des Transformatrices de Céréales du Faso* (Burkina Faso)
RW	Rwanda
TAP	Tropical Agriculture Platform
TAP CF	TAP Common Framework
ToC	Theory of Change
ToT	Transfer of Technology
VDFACA	Veterinary Drug and Animal Feed Administration and Control Authority (Ethiopia)

EXECUTIVE SUMMARY

1. What is new in the CDAIS approach?

The TAP Common Framework (TAP CF) was developed at the global level as an initial activity of the CDAIS project in order to guide capacity development (CD) and strengthening of Agricultural Innovation Systems (AIS). The project then tested this framework in eight pilot countries Angola, Bangladesh, Burkina Faso, Ethiopia, Guatemala, Honduras, Lao PDR, Rwanda. The TAP CF introduced three main novelties in the joint area of CD and strengthening of AIS:

A 'dual pathway approach'

The planning and implementation of simultaneous interventions within two CD processes – one at the local level of niches (or 'innovation niche partnerships') and the other one at the national system level (or 'national AIS') – was very new. This 'dual pathway' approach required i) a thorough understanding (or a vision) of the linkages between these two levels; ii) the design of customized CD interventions at each level, depending on purposes and CD needs; and iii) the design of bridging and facilitating interventions between the two levels. Taken separately, these components of the dual-pathway approach are not new. What was new – and challenging – was the way of orchestrating them in a dual-pathway approach within a time-bound project.

Targeting 'functional capacities'

The second novelty was the design of interventions focused on a set of very specific capacities: 'functional' capacities (different from technical capacities), which were moreover pre-identified as being necessary to realize the potential of technical capacities.

These functional capacities are defined in the TAP CF as capacities that enable actors to reflect and learn, collaborate, navigate complexity and engage in strategic and political processes. In this way, they could shift the focus from reactive problem solving to co-creating the future. Facilitative leadership is considered as necessary to enable all of the above to happen.

In general, functional capacities are rarely recognized in the agricultural sector. Rather, they are seen as indirect (or unplanned) outcomes of traditional agricultural development projects. The CDAIS approach proposed to use this new set of key functional capacities both for analysis and strategic actions with regards to strengthening of AIS. Preliminary capacity needs assessments were designed to identify capacity gaps and shape the design of CD interventions.

The focus on functional capacities, the identification of the functional capacities to consider, and the ways of combining analytical and operational actions pertaining to these capacities were all very new in the area of AIS strengthening, much more so than just improving technical capacities (e.g. production) or agri-business capacities (e.g. marketing).

Practical guidance on 'how to' develop functional capacities in AIS

While implementing these two new principles in the eight pilot countries, CDAIS project partners were encouraged to develop packages of innovative methodologies and approaches for making these two principles work in practice. The main innovative packages developed for practitioners were:

- The coaching process for innovation niche partnerships;
- The coaching process for innovation support service (ISS) providers;
- The marketplaces as bridging events between niche actors and ISS providers;
- The policy dialogue;
- The Monitoring, Evaluation and Learning (MEL) system;

These new methodologies are available in the form of manuals at www.cdais.net and are therefore not covered in detail in this document.

2. The objectives and approach of the transversal analysis

The purpose of the transversal analysis was to understand how the CDAIS approach contributed to outcomes and impacts in a diversity of contexts and to propose recommendations for upgrading the TAP Common Framework across its theoretical and practical dimensions. The two main guiding questions were:

- What made the CDAIS approach transformative (or not) in diverse contexts?
- How useful, usable and used was the TAP Common Framework?

In order to be able to trace changes during the entire project in such a diversity of contexts, we developed an analytical framework grounded in the principles of realist evaluation, which recognizes that projects work differently in different contexts and through different change mechanisms. We developed a qualitative and mixed-method approach

– called the 'MEL system for CDAIS'– to monitor, evaluate and compare capacity development processes throughout the implementation of the project in the eight countries. The MEL system included: i) an initial rough Theory of Change of the project (or 'ex-ante ToC'); ii) tools for assessing and monitoring functional and technical capacities in three dimensions (individuals, organizations, and enabling environment), and iii) tools for conducting contribution analysis and facilitating reflexive learning. MEL tools were mainly applied at the two levels of the dual pathway: the innovation niche partnerships, and the national agricultural innovation system.

The comparative analyses consisted in drawing patterns of context-mechanism-outcomes from case studies from the different countries. Insights gained from some countries were checked and complemented with the data and lessons learnt from others. Common patterns were merged, and particular cases were used to expand and then refine an emerging generic project's Theory of Change (or 'ex-post' ToC) that was built on the case-by-case approach.

3. Overview of the key results

The key results of the transversal analysis can be clustered into two groups in terms of what makes the CDAIS approach new:

- Insights into the successes and challenges of the practical interventions to develop functional capacities, based on an empirical understanding of what capacities are needed to innovate and how to develop them;
- A new vision of how to scale capacities to innovate at the country level and produce sustainable impacts on agri-food systems in a 'triple pathway' approach at three strategic levels: the micro level of innovation niche partnerships, the meso level of innovation support service providers, and the macro level of policymakers.

The results have led to the proposal of two sets of recommendations:

- A set of recommendations for using project-based approaches to develop capacities to innovate at different levels (policy actors, innovation niche partnerships, and organizations);
- A set of recommendations for the TAP for improving the usefulness, usability and applicability of the TAP CF.

4. Successes and challenges of promoting agricultural innovation through functional capacity development

Coaching of innovation niche partnerships for accelerating innovation

The CDAIS project supported a wide diversity of niches as regards their origin (farmer-based; organization-based; project- or partnership-based), their initial purpose (problem-focused; solution-focused; opportunity-focused), and the type of niche leader (farmer organization, government agency, NGO, private company).

Even though a common mechanism of capacity development was mobilized in all the 34 niches, they did not reach the same level of progress regarding the innovation process. At the end of the project, the innovation process was still at the exploratory phase in some niches, whereas in others, the scaling-up phase had been reached. Factors behind these differences included the resources (time, funds, skills) allocated to the coaching process and the innovation dimensions (technical, organizational, institutional, social) covered by the niche actors.

The coaching process provided a context conducive to the collaborative work of each niche actors. They made progress in their innovation project and they were able to use their resources better thanks to the development of five functional capacities, which were common across niches and countries: the capacity to engage in collaborative activities, as a key enabling capacities for developing the other following capacities; the capacity to develop and manage an innovation agenda and strategy; the capacity to deliver intermediate results; the capacity to mobilize new partners and expand the niche as needed in order to address the different dimensions of the innovation; and the capacity to influence their environment to make it more favourable. Each capacity produced effects that spread from individual triggers (motivation, knowledge, empowerment) towards the niche community (common vision, exploration, experimentation and learning), the wider environment (development of partnering and negotiation capacity) and the AIS (lobbying and policy dialogue). The faster niche actors acquired these capacities, the faster their niche moved across innovation stages.

When niche actors faced bottlenecks that needed institutional changes, policy support or some type of technical backstopping, the niche coaching approach alone was not sufficient. Four types of complementary supportive actions were sought through synergies with other projects: access to funds for technical activities of prototyping and experimentation; capacity strengthening of some key organizations of the niche; support to innovation support service providers so that they became able to respond to the niche's needs; and support to policy actors so that they became able to improve the niche's business and technological environment.

In the innovation niche partnerships that did not reach advanced stages of the innovation process, the CDAIS project led to two negative outcomes: the frustration of project beneficiaries and, *a priori*, less sustainable achievements. However, the niche actors acquired capacities to innovate, which should ensure a continuity of their action even after the end of the project. In order to verify this, a follow-up study of outcomes and impacts should be conducted, e.g. three years after the end of the project.

Promoting innovation support service providers for the continuity of niche coaching

The ISS providers appeared to form an intermediate level, between the innovation niche partnerships and the national innovation system. This intermediate level helped to create enabling niche environments and to advocate for changes in research, extension and education approaches during the policy dialogue. Different types of innovation support organizations were identified and mobilized in each country, ranging from traditional research, education and extension organizations from the public sector, to intersectoral coordination bodies, to private incubators specialized in innovation support.

Three main capacities needed by ISS providers were identified and developed through a customized coaching process: the capacity to organize, the capacity to deliver in a responsive manner, and the capacity to relate with other ISS providers. The results of this building up of organizational capacity were very heterogeneous, ranging from almost no observable effects to impacts on the vision, strategy and actions of the organization. This wide range of outcomes was mainly due to two factors. First, organizational coaching processes started very late in the project and ideally required more time and extensive work. Second, the challenges of supporting coordinated ISS providers around a niche was not anticipated, because this CD level was not included in the TAP Common Framework.

As a consequence, a main outcome of the project was a new vision and approach designed by project implementers for developing ISS and ISS providers' capacities, hence sustainably strengthening AIS at local and national levels.

Evidence-based dialogue for influencing the innovation policy-making processes

In all the eight countries, the level of the national AIS was approached through a policy dialogue concerning national innovation policies and strategies, with an objective of improving the niches' environments. Even though national AIS actors went through a common mechanism of capacity development in all the countries, they did not reach the same level of progress regarding the improvement of agricultural innovation policies and the changes achieved within the national AIS.

The level of progress depended on several factors including the pre-existence of innovation policies, the types of innovation supported at the niche level, and the ability of the CDAIS project to involve key individuals in a mobilizing role in policy making processes.

In most countries, awareness was raised on the need to have dedicated agricultural innovation policies, even if innovation policies already existed. Specific concerns were raised regarding the need to better articulate research, extension and education strategies, as well as economic policies, in ways that can enhance agricultural innovation. Concrete changes mainly concerned the agricultural regulations (e.g. new seed marketing directive, agreements with farmers' organizations), with limited impact on the national innovation system itself. Instead, changes were observable in the direct environment of some niches, in the form of unlocking of some of their technological and/or business needs.

The capacity development process at the policy level was based on two assessments that were conducted in a participatory manner at two levels (national AIS and niches) and on the policy dialogue process. These assessments helped innovation stakeholders obtain evidence to provide to policymakers on what the shortcomings and limitations were at the policy level and on what support was needed at the niche level to trigger or accelerate innovations. The policy dialogue was thus a stepwise process that built on this accumulated evidence, with the progressive involvement of the right actors with whom agricultural innovation policies issues could be tackled.

The more the niches embraced a variety of innovations (technological, organizational, social) in different productive sectors (values chains, farming systems, agri-food industry or technological domains), the more the policy dialogue was able to address the inter-sectoral dimension of the support to agricultural innovation at a national level. Otherwise, discussions remained very much focused on the development of particular value chains. The pre-existence of innovation policies determined a degree of openness to AIS thinking, which accelerated the understanding by policymakers of the challenges of strengthening the national AIS.

The better the communication and contact channels the CDAIS teams and niche partners had, or developed, with the policy level and the better their ability to voice AIS thinking, the more policymakers became engaged in policy dialogue activities with a systemic perspective. This degree of embeddedness of the CDAIS project architecture in the national AIS determined in some ways the extent of systemic changes and the level of engagement of multiple AIS actors from the different sectors (extension, research, education, productive sectors).

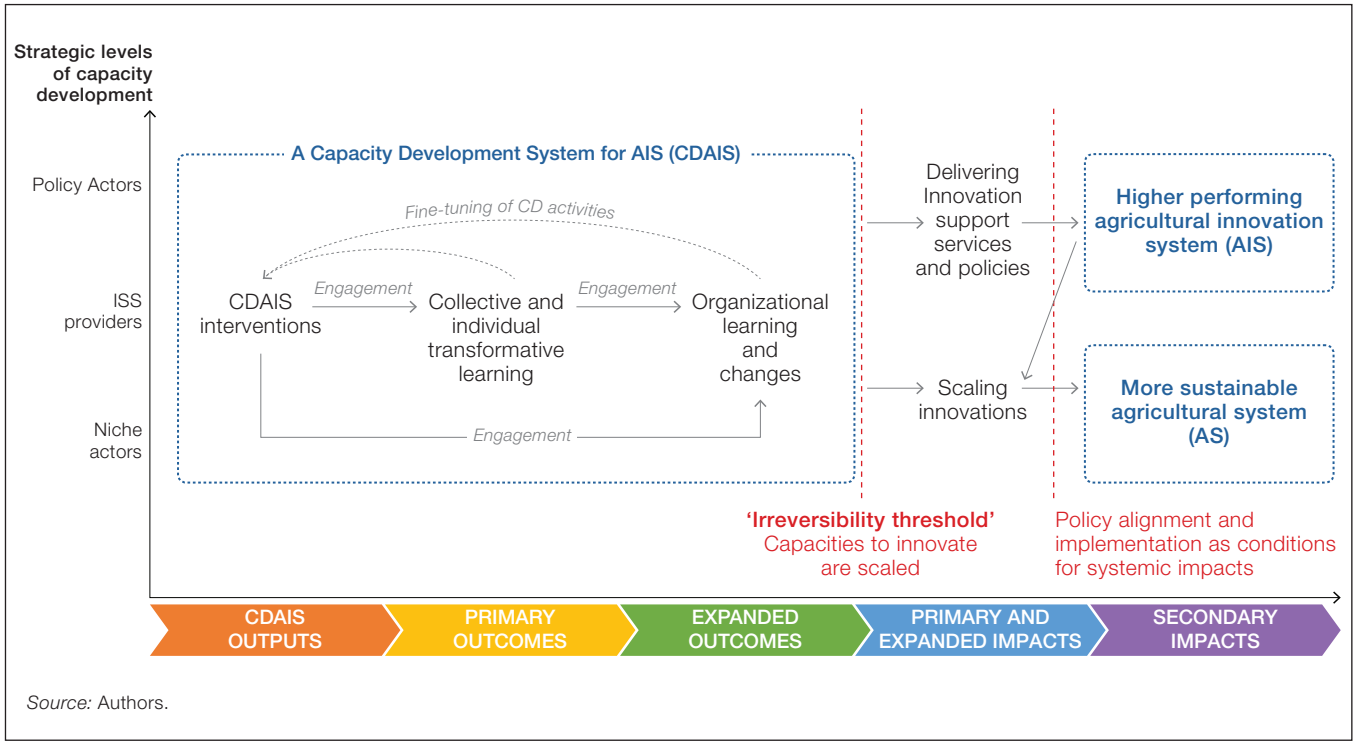
Three different capacity development patterns at the system level were identified across the eight countries: an AIS transformation-oriented CD pattern, an AIS alignment-oriented CD pattern, and an AIS expansion-oriented CD pattern. These patterns depended on the different core issues that were addressed (from the promotion of alternative open innovation models over that of top-down transfers of technology, to the unlocking of some niche environments) and the different types of actors of change that were mobilized (national innovation facilitators; ISS providers, mainly extension or research organizations; government executives; policymakers; or intersectoral coordination bodies).

5. A new vision for scaling innovation

The scaling of capacities to innovate as a way to sustainably strengthen AIS

The comparison of *ex-post* impact pathways across countries provided insights into three types of CD actions that triggered the transitions from outcomes to impacts and made the CDAIS approach transformative:

Figure 1. Ex-post Theory of Change of the CDAIS project



Source: Authors.

EXECUTIVE SUMMARY

1. Targeted CD actions at the niche level, aimed at strengthening their actors' functional capacities together with technical and entrepreneurial capacities;

2. Targeted CD actions in the wider environment of the niches, aimed at encouraging ISS providers and government executives to adapt their actions in order to unlock the niches' technological and business environments;

3. Targeted CD actions for the scaling out of innovation support services by a diversity of AIS organizations and policy actors.

These CD actions, when implemented together as a package, led to a systemic transformation of the AIS. They enabled alignment and coordination from the policy level, ISS provider level to the niche level, hence accelerating the emergence and success of innovation initiatives led by the niche actors.

Figure 1 displays the *ex-post* Theory of Change of the CDAIS project, which is anchored in learning and behavioural change theories. The 'engagement wheel' (motivation-knowledge-empowerment) is central to the CD for AIS system, playing a key role in the transition from outputs to primary impacts.

We also gained new insights into the interrelated changes between three systems: the agricultural innovation system (AIS), the agricultural system (AS) and the capacity development for AIS system (CDAIS). The CDAIS approach worked as a system in itself, proposing an architecture of resources, methods and inter-connected organizations with the same purpose of developing CD for AIS and fostering systemic changes. The network of national innovation facilitators (NIFs), the coaching teams and the embedded governance of the CDAIS project in national AIS played an important role in shaping this system. Outcomes and impacts were not the results of only project staff, but also of the effort of multiple individuals and organizations that purposefully spearheaded changes and mobilized cooperation through the incentives developed by the project staff.

We demonstrated that this CD for AIS system can lead to impacts at two levels: the AIS level and the agricultural system level. The CD for AIS system is meant to set up a high-performing national AIS, but this is contingent on the implementation of innovations with concrete positive impacts on the farming systems and livelihoods in order to actively engage AIS actors in systemic changes.

It was not possible to observe the transition from primary to longer-term and systemic impacts during the limited timespan of the CDAIS project; we observed only a range of indications in some countries. It was possible to see the beginnings of the emergence of primary impacts (new or improved support services, scaling up of innovations) and expanded impacts (increased yields, incomes, productivity or competitiveness, business and job creation) due to traceable expanded outcomes. We therefore assume that an 'irreversibility threshold' was crossed when the niche actors as well as ISS providers and policymakers reached a level of appropriation and acknowledgement of their respective changes (expanded outcomes), which allowed them to jointly maintain the momentum which in turn provided incentives for further completion. When this happened, we consider that capacities to innovate were scaled, meaning that AIS actors became able to design and plan actions that will lead to a well-functioning AIS. However, this needs to be verified through further impact studies with the benefit of more hindsight.

The fact that funding was by an international donor within the framework of a short-term development project raises the question of this 'CD for AIS' system's sustainability. Considering that some (or even all) countries did not exceed the irreversibility threshold, this CD for AIS system has to remain in place if changes to the AIS are to be sustained.

Catalyzing and hindering factors of the capacity-based approach for AIS strengthening

Several CDAIS beneficiaries stressed the difficult and lengthy capacity development process that CDAIS was trying to push. Based on cross-country comparisons, some hindering and catalyzing factors of the CDAIS impact pathway were identified. These factors pertained to the country context and other factors concerning the project's implementation modalities.

The degree of openness to AIS thinking, the diversity of innovation niches, the existence of adequate innovation support services and innovation policies accelerated changes along the impact pathway. These contextual factors contributed to accelerate changes along the impact pathway, but they varied significantly between the eight pilot countries.

When the leveraging CD actions at the three strategic levels – niches, ISS providers and policy makers, could not be fully implemented as coordinated packages, hindering factors resulting from the project's implementation modalities could be identified. They were linked to difficulties pertaining to

the project's internal organization, to the delivery of CD activities, and to the project's external partnerships. We noticed in particular that the lack of a vision of the purposes of the CD and of the linkages between the three strategic levels (what changes do we want to create, for which actors and how) slowed down the project's implementation and prevented actors from seizing opportunities for engaging with key actors and addressing system-wide issues. The difficulties in designing and planning a large number of CD activities at different levels in a timely manner inhibited continuity among CD activities and led to the early disengagement of some actors. Finally, the lack of synergies with other on-going projects prevented the number or types of activities and actors from reaching the critical level needed to lead to systemic changes.

6. Recommendations

How to increase the CDAIS project's transformative effect?

In addition to the three strategic levels at which capacities should be developed, the transversal analysis highlighted three key strategies that made the CDAIS project transformative, and which could be further improved: an AIS-embedded and participatory project architecture; a demand-led approach; and a multi-level and process-led approach. These three strategies are complementary and need to be combined to generate outcomes and impacts, which are not attainable if the strategies are pursued independently.

Our findings concerning the mechanisms that generated outcomes and impacts raise the question of whether the CD for AIS approach can be efficiently undertaken only by conventional, time-bound, pre-determined, 'logframed' project mechanisms, even if based on the three above key strategies. We identified additional interventions, both country-based and at the global level, that could support the efforts of such a project. These additional interventions should mainly aim at tracking innovation niche partnerships, developing and coordinating innovation support services, and at supporting policy-making processes over extended periods.

How to improve and scale-out the TAP Common Framework?

The report proposes a set of recommendations aimed at making the TAP CF more 'useful', 'usable' and 'used'.

The TAP CF – as formulated at the beginning of the CDAIS project – lacked clarity on the concepts used and on practical guidance, especially in a more managerial perspective (what changes do we want to create, for which actors and how). On the one hand, several concepts, such as innovation facilitator, AIS and niche remained too theoretical and could not be used for CD interventions without strong guidance. On the other hand, the empirical findings from the transversal analysis called into question some theories on which the TAP CF was built.

We thus make eleven recommendations for: i) adjusting concepts to realities; ii) using transformative theories, adult learning theories (learning by doing) and behavioural change theories (knowledge-attitude-practice) to build the TAP CF; iii) listing capacities that should be targeted by CD actions at the three strategic levels – innovation niche partnerships, ISS providers and policy makers, in a triple pathway approach; and iv) developing a MEL system instead of traditional M&E.

Finally, a list of actions and interventions is proposed in order for the TAP CF to become more applicable and more used by TAP members and countries. They mainly relate to three areas: 1) co-developing handbooks with professionnals in the domain of innovation support, 2) training researchers and extension workers exposed to multiactor and demand-led innovation processes, 3) mobilizing networks of international experts and researchers in CD for AIS as a meta-support to country teams in charge to strengthen their agricultural innovation system.

PART 1

Introduction and methodology

Part I presents the questions addressed by the transversal analysis of CDAIS project results and the analytical framework grounded in realist evaluation approaches.

1. INTRODUCTION

1.1. Purpose of this document

This report has been created as a resource for those interested in the Capacity Development for AIS (CD for AIS) approach, promoted by the TAP Common Framework (TAP CF).

It provides insights into the usefulness and usability of the TAP Common Framework, based on the review and comparison of the outcomes of the CDAIS project implemented between 2015 and 2019 in eight pilot countries.

Based on this cross-country review and comparison, the report proposes recommendations for upgrading the TAP Common Framework and for the design of interventions and future investments for strengthening agricultural innovation systems through capacity development approaches.

1.2. What is the TAP Common Framework (TAP CF)?

The TAP Common Framework on Capacity Development for Agricultural Innovation Systems (also known as the Common Framework of the Tropical Agriculture Platform, or TAP CF), developed as an integral part of the CDAIS project, provides concepts and guidance for the promotion of AIS thinking, collaborative learning and the development of agricultural innovation capacities and agricultural innovation systems (AIS) in tropical countries.

Details of the CD for AIS concepts and approaches can be found in the document 'Common Framework on Capacity Development for Agricultural Innovation Systems | Conceptual background document' (TAP, 2016).

An integrated approach is offered as a response to complex environments involving diverse actors. An AIS perspective requires not just technical capacity; the 'functional capacities' of actors and institutions at different levels are also important. These functional capacities are defined in the TAP CF as capacities that enable actors to facilitate, reflect and learn, manage knowledge resources, navigate complexity and participate in strategic and political processes. These four capacities should form the core of an overarching capacity to adapt and respond in order to realize the potential of innovation. In this way, AIS actors could shift the focus from reactive problem solving to co-creating the future. Facilitative leadership is considered as necessary to enable all of the above to happen.

The TAP CF advocates that developing such functional capacities to innovate requires an integrated approach to interventions, based on a set of principles:

1. A synergy of multilevel actions using a dual pathway of intervention at the niche level and the system level;
2. Action in the three 'dimensions of capacities', i.e. individual, organizational, and enabling environment;
3. A five-stage cycle for developing capacities at the different levels (individual, organizational, and enabling environment): galvanizing commitment; visioning; capacity needs assessment; CD strategy development and action plan; and implementation;
4. Facilitation, as a continuous process led by National Innovation Facilitators (NIFs) that enables interaction between actors within the system and strengthens capacities for change through trust building, conflict management, resource mobilization, etc.;
5. Reflection, learning and documentation for informing the M&E process in order to track and assess the performance of CD interventions.

1.3. The need for transversal analysis and learning review

CDAIS was a 'pilot experiment', since the rationale of the intervention was based on several assumptions pertaining to 'why' and 'how' functional capacities should be developed.

These assumptions are presented in Table 1, which provides some insights into the theories on which the TAP CF relies.

The TAP CF has been built on a large body of literature, combining very diverse concepts from AIS thinking, capacity development and innovation management, thus providing a rough outline for a 'Theory of Change'[2] on how to develop capacities favourable for developing agricultural innovation systems. To this end, this outline was used to design the operational logical framework (or 'logframe') for the CDAIS project.

[2] A Theory of Change describes the processes through which change comes about for individuals, groups or communities. It is used to develop the Theory of Action of an intervention – often developed as a 'logical framework' – which articulates the mechanisms through which the activities are being delivered, e.g. through which types of actors (for example, NGOs, government or markets) and following what kinds of processes (for example, grants to NGOs disbursed from a challenge fund, provision of technical assistance, advocacy activities, facilitation or the establishment of partnerships). It is possible to operationalize the same Theory of Change in different ways, through different Theories of Action.

PART 1 – INTRODUCTION AND METHODOLOGY

The TAP CF was tested in eight countries for the first time through the CDAIS project. As there were no previous similar experiences to build upon, the concepts developed in the TAP CF (such as 'innovation niches', 'AIS', 'innovation facilitator') as well as the theoretical processes of changes (such as the 'dual pathway' or the 'five-stage CD for AIS cycle') had to be appropriated, translated and operationalized by eight national and multi-disciplinary implementation teams, each relying on its own understandings and needs.

In order to support and harmonize this operationalization as far as possible, the Agrinatura Task Team (ATT)[3] developed common practical guidelines, based on the expertise of the Agrinatura members and on a process of preliminary testing/validation in some of the countries. The country teams played an important role in the co-design of these guidelines, working with the ATT during most stages of the design of CD interventions throughout the project. This operationalization process mobilized the knowledge and experience of both of these teams as far as possible. Inevitably, however, a diversity of practices emerged in each country in the course of project implementation, which provided us with lessons on how the operationalization worked in practice, and what its outcomes were.

The transversal analysis and learning review intend to 'validate' the TAP Common Framework, and has the aim of verifying the hypothesis underpinning this framework and verifying how changes pertaining to the TAP CF's mode of operationalization took place in the eight countries concerned. In other words, we sought to understand how the project produced outcomes and what these outcomes were in each country.

Stories of change (Pasiecznik, 2018) were harvested from each country during the project's implementation, showcasing how key stakeholders perceived important changes that occurred in their capacities to innovate and more broadly in the national AIS as a result of CDAIS activities. These stories illustrate how much AIS actors learned from CDAIS, thus enabling them to achieve both expected and unexpected results or providing them with new opportunities for innovation. Such testimonies indicate that CDAIS may fall within the category of 'transformative projects', which are defined as projects that support deep systemic and sustainable changes with the potential for large-scale impacts in key development domains such as agricultural innovation. However, the contribution of the CDAIS project to such changes needs to be demonstrated since AIS actors often benefitted from several simultaneous initiatives. Furthermore, the ways in which these changes have taken place and the difficulties faced need also to be identified, given that the original theory of change of the CDAIS project was operationalized differently in each country, with suitable adaptations based on contextual or implementation difficulties and not on the rationale of the project itself.

[3] The global Agrinatura implementing team is drawn from 5 different European research and development organizations belonging to the Agrinatura Network, i.e. CIRAD, NRI, ICRA, ISA and AICS.

Table 1. Theoretical background of the TAP Common Framework

Problem areas to be addressed		Proposed interventions	Theoretical background
Systemic problems	AIS are not fully functional because of a lack of efficiency, responsiveness and efficacy	Develop functional capacities and brokering activities thanks to innovation facilitators Develop innovation policies and support policy making processes	Capacities for innovation (Hall *et al.*, 2009) Brokers in AIS (Klerkx and Leuwis, 2009) Evidence-based policy making (Woolthuis *et al.*, 2005; Lamprinopoulou *et al.* 2014; Paschke *et al.*, 2019) Innovation policies for systemic and transformative changes (Weber and Rohracher, 2012; Wieczorek and Hekkert, 2012; Smits and Kuhlmann, 2004) Strategic network management (Heemskerk W. *et al.* 2011; Cap *et al.*, 2019)
Governance problems at the national level	Weak governance of external interventions, insufficient alignment with other interventions and national/international policies because of lack of coordination mechanisms at the national/international level	Strengthen or establish country-based and regional innovation mechanisms for advocacy, dialogue and action	
Innovation support problems at the local level	Current innovations do not really solve farmers' problems	Support joint innovation within innovation niches	Open innovation (Chesbrough *et al.*, 2006; Gassmann, 2006; Laperche *et al.*, 2008 Innovation support services (Toillier *et al.*, 2018) Strategic niche management (Elzen *et al.*, 1996; Kemp *et al.*, 1998; Schot and Geels, 2008)
	Current initiatives do not match capacity development needs because of inadequate analysis of needs	Develop participatory assessment of multistakeholders' CD needs	
	Current initiatives have little impact because of small-scale interventions with a narrow scope, mainly focused on individual training and lacking in meaningful coordination	Develop multi-level approaches (dual pathway approach)	Multi-level perspective of transition management (Geels, 2002; Grin, 2008)
		Develop five-stage CD approach (iterative learning cycle)	Supervised learning processes (Grin and Van de Graaf, 1996)

Source: Authors.

1.4. Questions for transversal analysis

Based on these observations, the transversal analysis aimed at answering two general questions, based on a comparative analysis of the outcomes in each country:

1. What made the CDAIS approach transformative (or not) in diverse contexts?
2. How useful, usable and used was the TAP Common Framework for the partners implementing the CDAIS project in the eight pilot countries?

For each of these general questions, specific sub-questions were identified:

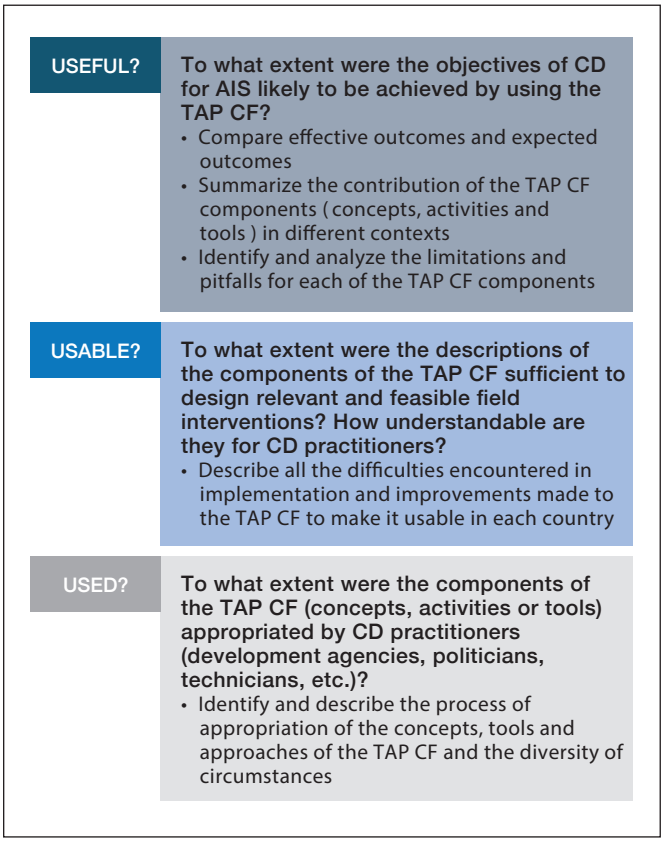
Question 1. What made the CDAIS approach transformative (or not) in diverse contexts?

1.1. To what extent did the CDAIS project contribute towards developing the stakeholders' functional capacities in the niches and at the system level?
1.2. To what extent did the improvement in these capacities contribute to 'realizing the potential for innovation'?
1.3. What are the different outcomes across countries and the possible explanatory factors?
1.4. To what extent are these outcomes irreversible, leading to deep systemic and sustainable change with the potential for large-scale impacts in agricultural innovation?

Question 2. How useful, usable and used was the TAP Common Framework?

2.1. What new perspectives did the TAP CF bring to the actors? (*How useful?)*
2.2. What was the guidance required for the successful operationalization of the TAP CF? (*How usable?)*
2.3. Who were the 'clients' interested by the TAP CF who took it over for their own purposes? (*How used?*)

Figure 2. Guiding questions for a learning review of the TAP Common Framework



2. THE TRANSVERSAL ANALYSIS AND LEARNING PROCESS

This report has been primarily written for those who want to learn from the practical experience of the CDAIS project and those who want to make use of the TAP CF for designing CD for AIS interventions. To this end, the transversal analysis was mainly an opportunity to reflect on what worked well and what did not. It was not undertaken as a traditional evaluation activity but it does make use of evaluative thinking to support data collection and comparative analysis. The Monitoring, Evaluation and Learning (MEL) system (Toillier *et al.*, 2019) developed in the project served as a framework for harvesting outcomes and for analysing the project's contribution to capacity development at the niche and AIS levels.

2.1. Comparison of context-mechanisms-outcomes

The framework we used is grounded in a realist evaluation perspective.

Realist evaluation was developed by Pawson and Tilley in the 1990s, to address the question 'What works for whom, in what circumstances and how?' in criminal justice interventions. Their main finding was that projects work differently in different contexts and through different change mechanisms. Therefore, projects cannot be simply replicated from one context to another and expected to achieve the same outcomes automatically. Theory-based understanding about 'what works for whom, in what context, and how' is, however, transferable. In this perspective, theory-driven, qualitative and mixed-method approaches to monitor and evaluate development projects have been developed, grounded in a realist evaluation framework.

Realist evaluation starts with theory and ends with theory. In other words, the purpose of a realist evaluation is as much to test and refine the programme theory as it is to determine whether and how the programme worked in a particular setting.

Realist evaluation explains change brought about by an intervention by referring to the actors who act and change (or not) a situation under specific conditions and under the influence of external events (including the intervention itself). The actors and the interventions are considered to be embedded in a social reality that influences how the intervention is implemented and how actors respond to it (or do not).

Rather than comparing changes in participants who have undertaken a project with a group of people who have not (as is done in randomized controlled or quasi-experimental designs), a realist evaluation compares 'context-mechanism-outcomes' configurations within the project. It may ask, for example, whether a project works more or less well, and/or through different mechanisms, in different localities (and if so, how and why); or for different population groups (e.g. men and women, or groups with differing socioeconomic statuses).

One of the tasks of a realist evaluation is therefore to make the theories within a project explicit, by developing clear hypotheses about how, and for whom, the project might 'work'. The implementation of the project, and the evaluation of it, then test these hypotheses. This means collecting data, not just about project impacts or the processes of project implementation, but also about the specific aspects of project context that might impact on project outcomes and about the specific mechanisms that might be creating change.

2.2. A three-step process for developing guiding questions

The development of specific guiding questions for the transversal analysis followed a three-step process:

- Developing a rough project's Theory of Change;
- Harvesting outcomes at the country level;
- Selecting specific aspects of the project context to be explored, which may impact on project outcomes and about the specific mechanisms that may be creating change.

2.2.1. The *ex-ante* Theory of Change of the CDAIS project

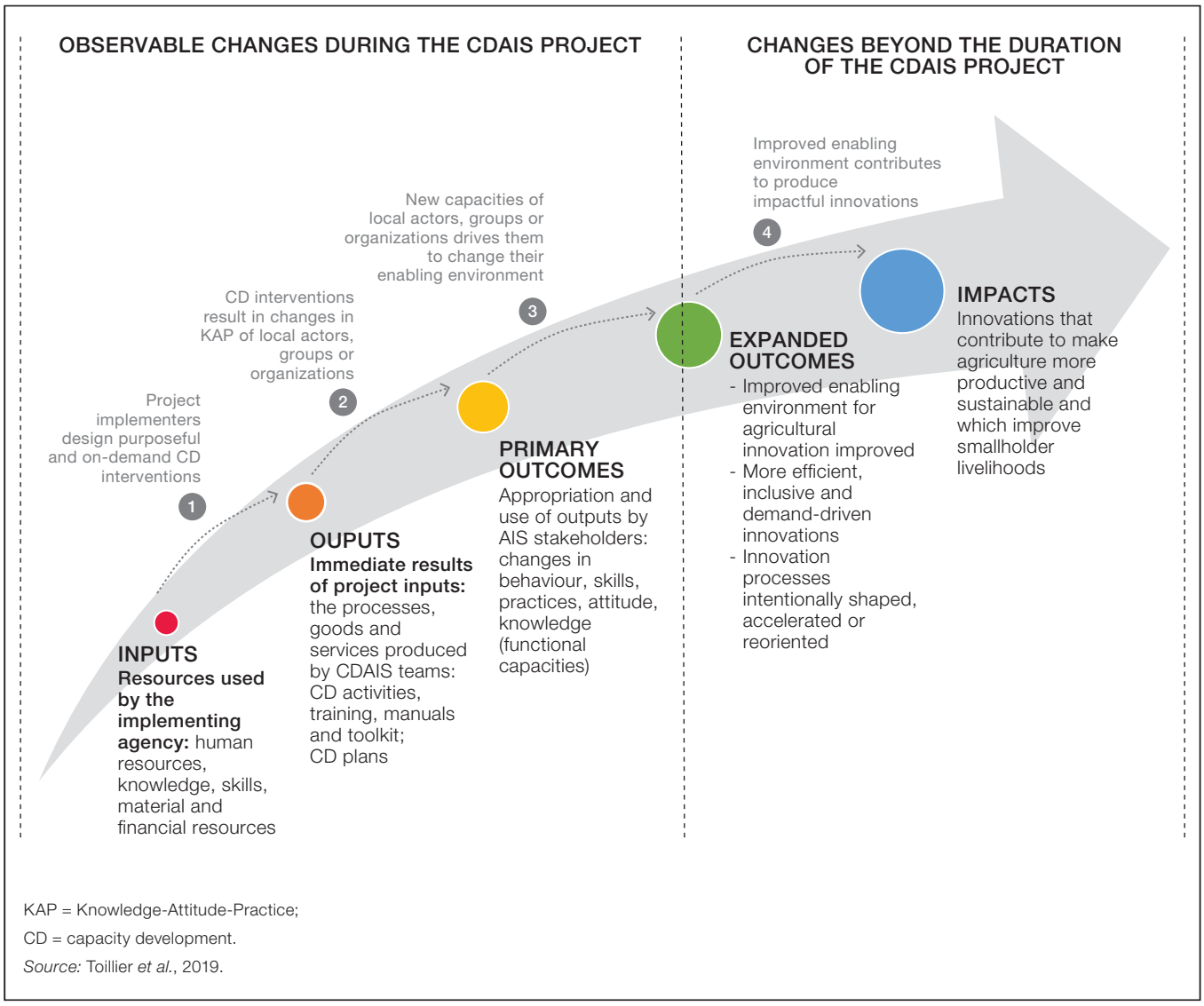
Following the realist evaluation framework, we developed a rough *ex-ante* Theory of Change of the project. An impact pathway (Figure 2) was developed to describe in detail the output to outcome and impact relationship, with outputs being defined as the direct and tangible results of activities, outcomes pertaining to changes in awareness, skills or understanding resulting from use of the results (outputs), and impacts being long term changes that meet the project's strategic goals.

Two types of outcomes are distinguished: primary outcomes and expanded outcomes.

Primary outcomes are changes in the behaviour, attitude, practice, or mindset of direct project 'beneficiaries'. They result from the appropriation and use of the outputs of the capacity development activities implemented by the project.

The expanded outcomes are observable changes in the functioning of the agricultural innovation system that make it more effective, efficient, responsive and/or sustainable. They result from individual and organizational capacities to

Figure 3. Ex-ante impact pathway of the CDAIS project



KAP = Knowledge-Attitude-Practice;
CD = capacity development.
Source: Toillier *et al.*, 2019.

innovate, and correspond to the overarching capacity to innovate at the system level. Expanded outcomes increase the probability of impacts or make them happen sooner.

The CDAIS project could thus only influence outcomes or contribute to outcomes, since outcomes are not under the complete control of the implementing organization.

Impacts refer to the long-term, sustainable changes in farmer livelihoods, the state of the environment and the conditions of the rural poor resulting from the spread/adoption of the innovations. Due to the long time-horizon and to increasing influence of a wide range of contextual factors, functional capacity development interventions can only contribute (partially and indirectly) to these enduring results in society or the environment.

This '*ex-ante*' impact pathway illustrates the core assumption of the TAP CF: functional capacities help change the way in which an AIS operates toward more demand-driven and open innovation processes, hence contributing to make the agriculture system productive and sustainable, and improving smallholder livelihoods. It shifts the focus of development from bringing about 'changes in states' to 'changes in behaviour, relationships, activities, or actions' among those the project interacts directly with.

2.2.2. Harvesting outcomes

Progress markers

During the project, outcomes were harvested by country teams using a tool developed for the MEL system[4]: the 'coaching plan'. This plan integrates a list of progress markers that captured the expected and completed changes in the functional and technical capacities of niche actors.

Progress markers are indicators of changes in behaviour, relationships, activities, or actions.

They were identified in a participatory manner at the beginning of the project, and were regularly evaluated, completed and fine-tuned all through the project's duration with the help of innovation facilitators.

In this way, the final list of progress markers provided insights into the types of capacities that have been developed at the individual and niche levels.

Storytelling

Storytelling is a technique frequently used to make sense of innovation processes or to capture innovation features (Temple *et al.*, 2018).
Storytelling in CDAIS was developed through interviews and written contributions from country teams, and was later published in two books: 'Stories of change' and 'Conversations of change'.[5] These interviews recorded the actors' perceptions and explanations of the changes that happened and their subsequent effects at the niche and system levels.

2.2.3. Selecting specific CD mechanisms and determining project contexts to further explore

Specific CD mechanisms

Based on the reflections during the implementation of the project and based on preliminary MEL results, two specific CD mechanisms that led to significant changes at the niche and system levels were selected for a deeper transversal analysis: the coaching process at the niche level, and the policy dialogue process at the system level.
Regarding the coaching process, we assumed that the more or less quick generation of results might have depended upon the manner in which the learning cycles were accompanied, which could explain differences in the achievements at the niche level.

As for the policy dialogue, different approaches were used in a more or less procedural, participatory or inclusive way, which might explain the differences across countries. In some cases, the policy dialogue built on the niche's achievements, hence providing evidence-based recommendations (e.g. Burkina Faso). In other cases, the policy dialogue was conducted prior to the final cycles of CD development at niche levels, with greater emphasis on policy awareness than on policy support for drafting new agricultural innovation policy (e.g. Rwanda). Finally, in some cases, the policy dialogue was embedded into the CD strategy of the niches (e.g. Ethiopia). Consequently, depending on the approach adopted, the outcomes were observable only at some levels, either the niche level, system level and/or policy level.

[4] The Monitoring-Evaluation for Learning (MEL) system was developed to support the process of capacity development through a continuous process of learning and assessment that enables adapting CD interventions in response to specific needs and thus favour higher impacts. Additionally, the MEL system can be used to provide funding entities with documented evidence of the effects produced by the project as well as of how it has been implemented and what lessons can be learnt from its outcomes. See: https://cdais.net/wp-content/uploads/2019/08/CDAIS-M6-MEL-Monitoring-Evaluation-and-Learning.pdf

[5] See: https://cdais.net/wp-content/uploads/2019/08/CDAIS-SoC-Stories-of-change.pdf and https://cdais.net/wp-content/uploads/2019/08/CDAIS-CoC-Conversations-of-change.pdf.

Specific country context

Three specific country contexts that might have influenced changes have also been selected for informing the comparisons of context-mechanisms-outcomes across countries: the AIS maturity, the characteristics of niches, and the appropriation of the TAP CF by country teams.

- National AIS maturity

The AIS maturity depends on the existing AIS actors, their numbers, their degree of inter-connectivity, the innovation policies that already exist, and the place accorded to open, collaborative and demand-led innovation in the agricultural sector.

We assume that in some countries, the national AIS might be more developed and efficient than those of other countries, which means, for instance, more effective relationships between a diversity of AIS actors. In Rwanda, the private sector is well-connected to farmers and the research community, thus possibly facilitating the emergence of innovation niche partnerships. In Guatemala and Honduras, the existence of recognized and government-supported 'value chains' (or value-chain platforms) provided a favourable context for AIS thinking. In contrast, in Lao PDR, there are no institutional platforms or mechanisms that enhance linkages bewteen famers and other value chain actors yet. This makes it more difficult to establish systemic approaches of agricultural innovation. Furthermore, in some countries, such as Burkina Faso, agricultural innovation policies are already in place, which might facilitate the mobilization of policymakers into CD for AIS activities.

- Niche characteristics

The characteristics of the niches depends of the types of innovations promoted, the types of actors mobilized, and the capacity needs stated by the niche actors. We assume that issues raised by the latter may have been more or less complex, and thus more or less 'achievable' within the timeframe of a four-year development project with limited funds.

- TAP Common Framework appropriation

The understanding of the TAP Common Framework by the country project implementation teams may have varied since the approach is very new and differs from those of typical development projects. As a consequence, it may have hindered project implementation.

The possible factors that influenced project outcomes and that we further explored in the transversal analysis are summarized in Table 2.

Table 2. Assumptions about factors that possibly influenced project outcomes at the country level

Context features that may influence outcomes at the country level	Possible effects on implementation	Possible effects on the outcomes	
Key capacity development (CD) mechanisms	Niche characteristics and purposes of the coaching	More or less efficient coaching across niches and across countries	More or less rapid delivery of results
	Policy actors' expectations and purposes of the policy dialogue (awareness raising or support to policy making process)	More or less evidence-based and change-oriented policy dialogue process	Different possible levels of outcomes, at the policy, system or niche levels.
Key aspects of the country context	National AIS maturity (levels of understanding, institutionalization and operationalization of AIS thinking at the country level)	Relative ease of supporting joint innovation processes, creating bridges between different AIS actors and mobilizing policymakers More or less slow project implementation	Relative ease in achieving a systemic transformation of the national AIS

Source: Authors.

2.3. Data collection and analysis

2.3.1. Data collection

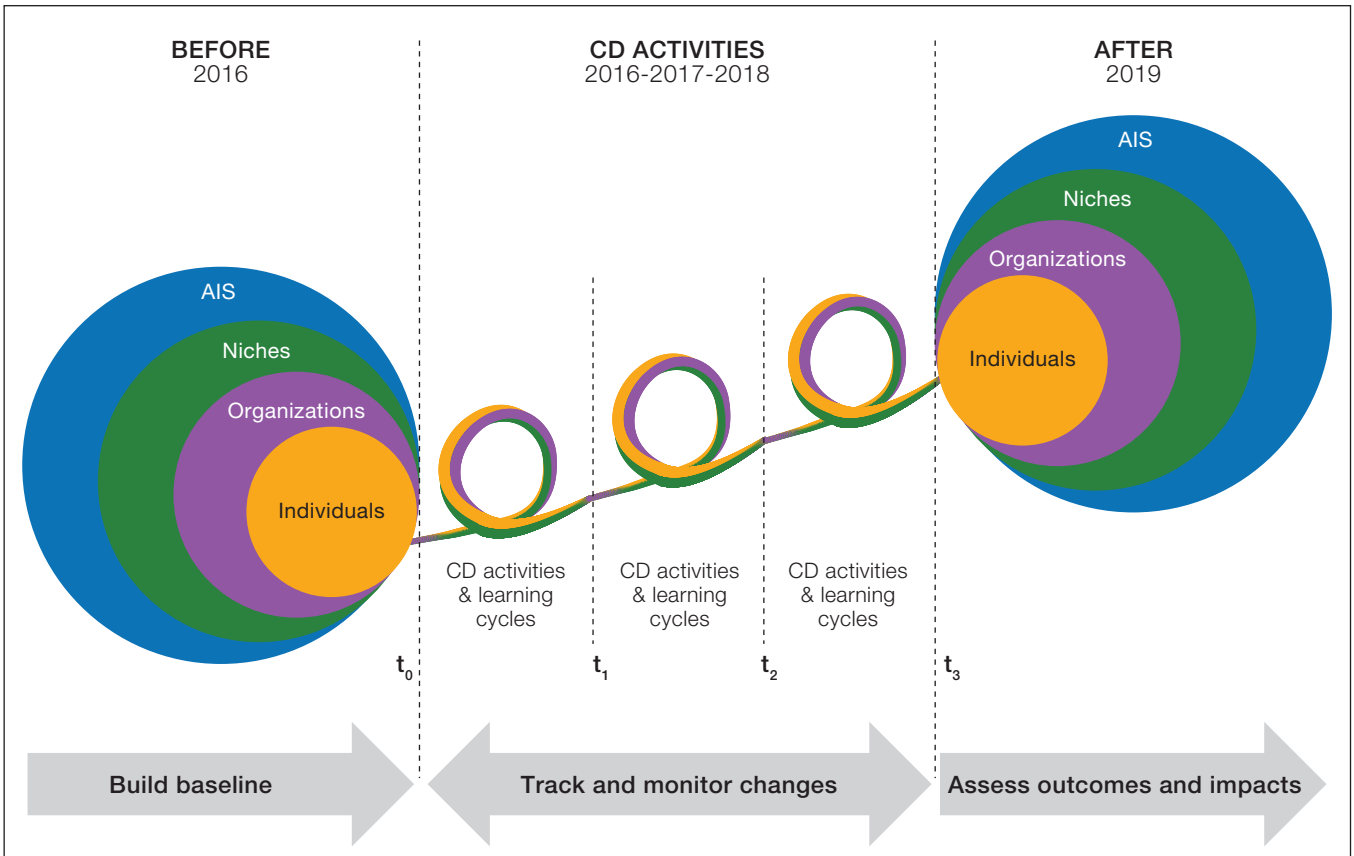
Most of the data were collected through the MEL (Monitoring, Evaluation and Learning) system over the project's duration. Some additional data, pertaining to the implementation realities and appropriation of the TAP CF, were collected through specific questionnaires addressed to country teams in the final year of the implementation of the project.

To have reference points to measure changes achieved by the project, various times were proposed in order to set a tentative coordinated schedule of MEL data collection across the eight countries:

- t_0 corresponds to the end of the capacity needs assessment phase, before capacity development activities are launched and the coaching plan introduced;
- t_1 corresponds to the end of the first learning cycle, approximately 5 to 6 months after starting the first capacity development activities;
- t_2 corresponds to the end of the second learning cycle, approximately 5 to 6 months after t_1;
- t_3 is at the end of the capacity development activities, right before the end of the project.

The tools used for data collection are presented in Annex 1.

Figure 4. Times of MEL data collection in the CDAIS project



AIS = agricultural innovation system;
CD = capacity development.
Source: Toillier *et al.*, 2019.

2.3.2. Data sources for the transversal analysis

Different types of data sources were used and are listed in the Table 3:

- MEL databases (coaching plan with progress markers), products (impact pathways at the niche and system levels) and reports (baseline at t_0 – Capacity needs assessment, scoping study; R&R workshops; t_3 report);
- CD activity reports (CNA reports);
- Final country reports;
- Workshop reports (final country reports);
- Written stories of change;
- Questionnaires ('implementation realities' questionnaire; TAP CF usability questionnaire).

Some reports or products were merged into one report, which explains the different numbers of documents per country.

Table 3. List of data sources and available documents for the transversal learning and analysis

Scope	Type of data source: MEL t_3 reports and impact	Total number of available documents	LA	BD	ET	RW	AO	BF	HN	GT
Outcomes harvesting										
Outcomes at the niche level	Niche coaching plans (Excel files)	35	6	3	5	4	3	6	4	4
	R&R workshop reports	21	3	3	6	0	0	3	0	6
	Niche impact pathways	22	3	3	5	1	2	3	1	4
	MEL t_3 niche report	24	3	3	1	3	3	3	4	4
	NIF skills questionnaires and report	6	1	1	0	1	1	1	1	0
	Story of change' chapters	24	3	3	3	3	3	3	3	3
	Final country report	8	1	1	1	1	1	1	1	1
	MEL t_3 reports and impact pathways	8	1	1	1	1	1	1	1	1
	'Conversations of change' chapters	8	1	1	1	1	1	1	1	1
Assessment of key mechanisms of change										
The coaching process	Questionnaires to country teams	11	1	2	6	1	0	1	0	0
The policy dialogue	MEL questionnaire + consolidated report	1								
Assessment of specific aspects of the project context										
AIS maturity	Scoping study reports	8	1	1	1	1	1	1	1	1
Types of niches	Capacity Needs Assessment (CNA) reports	17	4	5	1	1	4	1	1	1
Usability of the TAP Common Framework	Questionnaires to country teams	17	1	3	4	2	2	1	2	2
Total number of documents		210								

Source: Authors.

2.3.3. Data Analysis

Data was analysed as follow:

1. In-country data collection and back-office analysis led by MEL country teams leading to the production of MEL databases and MEL synthetic reports at t_1, t_2 and t_3;
2. 'Sharing and Shaping' MEL analysis with external actors during workshops: final country workshops (at t_3), and the Gembloux International Conference at the end of the project (May-June 2019);
3. Consolidation of findings at the country level by the country teams and writing of the final country report and the MEL t_3 final report at the end of the project (June-July 2019);
4. Transversal review of country documents (Table 3) and preparation of synthetic databases (Sept.-Dec. 2019);
5. Transversal analysis through comparative analysis and writing of the Transversal Analysis report (Dec. 2019-Feb. 2020).

The comparative analyses consisted in drawing patterns of context-mechanism-outcomes from case studies from the different countries (Eisenhardt, 1991). Some countries were analysed first, e.g. Ethiopia, Bangladesh and Guatemala. Insights gained from these countries were then checked and complemented with the data and lessons learnt from the other countries, whenever data sources or reports were available. Common patterns were merged, and particular cases were used to expand and refine an emerging generic project's Theory of Change (or 'ex-post' ToC) that was built on the case-by-case approach.

2.4. The presentation of findings in this report

The findings are presented in two parts, Part II and Part III. It is not meant to be read from beginning to end; readers are invited to go straight to a particular part or section. The structure of these two parts is as follows:

Part II presents the project impact pathways at the niche and system levels in each country. CD mechanisms, outcomes and impacts, and CDAIS contributions are reviewed across niches and countries. Insights gained from comparing context-mechanisms-outcomes helped identify some factors that hindered or enabled the development of capacities to innovate and the strengthening of AIS in different contexts. Finally, lessons are drawn on the 'best ways' to achieve transformative changes in AIS.

Part III lays out recommendations for improving the TAP CF's usefulness, usability and applicability. Findings are built on the results presented in Part II and on the results from specific questionnaires addressed to the project country teams. It brings together lessons learnt on the ways the TAP CF has been understood and operationalized, and on the pitfalls faced during implementation and the practical knowledge that CDAIS implementers and partners gained from this operationalization. A set of recommendations is proposed concerning all the key dimensions of the TAP CF.

It is expected that the recommendations from Part III will guide the process of revising the TAP Common Framework by TAP partners.

PART 2

Impact pathways

Part II presents the CDAIS project impact pathways at the niche and system levels. Capacity development mechanisms, outcomes and impacts, and CDAIS project contributions are reviewed across countries. Insights gained from comparing context-mechanisms-outcomes enable the identification of factors that hindered or enabled the development of capacities to innovate and the strengthening of agricultural innovation systems in different contexts. Finally, lessons are drawn on the 'best ways' to achieve transformative changes in national agricultural innovation systems.

3. IMPACT PATHWAYS AT THE NICHE LEVEL

3.1. Niches as temporary communities with evolving innovation agendas

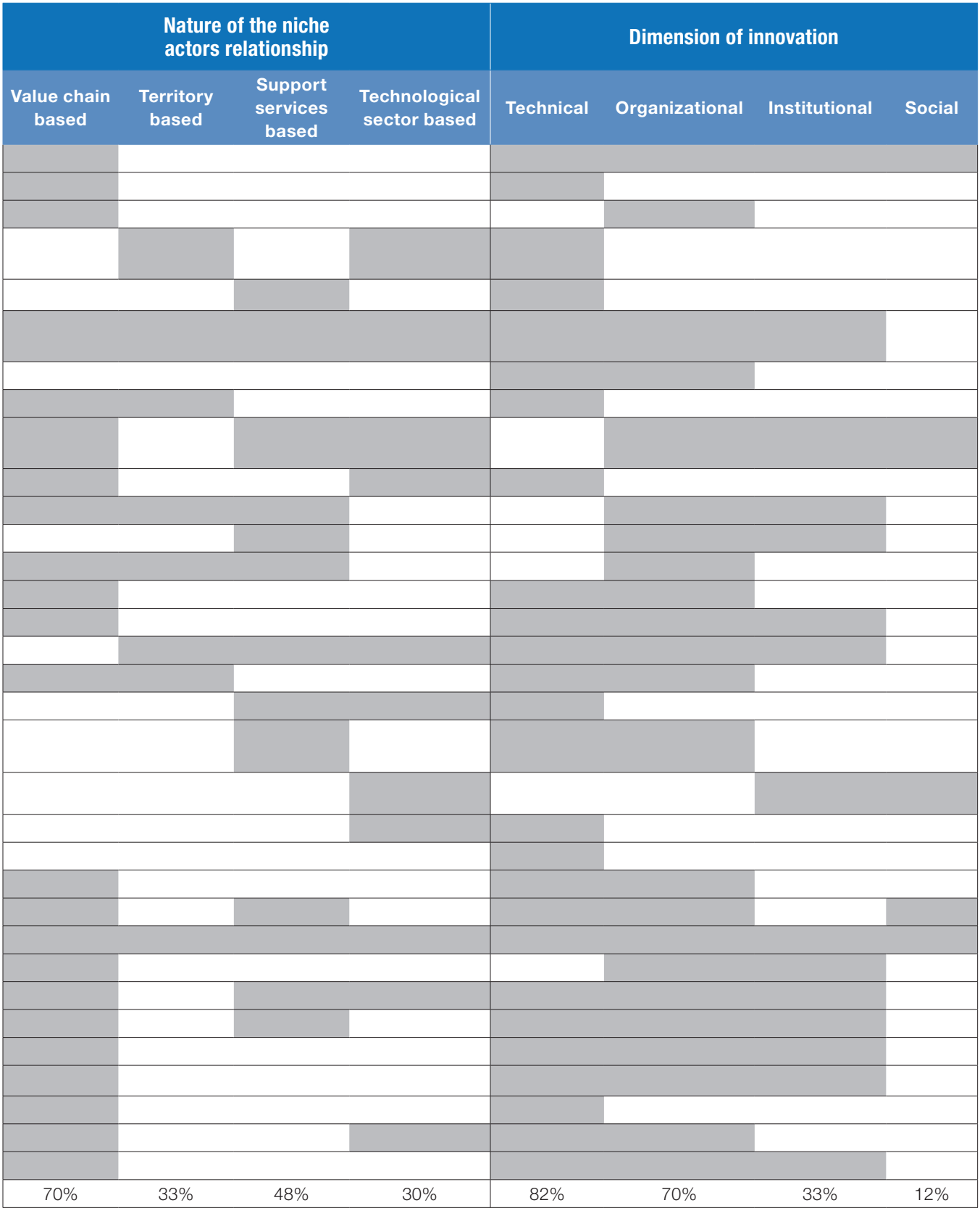
The 'innovation niches' were identified at the country level following guidance from the project. Demand-driven innovations and multistakeholder involvement were the two major criteria that drove the selection of niches. Consequently, each niche was a cluster of at least two types of different actors (farmers, producer organizations, NGOs, private companies, government organizations), promoting or developing an innovation at a more or less advanced stage. The description of all 'innovation niche partnerhsips' is displayed in Annex 2.

Different types of innovations were selected, involving either the technical, organizational, institutional or social dimension (Table 4). However, in most cases, even if the focus was initially on the development of some new techniques or products (such as pig breeding in Lao PDR or mango production in Bangladesh), new organizational and institutional arrangements were required when the issues of sustainability and competitiveness arose. Most innovations were systemic in character, meaning that actors attempted to simultaneously change or improve several inter-related technical, organizational, institutional and/or social aspects of the agricultural system. In this perspective, many of the niches worked at value chain level, at territorial level or at sector level.

Table 4. Mapping of CDAIS niches per country

		Origin of the niche			Initial purpose of the niche		
Country	**Niche**	**Farmer based**	**Org. based**	**Project based**	**Solution focused**	**Problem focused**	**Opportunity focused**
BD	Fish	■				■	
	Mango	■			■		
	Pineapple	■					■
LA	Aquatic animals proteins	■			■		
	Cattle	■				■	
	Tongmang and Non Tae organic	■					■
	Pig	■					■
	Quality rice		■			■	
ET	Milk demand stimulation		■		■		
	Malt-Barley		■			■	
	Community seed		■		■		
	Feed safety			■	■		
	Chickpea	■				■	
RW	Cassava	■				■	
	Milk	■					■
	Catchment			■	■		
AO	Rice development	■				■	
	Seed cooperative	■				■	
	Rural entrepreneurship		■				■
BF	Local Charters			■	■		
	NICT Extension		■		■		
	Drip systems			■	■		
	Microfirms		■				■
	PGS bio		■	■	■		
	Sunflower Oil			■	■		
GT	Avocado		■				■
	Beans		■				■
	Cacao		■				■
	Honey		■				■
HN	Potato	■			■		
	Coffee	■				■	
	Beans		■				■
	Cacao		■				■
		41%	41%	18%	36%	28%	36%

Source: Authors.


Nature of the niche actors relationship
Value chain based
Territory based
Support services based
Technological sector based
70%
33%
48%
30%
Dimension of innovation
Technical
Organizational
Institutional
Social
82%
70%
33%
12%

Consequently, as the niche actors were addressing different aspects of the innovation's development, the communities of niche actors evolved all through the CDAIS project in their composition and purposes, while maintaining a 'niche leader' or a 'niche host' (see examples in Table 5). This niche leader or host was usually the organization which initially promoted the innovation, which was coordinating the processes and which was the primary beneficiary of the outcomes. In this role, it was best placed to implement the niche action plan.

In a few cases, the niche members changed over the duration of the project. For instance, in the 'milk demand stimulation' niche in Ethiopia, the representatives of the partnership organizations changed with time as the challenge evolved,[6] making it difficult to draw lessons on how much the capacities of individual actors were developed and related outcomes achieved.

Furthermore, depending on the timing and duration of the intervention of the CDAIS project, innovation niches embraced to a differing degree the technical, organizational, institutional and social aspects of the promoted innovation, developed as part of the innovation agenda (see examples in Table 5).

This process of evolution of the niches during the project is reflected in the definitions of the purposes of niches and in the refinement of the coaching plans between the first year of the project and the final assessments made in 2018 and presented in country reports. The understanding by a niche's actor that innovation is not a function of a single actor or a single aspect of the agricultural system, but rather the complementarity of several players and dimensions in a complex socioeconomic setting is one of the key outcomes of the project as well as a key driver that explains the evolution of niches in their configuration and purposes as the project evolved.

[6] There were 26 different actor groups identified in the final country forum for this niche – all of which were seen as important to the decision making necessary to achieve this niche's objectives, thus demonstrating the complexity of the innovation process in such niches.

3.2. Niche outcomes and CDAIS contribution

3.2.1. Diversity of niches

Criteria for niche typologies

Given the evolutionary dimension of the niches, the type and level of CD needs identified at t_0 during CNA workshops proved not to be a discriminatory factor of the niche outcomes and impact pathways. At the beginning of the project, the CD needs across niches were very similar, framed by the normative approach of the 4+1 functional capacities as stated in the TAP CF. Across niches, these CD needs included: the need for the niche actors to better influence decision makers, and needs to address limited awareness of existing policies, limited incentives for networking and partnership development, lack of ability of joint learning and experimentation, weakness in information packaging and in sharing it with outsiders, limited knowledge on innovation processes, limitations of policy making on innovation, lack of technical expertise on some topics, organizational issues, limited leadership skills, and problems of managing multistakeholder processes.

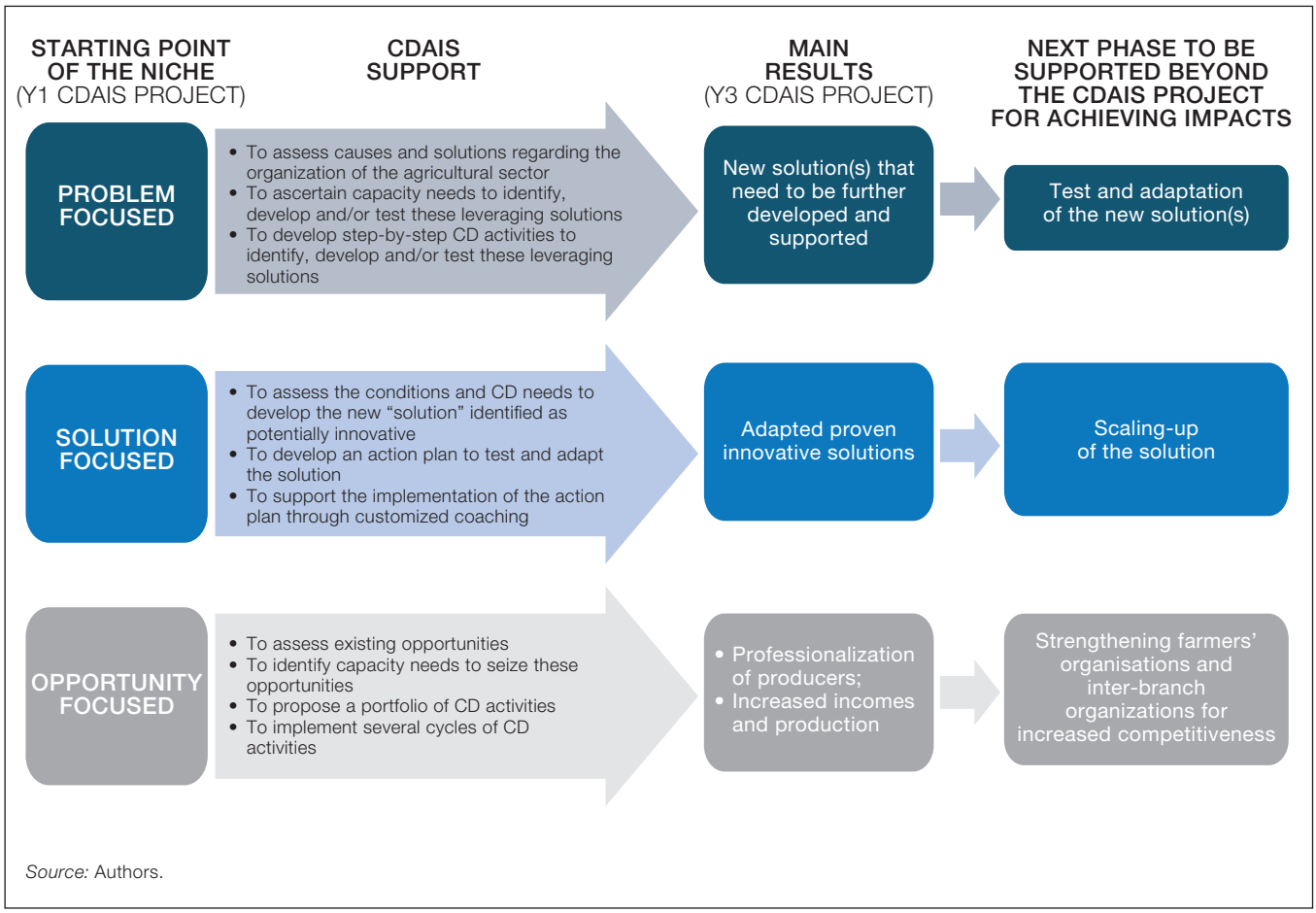
The composition of a niche, the initial purpose of its actors in coming together as a group, and the nature of their innovation agenda appeared to be most decisive factors in shaping the patterns of context-mechanisms-outcomes. We thus selected three criteria for characterizing a niche's initial situation in order to understand the CD strategies developed during the project (Figure 5). These criteria are: the niche's origin (farmer-based; organization-based; project- or partnership-based), the niche's initial purpose (problem-focused; solution-focused; opportunity-focused), and the type of niche leader (farmer organization, government agency, NGO, private company).

Table 5. Examples of innovation agendas per type of niche (solution-focused, problem-focused or opportunity-focused)

Initial purpose of the cluster	Niche/country	Innovation agenda	Niche leader or niche host
Solution-focused			
New policy framework	Feed safety/Ethiopia	To develop a legal framework in the country for risk assessment, management and communication in the sector of livestock inputs such as animal feed, vaccines and drugs	The Veterinary Drug and Feed Administration and Control Task Force Independent regulatory body
New policy instrument	Local land charters/ Burkina Faso	To disseminate a new land management instrument (the local land charter) for the municipalities to reduce conflicts between farmers and breeders at the district level	Government agency DGFOMER and an independent civil society association of observers (GRAF)
New types of service	NICT for extension services/Burkina Faso	To adopt digital tools for making extension services more effective	Résau-Gestion (a cluster of seven farmer organizations)
Systemic solution	Milk demand stimulation/Ethiopia	To promote pasteurized milk through the media, to make the policy framework evolve in favour of pasteurized milk promotion, and to promote school milk feeding, as a way of opening up a new market niche for the industry, triggering the raw milk supply chain and improving the performance of school children who are suffering from malnourishment	Private agency and government agency: Ethiopian Milk Processors Industries Association (EMPIA) and the Addis Ababa Bureau of Education
New technology	Mango fruit bagging/ Bangladesh	The uptake of fruit bagging, a technology intended to reduce the amount of pesticides required to produce a profitable crop	A farmer organization
Problem-focused: to diagnose problems and find possible new solutions to test			
Yields	Chickpea/Ethiopia	Promotion of a farmer's cluster approach – agri-business skills – developing partnerships with research organizations for access to seeds in order to increase chickpea yields	A farmer organization
Product quality	Fish quality/ Bangladesh	Making aquaculture sustainable by quality seed production and fish cultivation with improved technology and training, and ensuring local and export markets through proper processing, value addition and distribution at Trishal, Mymensingh	A farmer organization
Opportunity-focused: to seize business opportunities for greater competitiveness and sustainability			
New marketing and distribution channels	Avocado marketing/ Guatemala	To create an association composed of a network of producers from seven municipalities in order to establish new marketing and distribution channels	A farmer organization
New processing machines	Women-led microfirms/Burkina Faso	To improve food transformation processes by investing in new processing machines and buying higher quality inputs thanks to contractual arrangements with suppliers (grain farmers and packaging sellers)	An association of firms (RTCF)

Source: Authors.

Figure 5. Types of niches, contributions of CDAIS to the main impacts and expected next steps



Source: Authors.

The criteria used to describe a niche in the final stages of the project are: the innovation agenda that was pursued or developed throughout the project; the dimensions of the innovation that were embraced (technical, organizational, institutional, social); the dominant nature of relationships among the niche actors (value chain-based; territory-based, technology sector-based; support services-based; interpersonal-based).

Table 6 provides more insight into what we call the 'nature' of relationships with regards to the collaboration resources that were mobilized.

Table 4 maps the diversity of innovation niche partnerships across the eight countries according to the following criteria: origin of the niche, initial purpose of the niche, nature of the niche actors' relationships, dimensions of innovation.

Mapping of niches per type

Almost half (41%) of the niches were organized around farmer/producer organizations. Others were usually initiated by a research and development organization (41%), or a project context (18%) (Figure 6).

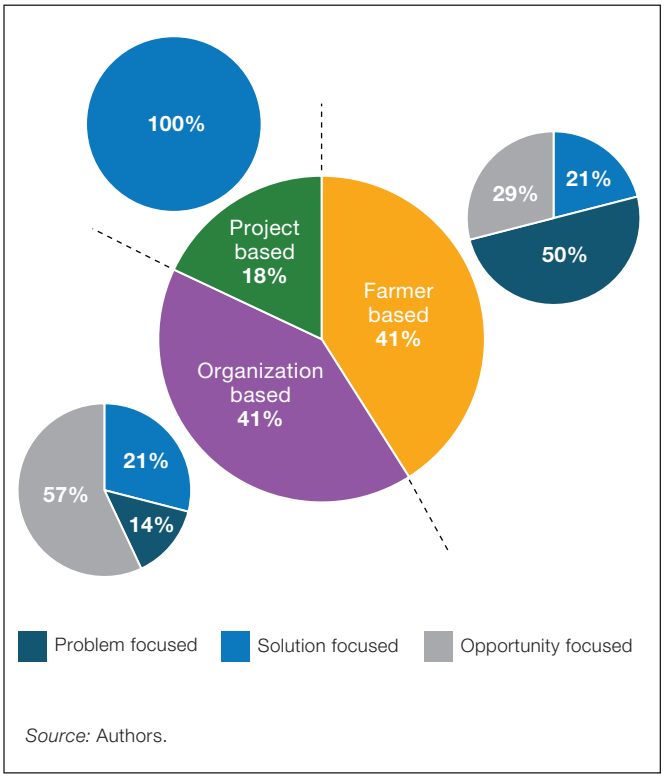
Thirty-six percent of the niches were driven by opportunities to develop business activities and increase incomes. Another 36% of niches were solution-focused, and 28% were mainly problem-focused (Table 4).

Most of the problem-focused niches addressed problems pertaining to three main segments of the value chain: production, post-harvest processing, and marketing. The development of agri-business skills and formal arrangements among value chain actors were key areas for functional capacity development activities.

The solution-focused niches were focused on the testing and adaptation of a solution considered as 'potentially innovative', meaning that the solution might successfully solve a well-known problem that concerns a large number of people. This is the case for instance of the 'ITC-extension' niche in Burkina Faso. This niche was composed of farmer organizations wanting to use digital tools in order to solve the problems of cost and demand-driven extension services. Most of these types of niches were project-based or targeted systemic solutions such as the 'community seed' niche and the 'feed safety' niche in Ethiopia, the 'drip systems' niche or the 'BioPGS' niche in Burkina Faso, or the 'potato niche' in Honduras. A systemic solution simultaneously addressed different aspects of the problem, i.e. technical, institutional, organizational and social (Table 7).

Whether a niche was framed as a problem, opportunity, or solution depended partly on the language preferred by the stakeholders who initiated the partnerships and assessed the capacity needs. In general, it was observed that the public sector and civil society preferred to frame an issue as a problem to be solved, while the private sector often preferred the more optimistic language of opportunities. In CDAIS, we noticed that farmer-based niches were mainly framed as problem-focused niches. When the niche was based on an existing project, the implementation of a solution was

Figure 6. Origins of niches and initial purpose of the niches



Source: Authors.

Table 6. Nature of relationships among niche actors

Nature of relationships	Collaboration resources
Value chain-based	The niche actors partner and coordinate with other actors based on their business relationships Example: food processing firm and consumers
Territory-based	The niche actors partner and coordinate with other actors based on their territorial relationships Example: farmers and breeders in a district
Technology sector-based	The niche actors partner and coordinate with other actors based on their technological relationships Example: users and technology developers in the seed sector, digital technologies sector or drip systems sector
Support services-based	The niche actors partner and coordinate with other actors based on their service provider or service demander relationships Example: farmers and extension workers
Interpersonal-based	The niche actors partner and coordinate with other actors based on their interpersonal relationships Example: family ties between farmers

Source: Authors, adapted from Ferru *et al.*, 2011.

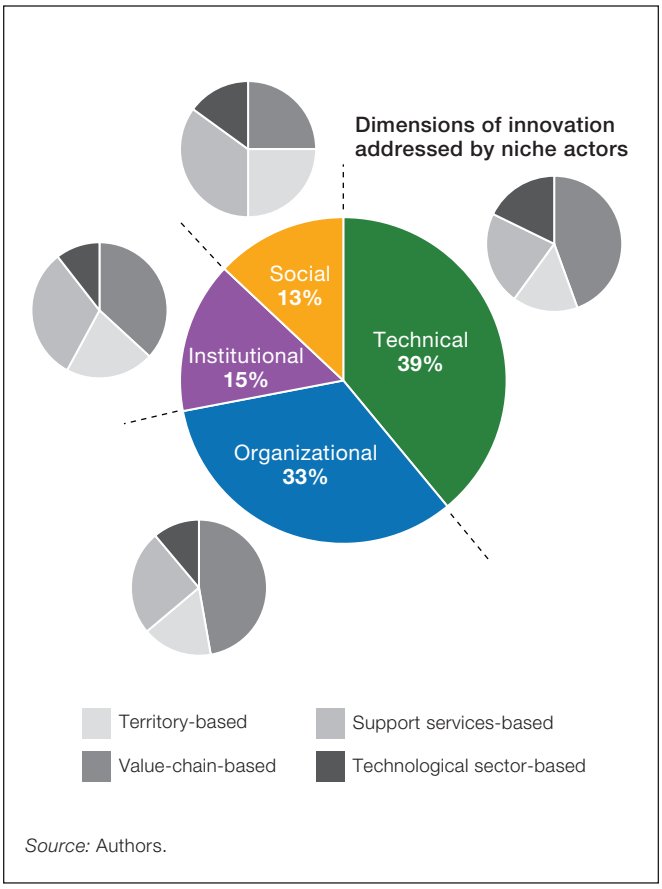
the main aim of the niche actors. In the case of producer organization-based niches, opportunities for business and improving competitiveness were behind the primary initial goals of the niches.

These framings influenced the design of the CD strategy and the ways in which the progress of a niche's actor was subsequently evaluated.

3.2.2. Problem-focused niches

For a problem-focused niche, the CNA consisted mainly in assessing the problem, the possible causes and solutions, in order to propose a CD strategy that aimed at helping niche actors find solutions based on increased functional capacities. The 'innovation' then emerged from the capacity-development process (Figure 5). For instance, the 'community seed' niche in Ethiopia began the CD process from the observation that the traditional seed marketing system was inefficient. At the end of the CDAIS project, the regional government had agreed to draft a new directive for seed marketing that was based on fair and equitable opportunities for both the seed producers and buyers. The CD process, based on collaboration with extension workers of the Bureau of Agriculture (district, zonal and regional offices), agricultural research institutes, cooperative offices at different levels, the seed quality control agency, Self Help Africa (NGO) and other seed companies, helped this niche actors find the appropriate solution to develop and the right way to influence policymakers. However, at the end of the project the new solution (a new directive in this case) had still not been implemented, delaying the project from proving its

Figure 7. Dimensions of innovation addressed by the niche actors and the nature of their relationships



Source: Authors.

Photo 1: Results from a Reflection & Refinment workshop – 'seeds' cooperative' niche in Angola

Photo 2: Capacity needs assessment workshop – 'chickpeas' niche in Ethiopia

value in solving problems of seed systems. In many niches, the design of new solutions took a significant amount of time, between one and two years. The CDAIS project acted mainly as a catalyst for creativity through its support to exploration and collective learning activities. For instance, the sponsoring of expertise to inform or advise the niche actors and help them make informed decisions was a key critical CD activity for these types of niches. For the 'malt barley' niche in Ethiopia, a study on institutional and policy factors pertaining to malt barley seed was critical in terms of generating information and knowledge about the malt barley seed business, leading to important recommendations for policymakers.

Nevertheless, the project often fell short in terms of the concrete implementation of new solutions, either because material support or technical activities were not possible, or because the time was no longer sufficient. This created a sense of frustration among these niche actors but, in some cases, it also motivated them to pursue their collaborative effort for achieving greater results and impacts. Focusing CD strategies on non-technical and non-material support prompted individuals and organizations to turn towards in-country suppliers and to raise funds on their own such as in the 'seeds cooperative' niche in Angola (Photo 1).

For instance, the actors of the 'chickpea niche' in Ethiopia (photo 2) sought the assistance of a regional research organization to provide them with quality seeds. The project led them to think about a sustainable process at the regional level that would allow them to access quality seeds on a regular basis. Furthermore, they were driven to raise funds from another donor, USAID, for putting up an oil processing plant. Even though it raised expectations without providing material support, the CDAIS project ultimately acted as an incentive to the niche actors to embark on serious long-term endeavours. Assessments of niche outcomes two or three years after the end of CDAIS project could provide valuable additional information on whether the functional capacities they gained enabled them to follow through and achieve their innovations over the medium or long term.

"*Some problems were too complex, beyond the scope of the CDAIS project (Burkina Faso project manager)*"

In some cases, the assessment of the problem during the CNA highlighted the complexity of the problem to be addressed. Given time and budgetary constraints, the project was not able to satisfy their CD needs.

Box 1.

Limitations of the CDAIS project in tackling niche problems - Example from Ethiopia

The 'malt barley' niche in Ethiopia was a very complex initiative but also a very interesting case that demanded the use of the innovation systems approach to solve key challenges. This niche actors identified possible interventions to improve the performance of the seed system and the supply of quality seeds:

Encouraging development and release of climate-smart and high-yielding malt barley varieties;

Capacity building of seed cooperatives so that they could actively participate in the malt barley seed business;

Improving market orientation and internal governance of agricultural cooperatives for increased productivity and integration into malt barley value chains;

Strengthening contract farming arrangements (contract design, prices, product quality, and volume) to improve the farmers' access to modern inputs and enhance seed quality and overall supply chain performance; and

Promoting co-innovation and collaborative activities in order to build a resilient malt barley seed system.

Unfortunately, partly because of the complexity of the problem and time constraints, this niche was not able to achieve this ambitious objective by the end of the CDAIS project. Meeting the demands of the brewery industry, increasing the benefits for smallholders and ensuring input substitutions through reduced imports of malt barley and seeds still remain substantial objectives, which require another round of facilitation. The planned partnership with the pre-exiting malt barely platform in Oromia may indeed help but further engagement is still required. It is surely important for CDAIS to find the additional resources necessary to take this niche to the next significant level.

Source: Final CDAIS Country Report – Ethiopia

Table 7. Mapping of niches according to the initial purpose of niche actors: solution-focused, opportunity-focused and problem-focused niches

		Origin of the niche			Initial purpose of the niche		
Country	**Niche**	**Farmer based**	**Org. based**	**Project based**	**Solution focused**	**Problem focused**	**Opportunity focused**
BD	Mango	■			■		
LA	Aquatic animal proteins	■			■		
HN	Potato	■			■		
ET	Milk demand stimulation		■		■		
ET	Community seed		■		■		
BF	NICT - extension services		■		■		
BF	BioPGS		■	■	■		
ET	Feed safety			■	■		
RW	Water catchment			■	■		
BF	Local land charters			■	■		
BF	Drip systems			■	■		
BF	Sunflower Oil			■	■		
LA	Cattle	■				■	
ET	Chickpea	■				■	
RW	Cassava	■				■	
AO	Rice development	■				■	
AO	Seed cooperative	■				■	
HN	Coffee	■				■	
LA	Quality rice		■			■	
ET	Malt-Barley		■			■	
BD	Fish	■				■	
BD	Pineapple	■					■
LA	Tongmang and Non Tae organic	■					■
LA	Pig	■					■
RW	Milk	■					■
AO	Rural entrepreneurship		■				■
GT	Avocado		■				■
GT	Beans		■				■
GT	Cacao		■				■
GT	Honey		■				■
HN	Beans		■				■
HN	Cacao		■				■
BF	Microfirms		■				■

Source: Authors.

		Nature of the niche actors relationship				Dimension of innovation			
Country	Niche	Value chain based	Territory based	Support services based	Technological sector based	Technical	Organizational	Institutional	Social
BD	Mango	■				■			
LA	Aquatic animal proteins		■		■	■			
HN	Potato	■		■		■	■	■	
ET	Milk demand stimulation	■		■	■		■	■	■
ET	Community seed	■	■				■	■	
BF	NTIC - extension services			■	■	■			
BF	BioPGS	■		■		■	■		■
ET	Feed safety			■			■	■	
RW	Water catchment		■	■	■	■	■	■	
BF	Local land charters		■	■				■	■
BF	Drip systems				■	■	■		
BF	Sunflower Oil	■	■	■	■	■	■	■	■
LA	Cattle			■		■			
ET	Chickpea	■	■	■		■	■		
RW	Cassava	■		■		■	■		
AO	Rice development	■	■			■			
AO	Seed cooperative			■		■	■		
HN	Coffee	■				■			
LA	Quality rice	■				■			
ET	Malt-Barley	■				■			
BD	Fish	■				■	■		
BD	Pineapple	■					■		
LA	Tongmang and Non Tae organic	■	■	■	■	■	■	■	
LA	Pig					■	■		
RW	Milk	■		■		■	■	■	
AO	Rural entrepreneurship			■		■	■		
GT	Avocado	■					■	■	
GT	Beans	■		■	■	■	■		
GT	Cacao	■		■		■	■		
GT	Honey	■				■	■		
HN	Beans	■			■	■	■		
HN	Cacao	■				■	■	■	
BF	Microfirms	■				■	■		

Such was the case for the 'malt barley' niche in Ethiopia. and the 'sunflower' niche in Burkina Faso. In these cases, the CDAIS project mainly helped the niche actors lay out a common vision and strategy to overcome an existing bottleneck in the value chain.

3.2.3. Solution-focused niches

For solution-focused niches, the CNA consisted mainly in assessing the conditions for testing and adapting the solution identified as potentially innovative, for identifying the required capacities, and for drafting the action plan. The 'innovation' initially identified was then fine-tuned and adapted to local contexts or needs. For instance, the farmer organizations (FO) of the 'NICT' niche in Burkina Faso started with the idea of integrating a digital platform and using tablets in their extension services to reduce the costs of data collection and analysis (photo 3). The two years of CD activities were dedicated to the co-design and testing of the digital tools with experts in the development of ICT-based solutions. In order to make progress, the FOs themselves bought the digital devices required to equip their extension workers. At the end of the CDAIS project, the digital tools were tested, adapted and appropriated. The next step would be the scaling up of the solution, by equipping all the extension workers of the seven FOs of the niche.

Photo 3: Digitising survey questionnaires for use via tablets – 'NICT – extension services' niche in Burkina Faso

Photo 4: Packing mangoes – 'mango' niche in Bangladesh

In such a niche, the CDAIS project acted mainly as a catalyst for experimentation and adaption, guiding the niche actors in processes of experimental methods. It also acted as a bridge to national and international experts able to advise the niche actors in the development of their solution(s). The main achievement of these types of solution-focused niches pertained to the identification of 'new problems' before being able to scale up the solution. Thus, further support was needed by such niche actors at the end of the project. For instance, the 'sunflower oil' niche in Burkina Faso, was the result of ten years of investments and efforts, leading to a value chain developed in Bobo-Dioulasso, ranging from production to oil processing, for supplying the local market. This niche brought together producer organizations, processors, and public research and development agencies. The CDAIS project helped them strengthen their collaboration with a national research institution and to engage in the political process in order to improve the regulatory framework (in particular to increase taxes on imported oil). However, while moving toward these objectives, they faced two new technological bottlenecks to increasing the production: the availability of quality seeds in a timely manner, and the limited capacity of the local industry. Some coping strategies were identified but time and funds were lacking to fully implement them. Similar bottlenecks were faced by the 'mango' niche actors in Bangladesh (photo 4).

3.2.4. Opportunity-focused niches

Thirty-six percent of the niches were organized at a value-chain scale in order to improve the competitiveness of farmers and farmer organizations as primary beneficiaries of the CDAIS intervention.

CDAIS support to these niches mainly consisted in improving the 'business attitude' of producers and producer organizations through the joint exploration of new marketing or distribution opportunities, and in connecting them with their policy environment.

In several countries, this type of CD activity is already being implemented by different types of producer organization, such as in Ethiopia, where the research system is making

Photo 5: Recording milk delivery at the cooperative milk collection centre – 'milk' niche in Rwanda

Photo 6: Training coffee producers on the use of organic manure to increase yields - 'Coffee' niche in Honduras

efforts to link farmers with the food industry (e.g. malt barley farmers with brewery companies, wheat farmers with the flour industry). However, these efforts often prove insufficient due to lack of regular, systematic and scientifically guided actions. The same observation was made for Bangladesh. Some groups were registered as cooperative societies but the training they received from the Department of Cooperatives was minimal and few groups remain operational. Some farmers were reluctant to play an active role in organizations as they expected the government to take responsibility and were unconvinced that change could happen without government support. They were unwilling to participate unless the government played a major role.

In such countries, where farmer organizations are not encouraged, the CDAIS project acted as a catalyst to enable the emergence of grassroots organizations.

Using a value-chain approach, the CDAIS project helped producer groups strengthen their linkages with other value-chain actors to create trust and build business relationships. A customized and proximity coaching approach, guiding producers step by step, helped them establish their organizations and build fruitful relationships with other value-chain actors such as in the 'milk' niche in Rwanda (Photo 5).

The primary outcomes of this type of niche were the formalization of the clusters into producer organizations with legal status (registration). The purpose of these organizations was to defend the interests of producers against those of other value-chain actors, as well as to facilitate the establishment of business relationships thanks to producers' leaders who became the heads of their respective organizations such as in the 'coffee' niche in Honduras (photo 6).

The catchphrase 'from me to we' was aptly coined by a fish farmer participant in Bangladesh to explain this type of change brought about by being involved in CDAIS.

The CDAIS project helped such producer organizations build visions, strategies and action plans. One of the project's main outcomes was the feeling of empowerment gained by the farmers, which allowed them to challenge outdated and ineffective systems and propose new ways of doing things.

To be formally established and recognized appeared to be a necessary step in developing a niche's capacities to influence its environment and make it more favourable for its innovation agenda. For instance, in Guatemala, the establishment of the 'Asociación Integral de Desarrollo Agrícola' (AIDA) to promote the production and marketing of avocado was an important step, made possible through the process of strengthening the capacities of actors to engage in decision making and become more persistent in this process.

Other outcomes concerned the increased awareness of producers of the various support services they could obtain from the government and companies in the private sector. In addition, the value-chain actors involved in the niche's activities, i.e. business partners or service providers to farmers, increased their functional capacities of engaging and collaboration, which made them more comfortable in interacting with producers. CDAIS made them realize the importance of working together such as in the 'beans' niche in Guatemala (photo 7).

These niches ended the CDAIS project with primary and expanded outcomes, i.e. the improvement of various functional, organizational and business skills, and their

Photo 7: Members of the ATESCATEL seed cooperative - 'beans' niche in Guatemala

anchoring into the existing system. For instance, in Bangladesh, several new relationships and innovation processes were built with innovation support service providers (BARC, DAM, BAPA). The fact that some of the staff from these entities were involved in project activities and engaged regularly with the farmers made farmers more comfortable in being approached and in getting along with the officials of these departments and staff from BAPA. The 'mango' niche members wrote to BAPA seeking their assistance with an issue: 'BAPA is responsible for organizing, coordinating and monitoring the processing companies (e.g. PRAN Food Ltd, ACI Ltd) operating in the country. It can help link these processing companies with the niche's members for the supply of raw materials such as green mangoes, fresh pineapple etc.'

Another example from Lao PDR is illustrative of the integration of the niche into the wider context of the value chain and its institutional environment, representing a key expanded outcome of this type of opportunity-focused niche. The 'pig' niche focused on enhancement of production through training in breeding techniques, artificial insemination, and healthcare. At the same time, the pig producers' organization was strengthened through business skills and support for the marketing of their products. Early engagement with government bodies (local and national) was organized in order to obtain the administration's support. As production increased, farmers grew more confident that there would be an improvement in marketing prospects. They then pushed for a greater integration of the value chain, upstream, with the breeding of piglets, and downstream, with processing of a range of meat products (sausages, sun dried and pickled meat). This expansion was made possible by internal technical progress and exchange of knowledge, experimentation and learning together. With increased confidence thanks to successful achievements and government support, the niche institutionalized by becoming a registered member of the Lao Farmers Network, gaining access to further knowledge through meetings and training as well as marketing opportunities in and beyond the province by engaging with traders and supermarkets. The blend of internal bonding through shared training and experimentation provided confidence to build bridges with external partners, including through visits to pig producers in neighbouring Thailand, resulting in new knowledge to the niche (e.g. information pertaining to the quantity and quality of pig/pork market demand in Xayabouly province). This reinforced the niche with more stable practices and organization, and an improved marketing vision. Officials from the local bank even visited the niche with a view to providing loans.

CDAIS helped increase production and incomes at the same time as professionalization by supporting producer organizations and building agri-business skills (photo 8).

Photo 8: Capacity needs assessment – 'Pig' niche in Lao PDR

At the end of the CDAIS project, producer organizations still needed to continue implementing their action plans and put the capacities they had gained into use, to continue their professionalization, in order to increase incomes and production. Furthermore, expectations were raised regarding access to new technologies and new industrial processes in order to improve the quality and value of the products they brought to market, and thus their competitiveness. Finally, the strengthening of national coordination of value chains appeared to remain a strategic challenge. For example, in Guatemala (where government-supported and formally established value-chain platforms have been set up with support from USAID), one actor stated, 'CDAIS resources allowed the initiation of a dialogue between authorities, the private sector, academia and producers, but it is not a mainstreamed practice. All the effort made, and all the progress achieved, could become useless if the CDAIS experience is not used to further support multistakeholder processes in the country.'

3.3. Common functional capacities developed across niches

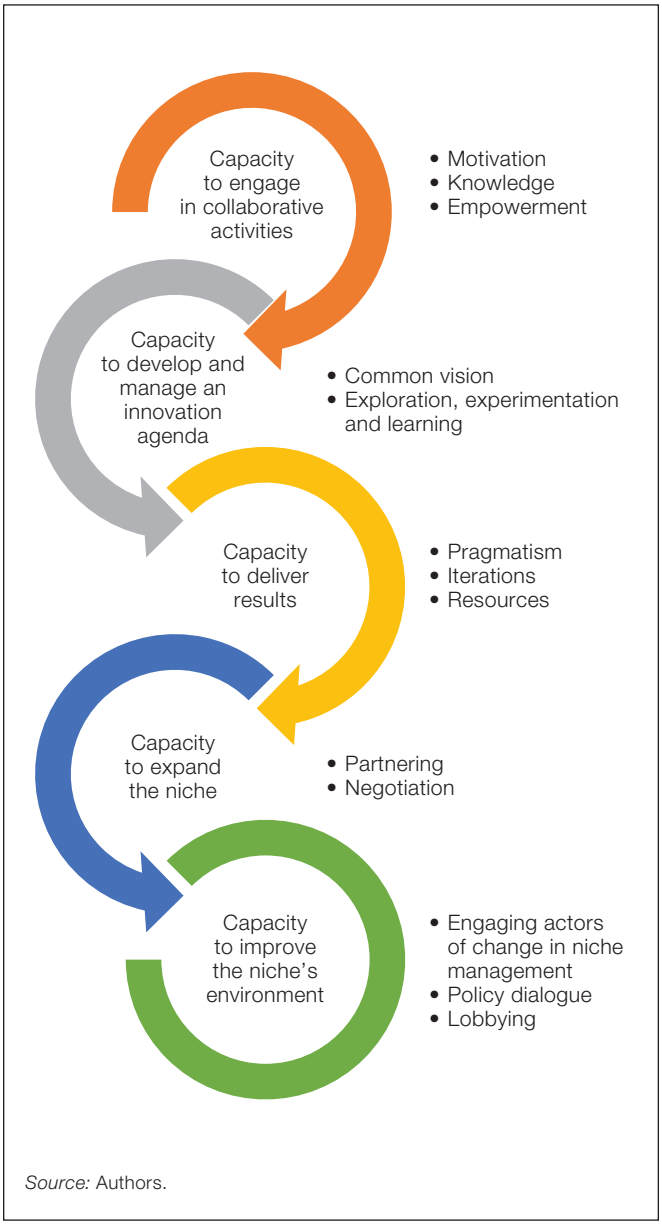
The transversal analysis of the niches' outcomes revealed different types of key common functional capacities that have been developed through the coaching process, and which helped the niche actors progress towards their innovation agenda. We refer here to them as the 'capacities for joint innovation', as they are specific capacities observed only at the niche level.

These common capacities for joint innovation are:

- The capacity to engage in collaborative activities, as a key enabling capacity for developing the other following capacities;
- The capacity to develop and manage an innovation agenda and strategy;
- The capacity to deliver intermediate results;
- The capacity to mobilize new partners and expand the niche as needed;
- The capacity to influence their environment to make it more favourable.

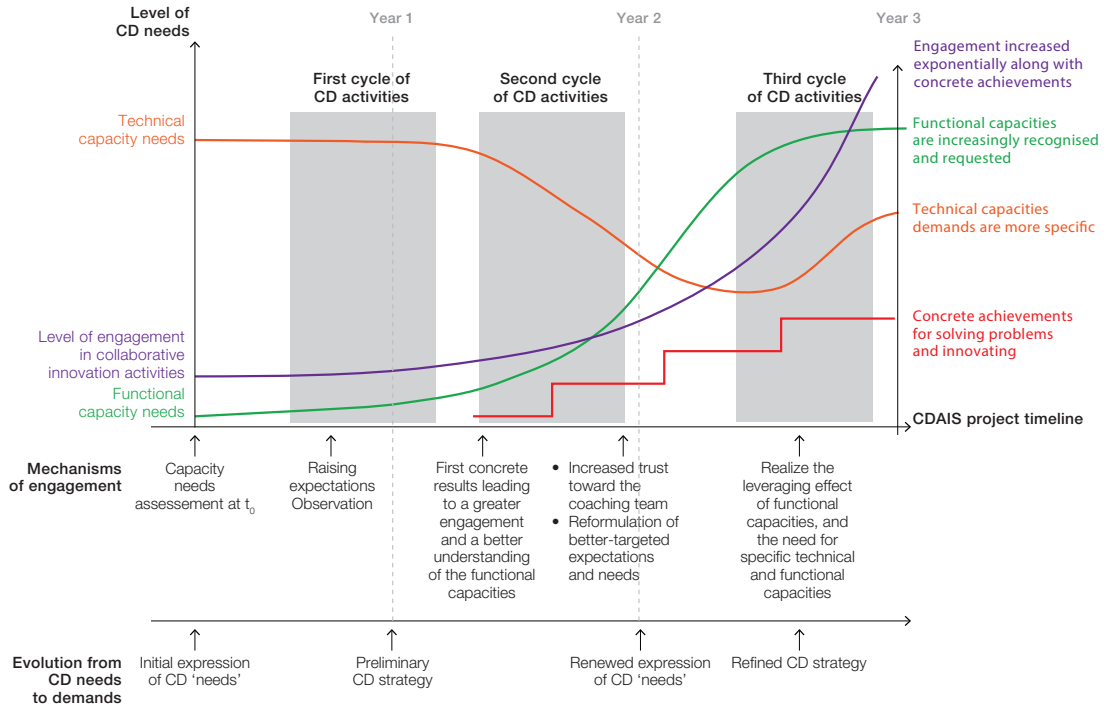
These capacities encompassed some specific skills, such as communication skills, computer skills and agri-business skills, that together make up the overall capacity to develop and manage an innovation agenda. They are presented in detail in the following sections.

Figure 8. Capacities for joint innovation: the key common functional capacities for innovation, across niches and countries



Source: Authors.

Figure 9. Steps of engagement and refinement of capacity demands of niche actors



Source: Authors.

3.3.1. The capacity to engage in multistakeholder partnerships as a key enabling capacity for joint innovation

Steps of engagement and refinement of capacity demands

The more niche actors engaged in its activities, the more they developed their functional capacities, the more they achieved results, and the more they became aware of the importance of functional capacities (Figure 10). Participating in collaborative activities also had retroactive effects on the capacities to collaborate amongst themselves. This is a learning mode called 'learning by doing', which is very efficient in professional situations that involve adults.

Getting niche actors engaged in collaborative activities took at least a year and even more in many cases. The first concrete results obtained by the niches were a key step for encouraging more engagement, with the realization that functional capacities do have some possible leveraging effects. As a consequence, more trust was built between niche actors and also between them and the coaching team. This led to an accelerator effect on joint niche activities and increased capacities to engage and to collaborate. As niche actors became aware of the importance of functional capacities, they revised their coaching plans in many cases during year 2 or even year 3 of the project. In particular, they could identify more precisely the types of technical capacities that were necessary to be developed to achieve their innovation agenda. For example, in the 'NICT' niche in Burkina Faso, after the first year, the niche actors realized that they needed very specific computer skills to be able to co-design their digital platform with the ICT-based solution developer.

After two or three learning cycles (i.e. by year 2 of their engagement in the project), most actors of niches agreed

that functional capacities were as important as technical capacities. In addition, at this stage, they became better able to express informed and targeted capacity-development 'needs', and subsequently became able to demand specific types of support.

As a conclusion, it appears that the capacity to engage in collaborative activities is a key enabling capacity for innovation. As such, it calls for specific attention in any coaching process.

The next part summarizes the CD activities implemented by coaching teams that helped develop this capacity to engage in collaborative activities at the niche level.

The engagement wheel: how CD activities enabled the engagement of the niche actors

In most niches, the different CD activities contributed to develop its actors' capacities to engage in collaborative activities.

Figure 9 highlights the different drivers of engagement that we identified (motivation, knowledge and empowerment) across the 34 niches, the types of CD activities that contributed to activate these drivers, and these activities' specific functions for each driver. As a result, we observe that a combination of different types of CD activities is required to develop the capacity of niche actors to engage in collaborative activities.

In niches in which too few CD activities or only a given type of CD activity had been conducted, actors disengaged during the second year of the project (e.g. the 'milk demand stimulation' niche in Ethiopia; the 'sunflower' niche in Burkina Faso).

3.3.2. The capacity to develop and manage an innovation agenda and strategy

Developing the innovation agenda was key for all the niches. It encompassed the following dimensions:

- A common understanding of the problem(s) to solve;
- A recognition of the complex environment and interplays between actors;
- Knowledge of the legal and policy frameworks;
- Awareness of policy agendas;
- Collection of relevant information and advice on the problems and possible solutions;
- Seeking of innovative solution(s);
- Developing a common vision of the future;
- Developing strategies and action plans to design, develop, and experiment with the solution(s);
- Learning from experimentation/experience;
- Monitoring outputs and outcomes;
- Revising and adapting strategy and action plans when needed.

At the individual level, this capacity required different types of skills, including:

- Skills in complex and 'systems' thinking;
- Skills in problem assessment;
- Skills in innovation management;
- Skills in leadership;
- Skills in the relevant technical areas of the innovation agenda.

This capacity was developed through the coupled MEL-coaching interventions: the capacity needs assessment at t_0, the R&R workshops at t_1 and t_2, the final outcome assessments at t_3. The methods and tools used during these workshops helped in the assessment of problems and solutions (problem trees), the conceptualization of the complex environment of the niche (NetMap), the identification of CD needs (capacity assessment questionnaires), the elaboration of a common vision (rich picture), and the strategizing of activities (coaching plan).

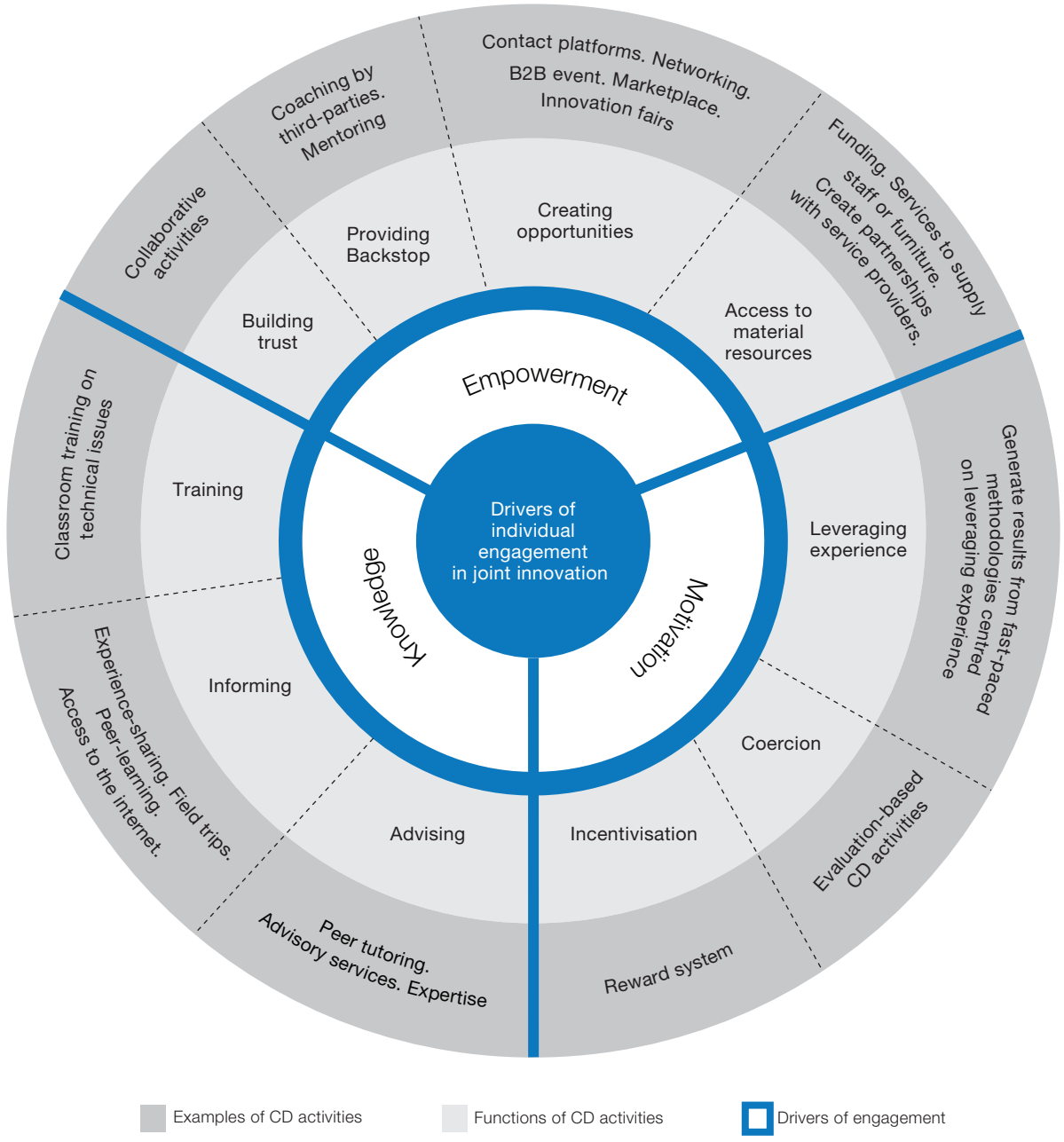
In some niches, some specific skills, such as skills in leadership, in relevant technical areas or in innovation management were developed through targeted CD interventions (classroom training, peer-to-peer exchanges, field visits, etc.).

3.3.3. The capacity to deliver intermediate results

As observed in the engagement process (Figure 10), the quick generation of some concrete results is key to maintain the attention and interest of the niche's members. It requires the niche actors to be able to:

- Prioritize and strategize activities in the short term;
- Accept uncertainty, failures and iterations;
- Identify and seize opportunities;
- Be proactive;
- Be pragmatic;
- Have a minimum of resources and margin of manoeuvre to take actions.

Figure 10. The engagement wheel



Source: Authors.

This capacity development was pushed by some innovation facilitators who prompted some niche actors to organize themselves and to deliver some results so that the coaching process could continue. In some countries (Lao PDR, Burkina Faso), the niche actors' proactivity was encouraged, ensuring in return that coaching and support was provided.

The support to agri-business activities was also a means to achieve results with fast-paced learning cycles.

3.3.4. The capacity to mobilize new partners and expand the niche as needed

All the niches faced the need to mobilize new partners at some point. The reasons were diverse, including:

- To access additional resources, either material, human or financial;
- To do business and develop activities;
- To obtain new insights into their innovation agenda and/or strategy;
- To co-design a solution with relevant experts or service suppliers;
- To produce new knowledge;
- To be trained.

The mobilization of new partners covered the following dimensions:

- Identifying relevant partners;
- Getting attention from relevant partners;
- Proposing and establishing win-win partnerships;
- Managing possible conflicts;
- Clarifying property rights;
- Raising funds or resources necessary for the partnership to work.

At the individual level, this capacity requires different types of skills, including:

- Skills in communication and marketing;
- Skills in partnership contract management;
- Skills in agri-business management;
- Skills in negotiation;
- Relational and social skills.

This capacity was developed through the organization of bridging events such as marketplace events, innovation fairs, business-to-business encounters, multi-actor workshops, project meetings, etc.

Specific skills required were developed through targeted CD interventions (classroom training, mentoring, etc.).

3.3.5. The capacity to influence the niche's environment to make it more favourable

Finally, an important capacity that enabled niches to make significant progress was the capacity to influence their environment in order to make it more favourable for their innovation agenda. Changes in the environment of niches mainly corresponded to the elaboration of new policy regulations or strategies, or to changes in the way of working of some key AIS organizations, such as research or extension organizations. For instance, changes in the attitude of researchers, who became more open and willing to collaborate with farmer groups and actors of niches, were of one of the key factors in making the environment of the niches more favourable.

This capacity covered the following dimensions:

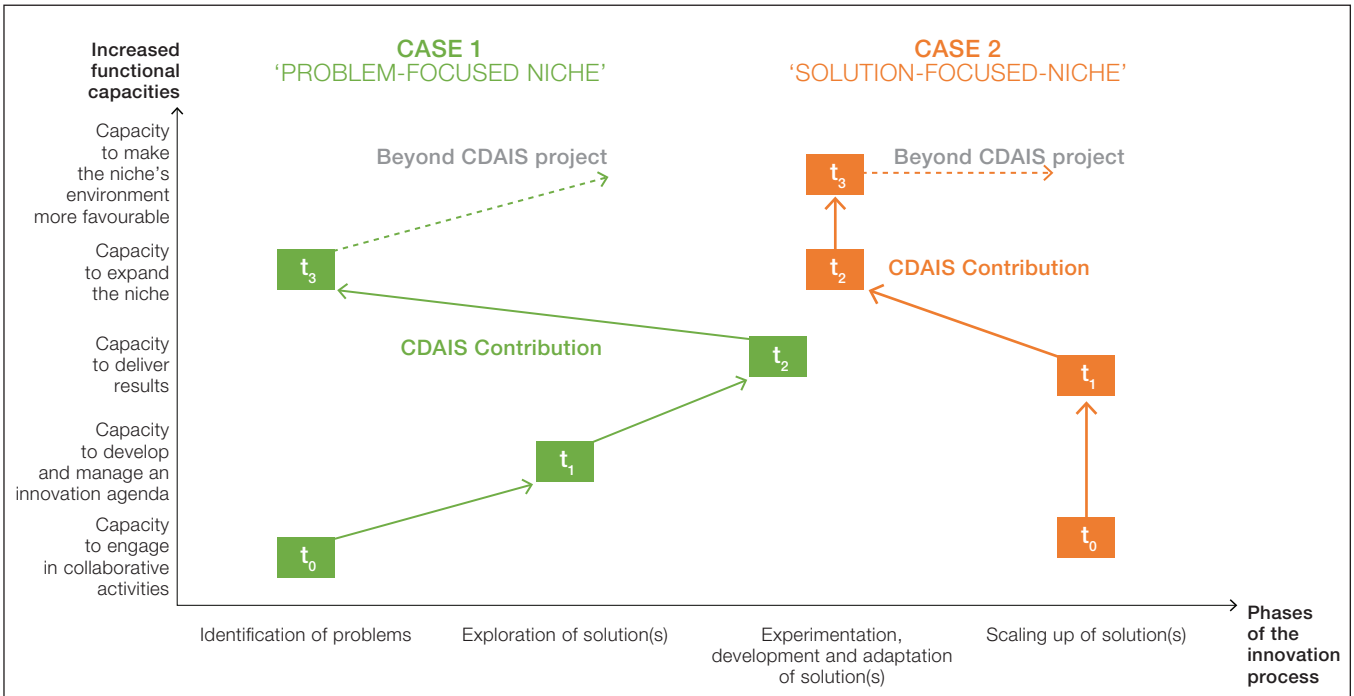
- Having an innovation agenda;
- Being knowledgeable about policy agendas;
- Identifying potential and relevant enabling organizations;
- Engaging in policy or high-level institutional dialogue;
- Convincing policymakers or decision-makers;
- Lobbying;
- Drafting policy briefs;
- Drafting new regulations or policy strategies.

At the individual level, this capacity requires different types of skills, including:

- Persuasion skills;
- Verbal skills;
- Technical skills concerning the innovation agenda.

This capacity was mainly developed through bridging activities with policymakers or government agencies, through marketplace events and through the policy dialogue process.

Figure 11. Coupled trajectories of development of functional capacity and progress in the development of innovation, resulting from the CDAIS project



Source: Authors.

3.4. Contribution of functional capacities in realizing innovation

The impact pathways at the niche level impelled us to identify different types of coupled trajectories between capacity development and innovation processes. The innovation trajectories, i.e. the progress from ideation to exploration to experimentation to development to scaling up of the innovation, were not linear and were very much dependent on the level of development of functional capacity.

For instance, the 'chickpea' niche in Ethiopia started with two objectives of enhancing agricultural practices by solving issues: reinforcement of the technical capacities of farmers through access to technology and services, and dynamizing two-way trade with agri-businesses by allowing them to sell inputs to the niche while, in return, buying more from the niche. As CDAIS activities unfolded the focus became clearer: '*Initially the priority objective of the niche was to focus on seed multiplication and grain production. Nevertheless, as we went through the tasks, we realized that it is not possible to focus on both seed and grain. Therefore, we modified the priority objective and narrowed our focus to seed multiplication. We were convinced that if the problem of seed is resolved, most of the problems of grain production (lack of seed quality and quantity, chickpea paste and disease) would be minimized.*' With a clearer focus '*the relationship has improved ... about eight new partners have been added to the map of the union in the past three years.*' As a result, unexpected and expanded outcomes were produced: '*Chickpea is now registered as one of the export items of the Ethiopia Commodity Exchange (ECX).*' According to the union's manager, this has been achieved unexpectedly and it is a great market opportunity. '*The productivity as well as the quality of chickpea is improving, and seed problems have been resolved due to interventions of CDAIS.' And a new partner joined the project to bring its support to scale up the seed multiplication activities started by CDAIS and support the union in the production of grain as well. Besides, the new partner will support the union in establishing a chickpea splitting and processing factory. When CDAIS leaves, the activities will continue because of the new partner. This is a great success….*' (chickpea farmer union's manager).

In Guatemala, the 'honey' niche started with objectives of enhancing strategic planning and management of their organization, the regional honey producers cooperative (CIPAC). In addition to developing trade, the intention was to change attitudes, empower producers and develop leadership qualities, as well as foster better interaction with the National Commission for Apiculture (CONAPI) and the Ministry of Agriculture. While engaging in a policy dialogue, the niche actors discovered that environment protection legislation threatened to curb production and trade through the levy of extra taxes. The collective reaction to this situation pushed the niche to focus primarily on this legislation. In order to counter the legislation, the niche reorganized its activities, strengthening its legal organization in terms of strategic and business planning, increasing membership, and reactivating its umbrella organization (CONAPI) in order to interact with policymakers and the government on a regular basis.

Two archetypes of these coupled trajectories are shown in Figure 11. The boxes correspond to the level of capacities when evaluated at t_0, t_1, t_2 and t_3 (see MEL times, Part I). In both cases, while the niche actors seemed not to be achieving much in the way of concrete results, their capacities were increasing thanks to CD activities, which in turn enabled them to achieve results later on concerning their innovation agenda. As their functional capacities improved, the niche actors became more able to develop this innovation agenda and strategy, hence revising and refocusing the initial action plan established during the initial Capacity Needs Assessment workshop. In case 1, they returned to the definition of the problems to solve, involving new types of actors. In case 2, while they were strategizing for scaling up their innovative solution, they realized that the 'solution' needed further adaptation and tests to be used by a large number of farmers. So they returned to the solution development phase.

These findings showed that niche level outcomes were at a more or less advanced stage, depending on the trajectories within the niches when the CDAIS project ended.

For future projects, this implies that such CDAIS support should not be stopped prematurely, otherwise it could lead to two types of risk: the frustration of project beneficiaries, and weak concrete achievements of the innovation project. Beneficiaries were very frustrated at the end of CDAIS in many niches. Expectations were raised, capacities were developed but there was insufficient time to make significant progress along the innovation trajectory. Furthermore, external evaluations of the CDAIS project emphasized the lack of observable changes since functional capacities are invisible.

4. IMPACT PATHWAYS AT THE SYSTEM LEVEL

4.1. Overview of CD patterns at the system level

Changes sought at the 'system level' concerned the improvement of the environment of the niches in order to enable them to solve their problems, to experiment and scale up solution(s) and/or to take advantage of business opportunities, thus making progress in their innovation agenda and realizing their potential for innovating.

Different dimensions of the 'environment of the niches' were addressed in each country, depending on each niche's needs, existing inhibiting factors and country context, as well as the feasibility of CD activities. For instance, organizational coaching could not be fully implemented in Lao PDR and Ethiopia mainly because of issues with project scheduling and resources. Other CD activities were undertaken, focusing for example on the strengthening of national coordination mechanisms or platforms. In each country, depending on the objectives pursued at the system level and the chosen entry points, different types of capacities were targeted.

In order to report on the diversity of CD strategies at the system level across countries, we empirically identified three discriminant dimensions: the core issues addressed, the entry points chosen, and the functional capacities targeted (Figure 12).

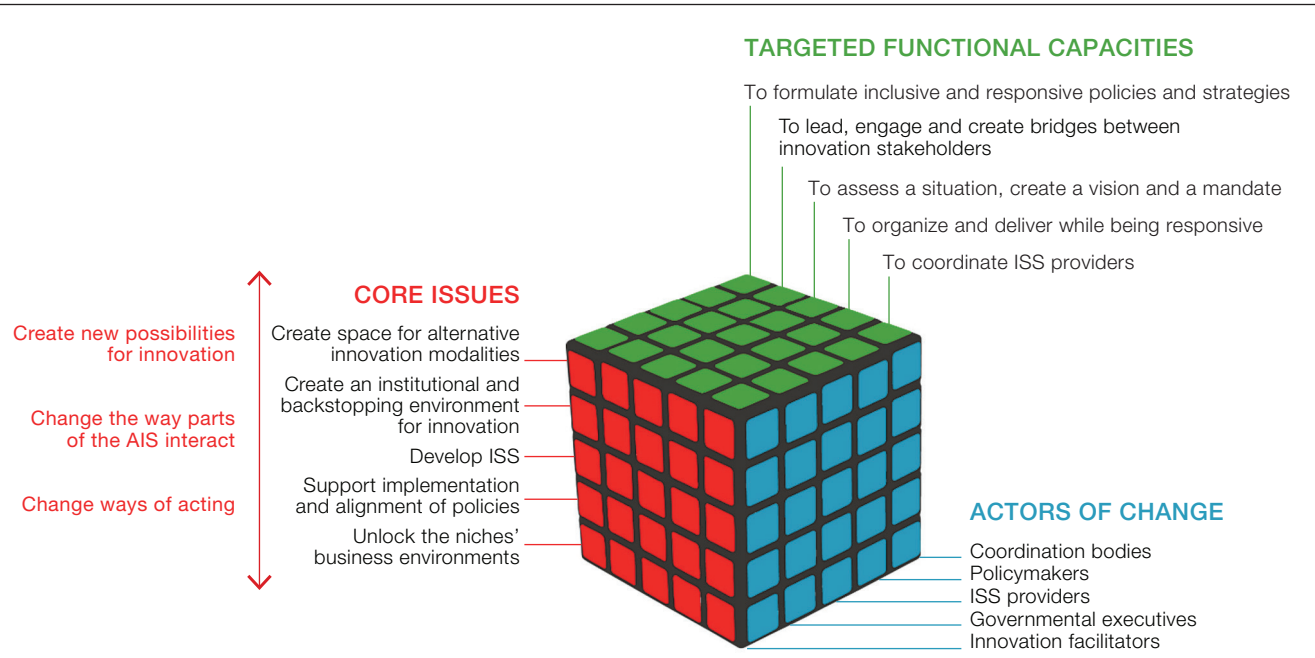
The core issues

The core issues were the main issues addressed through CD interventions at the system level across the eight countries.

They can be positioned along a gradient, going from creating new possibilities in the enabling environment of the niches to changing the ways AIS actors interact to changing the ways AIS actors act in supporting innovation niches. This gradient pertains to the intensity of the expected transformation at the AIS level (Figure 12).

The top of the gradient corresponds to deep systemic transformations. In countries where the 'transfer of technology' (ToT) model is very firmly entrenched, such as in Bangladesh, or in countries where national agricultural

Figure 12. The empirical dimensions of capacity development for innovation at the system level across the eight pilot countries



Source: Authors.

innovation approaches are almost non-existent (such as in Lao PDR), the creation of new possibilities to support grassroots and open innovations was the guiding principle of CD at the system level. It requires a change in the way actors perceive innovation and an introduction of new ways to support collaborative innovation. It raises complex challenges since adequate actors of change had to be found as well as actors with the ability to lead such transformations.

In countries where innovation policies, institutional arrangements and/or operational policy instruments were very weak or lacking altogether (Angola, Honduras, Ethiopia), the core challenging issues pertained to equipping government executives with new ways of thinking, new frameworks and approaches in order to help align agricultural policies and innovation support services provided by the system's different parts. Support efforts were directed towards the nature, quality and intensity of the interactions among system actors.

In countries where innovation policies already existed but were not efficient or implemented yet (e.g. Burkina Faso, Guatemala), the challenging core issues pertained to changing the ways of acting and behaving, and to making existing approaches more pragmatic and responsive to niche needs. Examples include improving existing innovation support services, or unlocking the niche's business environment through changes in policy regulations.

The five core issues and associated CD approaches are presented in Table 8. These core issues reflect in some ways the rationale used by project implementers for conducting national events, such as the marketplace event and the policy dialogue. For each country, we observed a thread of trends toward priority core issues and dominant CD approaches but no straightforward approaches. It must be acknowledged that project implementers designed their CD approach while doing it, depending on interest expressed by AIS actors, their responsiveness to and participation in CD activities as well as emerging opportunities for the creation of bridges between actors.

The actors of change

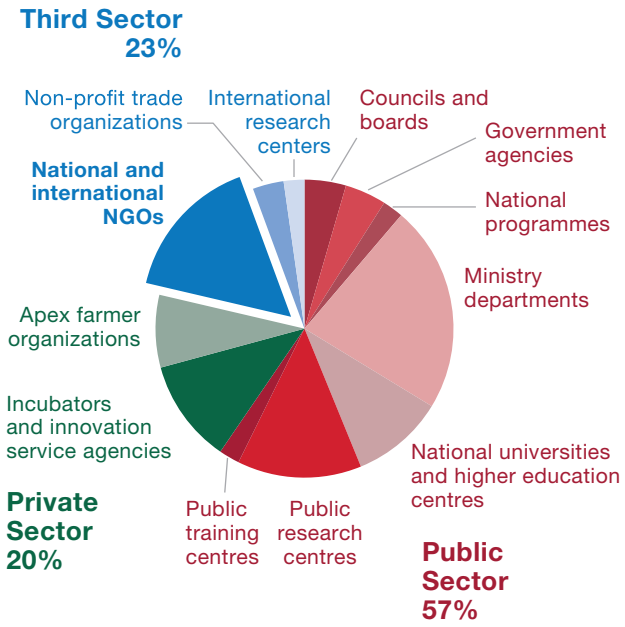
The capacities required at the system level concern different individuals, organizations and meta-organizations (such as platforms, boards, councils, etc.). We call them 'entry points' because they have been targeted by project implementers as the main primary beneficiaries and/or leaders of CD activities at the system level. For the most part, they correspond to actors of change identified during the MEL workshops. Across the eight countries, we identified those who were mobilized to play the most active roles in addressing the core issues. We grouped these entry points into five categories (Figure 12):

- National innovation facilitators (NIF);
- ISS providers, mostly agricultural research, extension and education organizations;
- Government executives;
- Policymakers;
- Intersectoral coordination bodies.

They are composed of public-sector organizations (57%), third-sector organizations (23%) and, to a lesser extent, private sector organizations (20%). The private sector consists of for-profit organizations. The third sector consists of non-profit and cooperative organizations.

Figure 13 shows the institutional affiliations of all the individuals and organizations used as entry points across the eight countries. The traditional actors of the agricultural development sector dominate: ministry departments (17%), international NGOs (19%) and public research centres (15%).

Figure 13. Institutional affiliation of individuals and organizations mobilized as actors of change for CD at the system level across the eight countries



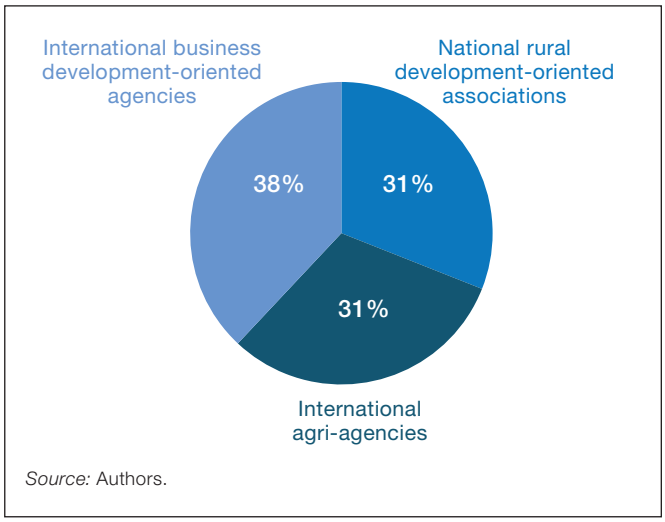
Source: Authors.

Table 8. Capacity for what? Core issues addressed at the national innovation system level by policymakers across the eight countries

Core issues	Definition	CD approach	Countries
Creating space for the promotion of innovation models alternative to that of transfer of technologies (ToT)	In a national context in which the ToT model is firmly entrenched and institutionalized, the CDAIS project was used as an opportunity to showcase to government executives the benefits of multistakeholder innovation partnerships and grassroots innovative initiatives	Wide exposure of government executives to AIS thinking and innovation niches Involving them in niche activities	BD, LA
Creating an institutional and backstopping environment for grassroots agricultural innovations and capacity development	In a national context in which there is no enabling framework dedicated to agricultural innovation and CD, the CDAIS project was used as a methodological model to create new modes of organization and action at the inter-institutional level	Involving policymakers in assessment, learning and visioning activities Tracking and identifying existing organizations with adequate mandates and capacities to support agricultural innovation Engaging civil service staff in the NIF programme	LA
Supporting the implementation of existing innovation strategies and policies, in alignment with niche innovation processes	In a national context in which the government already has innovation policies and strategies, but which were not being implemented for various reasons, the CDAIS project was used to support the operationalization of these existing policies and strategies	Involving non-traditional innovation actors such as the private sector (incubator) or education sector in policy implementation	BF, ET
Developing and/or improving innovation support services (ISS) to niches	In most countries, ISS are under-developed or unsuitable, mainly because of lack of capacities and/or resources	Training staff and organizations in the design and delivery of adequate ISS to niches Engaging ISS providers' staff in the NIF programme	RW, BF, AO
Unlocking marketing, processing, funding and supply possibilities at the niche level (i.e. the niche's business environment)	Based on niche needs, a number of regulatory and technical constraints needed to be removed or adapted by policy executives, in particular related to dissuasive taxes	Providing evidence-based recommendations to policymakers for fine-tuning, improving or creating regulations that directly affect niche activities	ET, RW, BF, HN

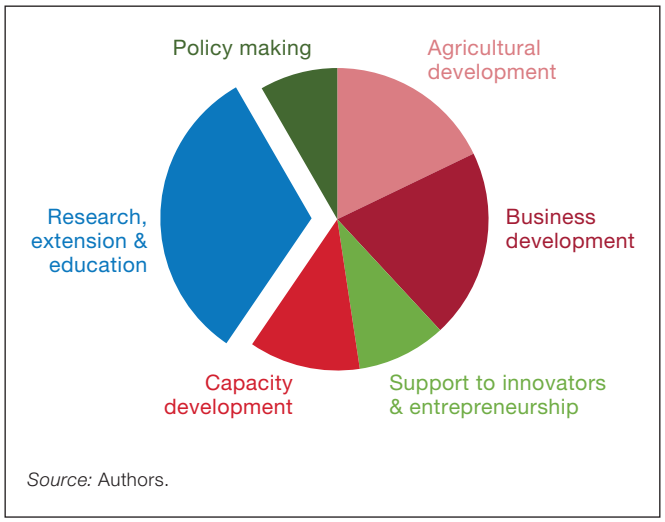
Source: Authors.

Figure 14. Types of NGOs



Source: Authors.

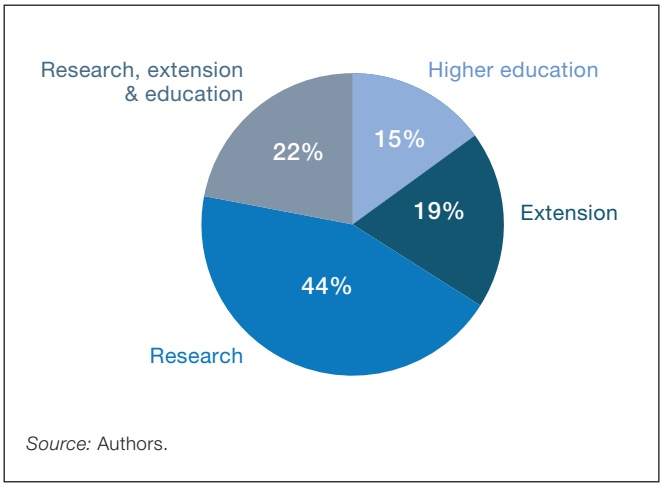
Figure 15. Main domains of activity of the organizations mobilized as actors of change for CD at the system level across the eight countries



Source: Authors.

Figure 15 displays the distribution of their main domains of activity. Research, extension and education is over-represented (32%), with stand-alone research activities representing 44% of this category (Figure 16). Business development (value chains) and agricultural development in general represent 20% and 18% of all the activity domains. Only 10% of organizations undertake activities specifically dedicated to innovation (i.e. providing support to innovators and innovative entrepreneurship).

Figure 16. Distribution of activities in the 'Research-Extension-Education' domain



Source: Authors.

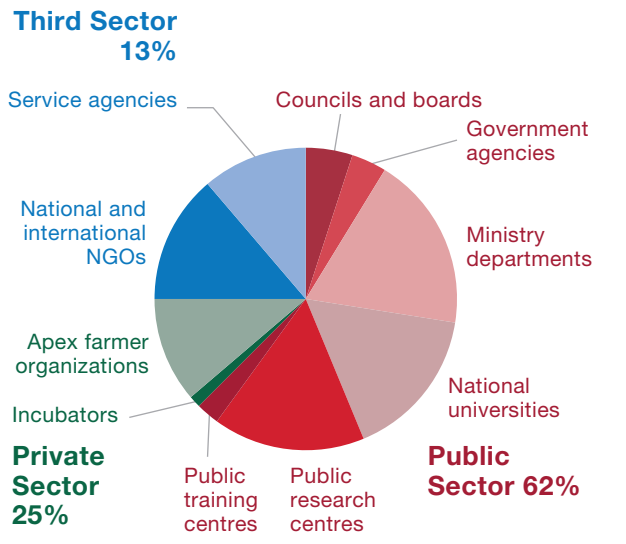
Figure 17 displays the institutional affiliations of the national innovation facilitators (NIF). They were mainly chosen from public sector organizations (62%). The multiple objectives of the selection were: to expose key ministerial staffs to AIS thinking and AIS tools as much as possible; to show the way towards the institutionalization of the approach in public AIS-pillar organizations; and to legitimize or catalyse CDAIS support to innovation niches through the involvement of civil servants.

The functional capacities targeted

We identified five functional capacities targeted at the system level across the eight countries. These are (Figure 12):

- The capacity to assess a situation, create a vision and a mandate;
- The capacity to organize and deliver while being responsive to the niche needs;
- The capacity to coordinate ISS providers (ISSPs);
- The capacity to lead, engage and create bridges between
- AIS stakeholders;
- The capacity to formulate comprehensive and inclusive and responsive innovation policies and strategies.

Figure 17. Institutional affiliations of NIFs across the 8 countries



Source: Authors.

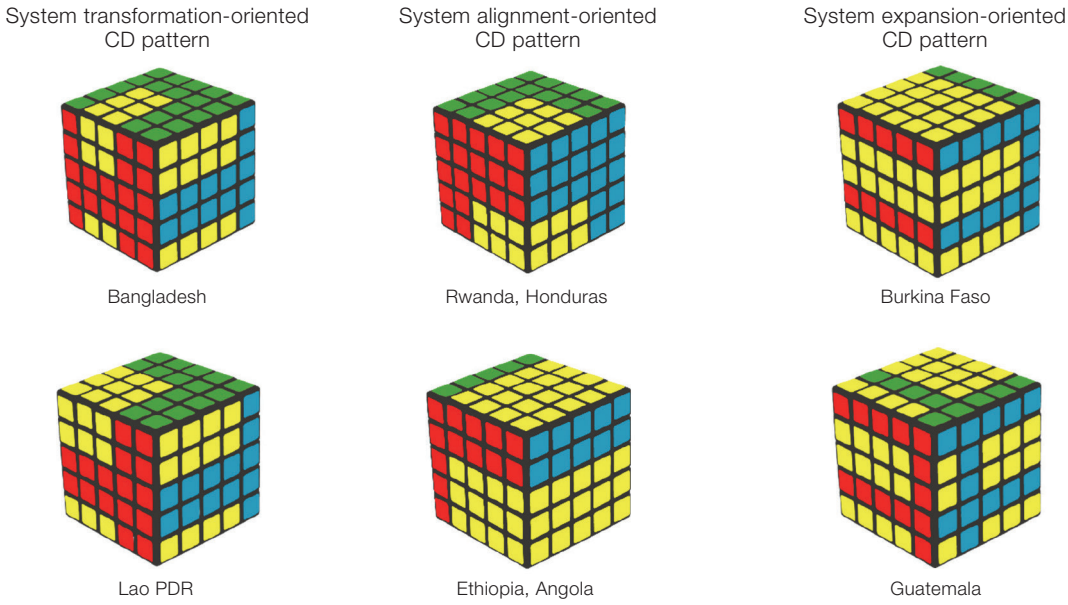
Country CD patterns

According to the prioritized core issues, selected actors of change and targeted functional capacities, the eight pilot countries can be clustered into three main groups of CD patterns (Figure 18):

- AIS transformation-oriented CD pattern;
- AIS alignment-oriented CD pattern;
- AIS expansion-oriented CD pattern.

CD patterns are given by the yellow boxes along each face of the cubes (figure 18). In the AIS transformation-oriented CD pattern, project implementers focused on two or three core issues and two or three functional capacities, mainly concerning the exposure of traditional actors (research centres, government executives, and agricultural policymakers) to AIS thinking and the needs of innovation niches in a context in which the ToT model is firmly entrenched. In Lao PDR, this approach was supported by the setting up of an intersectoral coordination between innovation support services and the development of a network of NIFs inside government agencies from the national to the local level (provinces).

Figure 18. Typology of CD pattern at the national innovation system level



Source: Authors.

In the AIS alignment-oriented CD pattern, project implementers focused on two or three core issues and three or four functional capacities, mainly concerning the improvement of existing agricultural policies in order to unlock the niche's business environment, while introducing new methodological approaches to better link business actors, researchers and innovators. This was the dominant CD pattern across the eight countries (and especially in Ethiopia, Honduras, Rwanda, Angola).

In the AIS expansion-oriented CD pattern, project implementers focused on two or three core issues and four or five functional capacities, mainly concerning the implementation and/or refinement of existing innovation policies and instruments through the involvement of new actors in the system, such as private innovation support service providers (incubators, foundations, service agencies). In Guatemala and Burkina Faso, the CDAIS project helped promote and implement policy instruments dedicated to agricultural innovation support, building on dialogue with representatives from all sectors (private, public and third sectors).

4.2. Functional capacities developed

At the system level, functional capacities were built through system capacities, meaning that even though they pertain to the overall functioning of the AIS, they are distributed across all the individuals and organizations that are active members of the AIS. The five functional capacities identified across the eight countries were developed in several different manners but led to similar outcomes. It means that different context-specific pathways can be found in order to develop capacities at system level for strengthening the national AIS.

4.2.1. The capacity to assess a situation, create a vision and a mandate

The CDAIS project helped highlight the system failures for the project's beneficiaries through concrete case studies of the innovation niches: disconnects between institutions, disconnects between agricultural policies and innovation processes, and disconnects between the research sector and the business sector. However, most of these disconnects were noted at the very beginning, during the initial scoping study, and presented during the inception workshops. Several recent reports exist in all the eight countries which note the weaknesses of institutions, institutional arrangements, the policy needs or the need for strengthening the AIS (see example from Bangladesh in Box 2).

What made the CDAIS diagnosis meaningful for AIS stakeholders was its application to concrete cases raised at the policy level by niche actors themselves. The bottlenecks faced by niches and the support needs that were expressed directly to government executives and/or policymakers created momentum and a context in which governmental entities could share a common understanding of the problems and then become able to propose a shared vision and mandate.

For example, in Ethiopia, a policy review was implemented for the 'milk demand stimulation' niche, as a preparatory

Box 2.

Challenges in the national AIS and agricultural policy development - Example from Bangladesh

The Ministry of Agriculture is responsible for agricultural policy development. The National Agriculture Policy of 2013 highlights the major challenges for Bangladeshi agriculture: raising productivity and profitability; reducing instability; increasing resource-use efficiency; ensuring equity; improving quality and meeting demands for diversification and commercialization (Section 1.8).
It recognizes as a weakness, the 'poor coordination among the public and private universities and research organizations' and calls for a 'paradigm shift in agriculture from a supply-driven to a demand-driven approach.' The policy emphasizes the importance of forging partnership (Section 4.7), 'NARS institutes will create opportunities for promotion of research through increased public and private sector collaboration.'
In its Human Resources Development section (14), it states, 'The government plans to introduce innovative approaches to upgrade the skill of researchers, extensionists and farmers …,' and in Workplan Development (14.8), 'The government will facilitate and strengthen training related to demand-driven research and extension.'

Source: Bangladesh – Scoping Study Report

phase of the policy dialogue. During the policy review, it was found that several policy, strategy and programme documents pertaining to nutrition and school feeding existed in the country. One of the key shortcomings found by the study was that the national strategy document on school meals did not consider milk a principal food in the school meals programmes and did not recognize the importance of multi-actor interactions and networking in making milk available in school meals on a larger scale. Improving the strategy document in light of these and other factors was the key contribution of the CDAIS project to the national school meals strategy.

In the Ethiopian 'feed safety' niche, a critical issue was whether the Veterinary Drug and Animal Feed Administration and Control Authority (VDFACA) had the mandate as a Federal agency to operate in the regional states in the course of implementing the directive. There was no easy answer to this, since this kind of issue has become prevalent in the country, mainly because of the nature of the federal government system, which tends to have grey areas between regional and federal mandates, especially concerning cross-cutting issues. Finally, it was recommended that VDFACA needed to consult the legal departments of the government at different levels in order to determine the correct answer to this question. The niche continued its efforts to finalize the document and translate it into the official language (Amharic). VDFACA management is now in discussions to approve the document and direct it to the relevant directorate for implementation.

In Lao PDR, the CDAIS project increased the capacities of all the participants in the policy dialogue to understand the root causes of problems faced by the actors of the innovation niche partnerships. As a consequence, they became able to better identify the way ahead.

4.2.2. The capacity to organize and deliver in a responsive manner

The capacity to organize and deliver while being responsive to the niche's needs refers to the action taken by innovation support service providers in the perspective of better fulfilling the innovators' needs.

This capacity was developed mainly through the NIF training programme and the organizational coaching process.

For instance, in Bangladesh, at the end of the project, DAM and BAPA were able to propose farmer-responsive and market-focused activities to better integrate innovation into new and ongoing projects. Three innovation support service providers (two government, one private sector) worked with CDAIS innovation facilitators to identify capacity gaps, develop a vision, and set priority objectives in order to become more effective and responsive service providers. The staff considered the status of their organizations in terms of their mandates and of farmer expectations, analysed their capacities to organize and deliver, and developed action plans with a vision, priority objectives, actors of change and progress markers. This helped staff understand the weaknesses of their organization, and while making changes was not easy, it was indeed happening, little by little, with new ideas being presented at monthly meetings and with people beginning to think differently about proposing farmer-responsive and market-focused activities to better incorporate innovation. All three Bangladeshi niche partnerships identified marketing and processing as particular challenges, so the DAM and BAPA were invited to work with the CDAIS team to identify capacity gaps, develop a vision, and set priority objectives to become more effective and responsive agricultural innovation service providers. BARC was also invited because it has responsibility for prioritizing research. As mentioned above, staff from these three organizations considered the status of their organizations in terms of their mandates and of farmer expectations and needs, analysed their organizations' capacities to organize and deliver, and developed action plans with a vision, priority objectives, actors of change and progress markers.

4.2.3. The capacity to coordinate ISSPs

The capacity to coordinate innovation support service providers (ISSP) refers to the deployment of networks of innovation support services at the country level that can support innovative initiatives specific to each region.

In Burkina Faso, this was one of the main core issues at the system level. A mapping of innovation support service providers was undertaken so that the Direction Générale de la Recherche Scientifique et de l'Innovation (DGSRI) could better understand the shortcomings in the innovation ecosystem. Agents were trained in CDAIS concepts and approaches so that they could participate in a workshop on issues of service creation or service coordination with all the service providers. This workshop also allowed the various participants to align their understanding of the innovation concept itself. Some participants stated that their understanding of this concept improved at the end of the workshop.

In Ethiopia, agriculture is becoming complex and is expected to become even more so in the coming years. The number and types of actors in the value chains is increasing,

the missions of the actors are diverse, and the need for interdependency is becoming obvious. In this changing context, smallholders still form the core of all agricultural value chains. And yet, the public research and extension organizations seem to lack a clear direction to engage all the various value-chain actors in their programmes. They are restricted to mainly working only with smallholders, primarily because this is their lawfully assigned mandate. Responding to the changing context is however key to the relevance and effectiveness of public research and extension organizations, simply because the agenda of smallholders would be addressed better if public organizations are able to serve entire value chains. For example, dairy smallholders can have better sales of their products if the intake of the milk processing industries increases. Therefore, the Ministry of Agriculture must have an interest in supporting the development of the private sector actors involved in milk processing. This is however not happening to a sufficient extent, not because the organizations lack interest, but instead due to a lack of knowledge, skills and attitude on the mobilization of relevant actors for collective learning, experimentation and actions. Since it is guided by the innovation system approach, the CDAIS project has taught important lessons in this regard. The capacities developed in the country, the experience in facilitating and managing innovation projects and the documents produced by the project are all assets for the nation. They lay a firm foundation for further initiatives.

4.2.4. The capacity to lead, engage and create bridges between AIS actors

The capacity to lead, engage and create bridges between AIS actors refers to the process of institutionalization and operationalization of AIS thinking: identifying the key AIS-pillar organizations and organizing links between them. This process relies not only on the emergence of a government leader but also on the formulation of concrete goals as part of a wider civil society project such as the promotion of the agro-ecological transition or of healthy agri-food systems.

In Lao PDR, the Ministry of Agriculture and Forestry (MAF) and the Ministry of Industry and Commerce (MoIC) reported an increased capacity to connect and influence actors for better supporting and facilitating production, as they have now a better understanding of the challenges and the importance of addressing them. The National Agriculture and Forestry Research Institute (NAFRI) and the Department of Policy and Legal Affairs (DoPLA) took the lead in the creation of an 'AIS level group', which they involved in a comprehensive AIS assessment in order to be able to create a national vision of and mandate for CD for AIS. Thanks to the specific investment of NAFRI in committing other departments of MAF, the Lao CDAIS project was able to scale out and up. This innovative intersectoral commitment succeeded in improving the institutional and backstopping environment of agriculture innovations. These results will help in better defining the concrete approaches necessary to achieve the TAP goal of creating an 'enabling environment' for agricultural innovation, especially as regards to the emergence of an intersectoral commitment and subsequent action, amongst partners ranging from the national to the local (provincial staff).

In Ethiopia, the organizational coaching stimulated the interest of the leadership of the Ministry of Agriculture and the Ethiopian Institute of Agricultural Research (EIAR) on the concept of innovation support services. Subsequently, the policy dialogue managed to bring on board the right stakeholders, including the State Minister of Livestock, key managers of VDFACA, private sector actors and relevant NGOs. A general consensus has been reached that a drafted directive was considered important enough to be issued by the government. Actors got engaged through the recommendations they made to the government to make the directive more complete and relevant.

In Burkina Faso, the CDAIS project was initially consistent with the national innovation strategy and political agenda on agricultural innovation. However, planned activities were not totally embedded in ongoing activities in the country since the strategy of the project was globally designed without references to the specificity of agricultural innovation challenges in Burkina Faso. Thanks to a step-by-step adaptation of the implementing strategy and the identification of key socio-technical challenges (such as the agro-ecological transition or the deployment of irrigation), the project team managed to use the CDAIS project to pave the way for ongoing innovation processes, and to satisfy on-going capacity development needs. Under the lead of the Ministry of Higher Education, Scientific Research and Innovation (MESRSI), synergies on many fronts were developed with the activities of some 20 organizations which were involved in at least one of the three levels of intervention (niches, service providers, policies).

In Bangladesh, CDAIS was ultimately seen as an approach to support the shift of agricultural policies from intensification promotion to the development of healthy agri-food systems. Climate change, of enormous concern in Bangladesh, is an example of where policymakers are coming together to consider how to support adaptation.

The country's agricultural policy is shifting from a focus on production of food on less land with more inputs to safe, nutritious food along with recognition of the need to involve the private sector and other actors in pre- and post-production activities. CDAIS has created links between farmers, researchers and the private sector, leading to a kind of working culture that did not exist before.

4.2.5. The capacity to formulate comprehensive and inclusive innovation policies and strategies

The capacity to formulate comprehensive and inclusive innovation policies and strategies refers to the process of taking stock of the specific support needs of endogenous and collaborative innovation processes, and the process of designing adequate policy instruments and regulations in dialogue with the actors concerned.

In Honduras, a ministerial agreement was drafted that guarantees future government support to the 'potato' niche, providing the space to the producers to engage in strategic and political processes. Direct communication, supported by CDAIS events and meetings, have allowed the 'potato' and 'beans' niches to become core elements of the programmes of national value chains, co-designed with the Ministry of Agriculture. These niches are now on track to reinforce their legal standing through institutionalized bodies such as the National Chamber of Beans (Cámera de Frijol), which will allow producers to act jointly or collectively in pursuit of improvement in production as well as in accessing national and international markets.

In Ethiopia, a new seed marketing directive has now been enacted and is being implemented at regional level. Problems concerning the arbitrary setting of seed prices have been resolved and the endorsement of the new directive encouraged members of the 'community seed marketing' niche to recognize their role and to feel more confident in the overall development process. Thanks to the policy consultations, members of this niche were able to convince the regional governing bodies to approve the directive within a timeframe of two months. In the 'milk' niche, the establishment of a dairy board under the Ministry of Agriculture was considered an important landmark, in addition to the drafting of a directive on raw and unprocessed types of livestock feed. 'Had the development of the directive been left to the organization, it would not have materialized in so short a time. All the validation phases held during the directive preparation processes were the product of the CDAIS initiative' (quote from a participant in Ethiopia).

4.3. A stepwise CD process from niche to national level

Capacities at the system level were developed thanks to multi-dimensional and multi-level capacity development activities. Through the mobilization of some key individuals from some key AIS organizations in several CD activities at the three levels (niches, ISS providers and policy), the CDAIS project enabled learning on 'how to' identify and support innovation niches (Figure 19). AIS actors changed their perception of innovation processes and they gained insights into new ways of supporting innovation. Transformative learning cycles took place, supported by the involvement of several different categories of AIS actors in niche activities.

All the CD processes were rooted in the activities and learning of the innovation niches. The niches influenced the system toward a more favourable environment for their activities. CD activities at the national innovation system level took time and the first outcomes only appeared during the final year of the CDAIS project. Table 9 summarizes the contribution of CD activities to the development of functional capacity at the system level.

The inception and visioning workshop as a first step in engagement and alignment

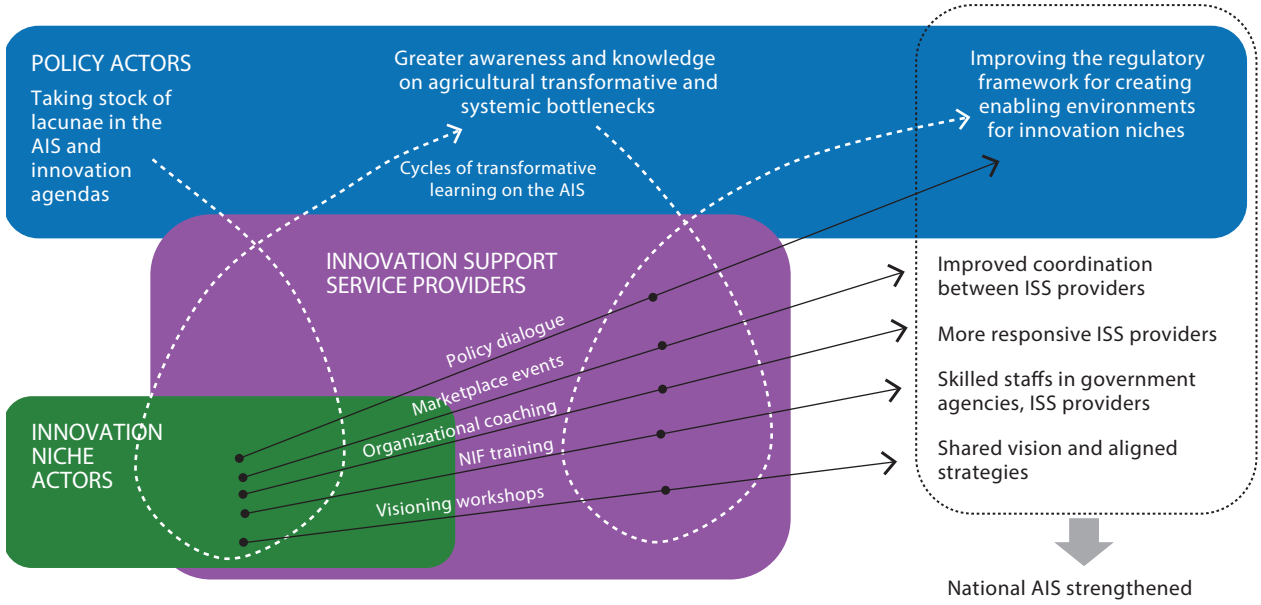
The inception workshop worked as a visioning workshop, where participants took stock of existing lacunae in the AIS and innovation agenda and reached agreements on the needed changes. They came to an agreement on the priority domains of innovation where the changes had to be made. The very diverse categories of actors attending the workshop led actors to make commitments and start thinking on how to align their agricultural innovation interventions and strategies.

The coaching of organizations as a driver for systemic changes

In all the eight countries, the coaching of organizations was a pivotal CD process towards transformative effects on the national AIS.

In Ethiopia, CDAIS's organizational coaching was the activity that was most expected to result in important changes at the system level. Unfortunately, this activity started very late and had not shown significant changes at the system level by the time the project ended.

Figure 19. Capacity development processes that led to the strengthening of the national AIS across the eight countries



Source: Authors.

Table 9. Contribution of CDAIS activities to capacity development at the system level

Functional capacity developed	CDAIS contribution: CD events, approaches and activities that made a difference at the system level
The capacity to lead, engage and create bridges between AIS stakeholders	• Marketplace events • Training on the relevance of facilitation for development in the context of AIS; • Project technical advisory committee and steering committees
The capacity to assess a situation, create a vision and a mandate	• Scoping study followed by the inception workshop • The National Validation Workshop • Preparation phases of the policy dialogue: policy review, consultative workshops • Participation in niche activities and R&R workshops
The capacity to coordinate ISSPs	• Support for platform creation or facilitation • Mobilization in the niche's activities and support for partnering • Training for organizations on brokering strategic partnerships and networking • Training for organizations on stakeholder mapping
The capacity to formulate comprehensive and inclusive innovation policies and strategies	• Policy dialogue process
The capacity to organize and deliver in a responsive manner	• Organizational coaching • Training on how to implement incubation activities for innovative entrepreneurs

Source: Authors.

In Bangladesh, it was acknowledged that through this process, ISSPs got to understand the weaknesses in their organizations, and though not easy, change is indeed taking place little by little. New ideas were presented at their monthly meetings, and people started thinking differently. The work at the niche level actually built the capacities of organizations which, in turn and consequently, changed their vision and practices. This is an illustration of how a niche can influence a system.

In Guatemala, the CDAIS project implementers considered organizational training to be an integral and necessary aspect of improving agricultural innovation systems. However, the organizational training activity began only in the 4th year of the project, which resulted in limited time to observe changes in the behaviour of the organizations participating in this training activity. However, in the final workshops organized with the organizations, they described results at the organizational level resulting not only from their involvement in activities at the organizational level, but also from their participation in activities at the niche level (multi-actor alliances organized around a specific value chain: beans, honey, avocado or cocoa). The impact of these niche-level activities was even more prominent when a member of the organization had acted in the capacity of niche facilitator.

The performative power of the NIF training programme

The NIFs were trained both through classroom sessions and through learning-by-doing, as part of the coaching of innovation niches. NIFs from research centres and government agencies received significant exposure to new ways of working. As researchers or public servants, some NIFs had had limited opportunity to meet and work with farmers at this level and intensity as equals. Although some did feel outside their comfort zone at times, they all felt that their learning from CDAIS had been invaluable and all stated that they would use the approach in their everyday work.

In Ethiopia, technical experts (e.g. agronomy, breeding, veterinary sciences) and those involved in R&D have limited soft skills such us as facilitation, advocacy, networking, use of participatory learning tools, etc. Training in soft skills provided by CDAIS quickly improved NIF capacity and even influenced some of them to assume new roles as facilitators instead of remaining as subject-matter specialists. The lesson is that governments have to expand resources and provide training on soft skills to R&D workers in order to improve their skills and also to change their attitudes. This will help them move from a narrow discipline-oriented engagement to a participatory approach in which they can share their knowledge and also learn from other actors in the system.

In Bangladesh, the Bangladesh Academy for Rural Development (BARD) provides capacity development training to government development officials, including to staff from the Department of Agricultural Extension (DAE) and NGOs. BARD personnel did have some important and relevant skills but were little used to working with and listening to farmers and supporting their solutions (it is not their duty to interact with farmers, that is the role of extension officers). In the training sessions on innovation and personnel management development, functional skills were developed that will be a helpful tool to develop the capacity of these officials. As BARD personnel were trained as NIFs, they can ensure that BARD will incorporate the CDAIS methodology in its work. This process will help promote CDAIS methodology. The CDAIS National Project Coordinator at BARC was promoted to Director of Manpower and Training, which may help maintain the importance of functional capacities in the future.

Marketplace events

Marketplace events were organized to connect innovation support service providers with innovation niches, matching demand and supply. On the one hand, they offered the opportunity to policymakers to learn about existing innovation ecosystems as well as to learn about new ways to connect innovation actors to each other. On the other hand, marketplaces also offered the opportunity to ISS providers to meet and perceive their mutual interest in supporting some of the innovation niches. Marketplaces thus acted as bridging and learning events at the system level.

Policy dialogue as a stepwise process

In general, the policy dialogue was organized in a stepwise manner and promoted as a collective and joint decision-making process. Members of the innovation niche partnerships were inspired by the policy dialogue processes and came to understand the policy context and the pros and cons of the formulation, implementation and enforcement of policies, laws and regulations affecting innovation in their particular sector or value chain. The joint engagement of actors with technical and managerial roles allowed them to advocate for policy related issues in a holistic manner. The power of actors increased through an iterative process of preparation, review and validations. The actors became more aware of the role they played – and understood it better – and what they could do to achieve better results. And, consequently, the capacities of individual actors to connect with and to influence policymakers can be claimed as an important outcome of the policy dialogue. The involvement of local/niche level policy actors in the innovation niche partnerships was an effective way to

influence policy processes because local authorities are closer to the other actors of the niches and are better able to understand local needs. However, it was also important to invite national decision makers to the local territories so that they became acquainted with ground realities.

An overall outcome was the strengthening of trust and confidence. Actors acquired a sense of responsibility and accountability, as well as awareness of the roles played by different actors, which in turn optimized the use of resources and efforts, and improved the performance and competitiveness of the niches.

Leaders and outsiders as key factors of the success of CD at the system level

Collective CD activities played an important role for generating outcomes at the system level. However, in each country, it was noted that some individuals played a decisive role either as a leader or as an outsider.

In Bangladesh, the lack of leadership at the national AIS level hindered the take-off of the CDAIS approach, whereas in Lao PDR, the leading role played by the NPC was decisive.

In Burkina Faso, the leading role of the ex-minister of agriculture was key to engaging the 'right' actors in national events such as the marketplace and the policy dialogue. Moreover, since he was retired and the former head of the national agricultural research centre, he acted as an outsider in the multi-stakeholder workshop, and was free and had a legitimacy to criticize the actions of the government and to make recommendations.

Some non-traditional actors from the private sector who were invited to meetings and events took the opportunity to reflect on the ineffectiveness of the agricultural innovation system and to make breakthrough recommendations.

The identification and mobilization of outsiders and leaders were also a very important 'CD activity' led at the system level by project implementation teams.

4.4. Improvements in the enabling environment of niches

The changes at the system level were hard won and occurred late in the project given that multiple activities at the different level (niches, organizations, NIF and policymakers) had to be completed.

As a consequence, expanded outcomes and impacts at system levels were quite weak or non-existent at the end of the CDAIS project. We instead identified possible future contributions of the knowledge gained by AIS actors to the improvement of the enabling environment of innovation niche partnerships.

In Angola, the CDAIS beneficiaries thought that the process of capacity development for innovation should be inclusive and participatory, and that attitudes cannot change in a short time, so it is necessary to be more insistent and expand the territorial reach. Similar conclusions were reached in Bangladesh, where the majority of actors emphasized the long and slow process and therefore the lack of significant changes observed.

In Ethiopia, the project was not immediately able to influence the institutionalization of the approach within the public research, education and extension organizations. The recently begun work on organizational capacity development of the CDAIS, which primarily targeted EIAR and the Ministry of Agriculture was relatively instrumental in achieving this goal, but the project ended before it displayed substantial results in this regard.

However, we observed that important outcomes occurred at the level of the CDAIS implementation country teams (Agrinatura focal point together with project manager, NIF and project coordinator) concerning the understanding of systemic bottlenecks and possible pathways of change. The country teams came up with refined CD strategies at the system level at the end of the project. Also, a body of evidence pointing to primary impacts in the enabling environment of niches was collected at the end of the project.

4.4.1. Unlocking of the niches' business environments through policy alignment

Some actions were taken to unlock the business environment of niches.

In Ethiopia, after discussions during the policy dialogue event, the Ministry of Education agreed to incorporate milk in the national school meals strategy. The recent school milk day organized by niche members at Menilik School in Addis Ababa was evidence of a remarkable attitudinal change: milk was considered the most essential and accessible food item for school children. Some donors expressed interest in funding a pilot project on milk in school meals and a fundraising committee was set up.

A major change in policies and regulations was observed with relation to the 'Listado Taxativo'[7] in Guatemala. The tax burden on honey producers already included value added tax and income tax. When the listado taxativo act was first drafted, it was believed that bees pollute the environment, so beekeepers were required to pay 5000 Guatemalan Quetzal (equivalent to USD 650) annually, which represented a big burden for them and prevented them from being competitive. This was discussed during the national policy dialogue, and CONADEA, through the authorities of the Ministry of Agriculture, Livestock and Food (MAGA), initiated a discussion with the ministry about the negative implications of the listado taxativo for the honey value chain.

In Honduras, the coffee niche benefitted from the creation of new coffee markets through the departmental 'aroma y cultura' coffee fairs, as well as special coffee competitions, with the support and involvement of local authorities. In addition, the participation of producer groups in the different policy dialogue events with government authorities and with the Food Security Commission made possible the signing of the framework agreement for potato competitiveness. The membership of the mayor's office in the innovation niche partnerships was key in making this happen.

4.4.2. Unlocking of the niches' technological environments through better articulation with the research sector

Across the eight countries, a major expanded outcome at system level pertains to the linkages between the research sector and the productive sector. The CDAIS approach provoked or initiated a paradigm shift in the way agricultural research is conducted: several research centres acknowledged that they must open up to society, open laboratories, support the insertion of researchers in innovation ecosystems, encourage them to co-create with public, private or civil society actors looking for new ways, and help them leverage the results of their research in the best possible way, especially in the context of value creation projects.

4.4.3. Increased visibility and responsiveness of ISSPs

The CDAIS project enabled the dissemination of the concept of innovation support service providers, and made them visible during national events and the niches' activities.

At the same time, organizational coaching of selected ISS providers enabled their strengthening and increased their capacities to provide responsive services.

Different types of innovation support organizations were identified and selected in each country, ranging from traditional research, education and extension organizations from the public sector, to intersectoral coordination bodies, to private incubators specialized in innovation support.

Three main capacities needed by ISS were identified and developed through the coaching process: the capacity to organize, the capacity to deliver in a responsive manner, and the capacity to relate with other ISS providers.

The results of this building up of organizational capacity were very heterogeneous, ranging from almost no observable effects to impacts on the vision, strategy and actions of the organization. This wide range of outcomes was mainly due to two factors.

First, coaching processes started very late in the project and ideally required more time and extensive work. The type of coaching skills differed from the niche level, which required the identification and training of new profiles of facilitators for the setting up of the CDAIS coaching team.

Second, the challenges of supporting coordinated ISS providers around a niche was not anticipated, because this CD level was not included per se in the TAP Common Framework, but embedded in the level of organizations.

However, the capacity need assessment phases helped to provide insights into the challenges of developing adequate innovation support services at the local and the country levels and of developing the capacities of such organizations. The identified organizations were generally specialized in a single type of support to innovation niches: support during the prototyping phase (incubation), support during the experimentation phase (action-research project), or support during the scaling-up phase (extension services). In addition, some support services were organized along innovation domains (e.g. digital agriculture, organic farming, irrigation, or cassava value chain) or only operated in particular geographic areas, which brought to light to the existence of 'mission-oriented' ecosystems of innovation support services.

[7] This environmental impact tax was introduced through Government Agreement 137-2016, in order to reduce environmental contamination and maintain the ecological balance.

Based on this observation, the project's implementers identified the need for supporting coordination and partnering among ISS providers, hence strengthening or developing local ecosystems of support services around niches. Ideally, this need should have been determined right at the beginning of the project in order to better identify existing ecosystems of support services to work with. In addition, it would have been necessary to include this question of coordination and partnering in the policy dialogue in order help create the enabling institutional environments for ISS providers to improve their services (accessibility, responsiveness).

These dimensions and challenges were not anticipated by CDAIS project implementers because they were not included in the TAP Common Framework. As a consequence, a main outcome of the project is a new vision and approach designed by project implementers for developing ISS and ISS providers' capacities, hence sustainably strengthening AIS at local and national levels.

4.5. Institutionalization of the AIS approach

CDAIS paved the way towards the institutionalization of the AIS approach in the pilot countries. Two main perspectives can be drawn in this regard across the eight countries: supporting grassroots innovations as an alternative to the transfer of technologies, and setting up an inter-ministerial or inter-sectoral body in charge of a national agricultural innovation strategy.

Supporting collaborative grassroots innovation as an alternative to the transfer of technology approach

Tracking, selecting and coaching innovation niches enabled AIS actors to acknowledge the existence and multiplicity of endogenous innovation initiatives. The promotion of ISS providers during the marketplace events shed light on national capacities to support such grassroots initiatives. Policymakers gained insights into local innovation ecosystems that could produce efficient solutions to national problems. The policy dialogue paved the way for the different actors to know each other's roles, scopes of engagement, limitations and their respective contributions to the supply chain. The participation of grassroots practitioners in the consultation process ensured alignment of policies with local solutions, and the weak linkages that existed between various administrative tiers were significantly strengthened.

In Angola, for example, before the CDAIS project it was generally understood that innovation applied only to major technological changes. There was no knowledge about social and organizational innovation or how it should be monitored. NIFs are now capable of identifying different types of innovation, from the simplest to the most complex.

In Bangladesh, the recently formed National Technology Transfer Coordination Committee, coordinated by BARC, explored the possible avenues for taking the CDAIS approach forward. There is now a plan to include fish and livestock farmers, as well as agro-processors, farmer representatives and other actors.

In Ethiopia, the Ministry of Agriculture was the main ministry engaged in CDAIS activity, but it became apparent at the end of the project that engaging the Ministry of Technology and Innovation would have been a better approach to contribute to system-level changes. But this ministry was going through a re-organizational process towards the end of the CDAIS project and little effort was made to bring it on board. Future innovation-related national projects should involve this ministry in order to be able to make important system-level changes.

The need for coordination committees, platforms or inter-ministerial cells at the national level

Many of the eight pilot countries did not have well established and/or functioning multistakeholder partnership mechanisms at the national level that could be co-opted for capacity development. Creating time and space at the national level for stakeholders to come together and learn was very challenging and took considerable time.

In Bangladesh, for the CDAIS approach to take off, further input is needed to enable policymakers, ministry officials and key stakeholders to come together to assess what has been learned and develop an action plan to support national policies and goals. A bid should be considered for the EU 'Development-Smart Innovation through Research in Agriculture' programme, or similar programme, for resources to bring people together to prepare a project proposal for government and donor funding. A CDAIS coordinator should be appointed in BARC, such as a member of the Innovation Cell who was involved in the CDAIS project's activities of institutional strengthening.

In Angola, the importance of farmer organizations (private entities) and their articulation with the State in order to create a strong rural extension programme at the national scale was one of the issues discussed during the policy

dialogue. The creation of a multi-actor platform to help the implementation of the extension programme to boost agriculture innovation was also suggested.

In Guatemala, as part of the National Innovation System, CDAIS promoted the formation of the National Platform for Agricultural Innovation to support the existing 'National Subsystem for Research, Innovation and Technology Transfer' (SNITA). This nascent platform comprises representatives of innovation initiatives from both the public and private sectors. With the start of the CDAIS project in El Salvador at the end of 2018 and with the experience gained in the respective projects in Guatemala and Honduras, discussions have been held with IICA, CDAIS Honduras and El Salvador to present a proposal for an agricultural innovation platform with a wider regional scope.

5. INSIGHTS FROM COMPARING IMPACT PATHWAYS

We identified not only different impact pathways but also different speeds of generation of outcomes at both the niche and system levels. The comparison of patterns of context-mechanisms-outcomes helped us to identify an overarching *ex-post* impact pathway of CDAIS intervention. Based on these findings, we draw some lessons on the 'best ways' to achieve transformative changes at AIS level in a diversity of contexts.

5.1. CDAIS *ex-post* impact pathway and refined Theory of Change

Figure 20 shows the *ex-post* CDAIS impact pathway and associated theory of Change (ToC) which emerged from the comparison and merging of the eight country *ex-post* impact pathways. The three levels where it was possible to observe and measure outcomes, with a high probability that CDAIS was responsible, are the innovation niche partnerships, the organizations that provide innovation support services, and the policy actors (including both individuals and organizations).

The following sections provide insights into each segment of the impact pathway as well as the rationale of the *ex-post* ToC.

5.1.1. CDAIS *ex-post* impact pathway

In this section, we provide insights into the level of contribution of the CDAIS project all along the impact pathway. We note the main hindering factors as well.

Project outputs are the CD activities conducted at the niche level, at the level of organizations and at the policy level. Through a continuous coaching process and policy dialogue process, the CD activities contributed not only to primary outcomes but also to expanded outcomes.

The primary outcomes mainly concern individual and collective learning about AIS thinking, open innovation, responsible innovation, and multistakeholder challenges. The collective dimension of these kinds of learning is crucial for changing the frame of reference in which individuals and organizations plan their activities and strategies. They are well known as transformative learning (Mezirow, 1991). By acknowledging, during multistakeholder workshops or activities, that functional capacities are needed and that innovation is not going to happen without changes at a system level, incentives and motivation were created for individuals and organizations to change the ways they act. Furthermore, the need for new knowledge, preferentially evidence-based knowledge, on how AIS thinking and approaches enhance agricultural innovation was recognized. Hence, CD interventions based on training, experiential learning and knowledge production were key at this stage.

Knowledge, motivation and empowerment through bridging opportunities create all the conditions for engagement towards more sustainable transformation at the level of organizations. In other words, it opened the door to possible expanded outcomes, which corresponded to concrete changes in how the organizations work, and in what they deliver as services, regulatory frameworks or knowledge.

The transition from primary outcomes to expanded outcomes was pushed or supported by CDAIS interventions through the coaching process, bridging activities, policy dialogue and national platform support, if not 'pulled' by the organizations themselves in some countries. However, it always required the mobilization of the organizations' own resources, such as the mobilization of their staff for internal activities. The lack of resources of some organizations impeded the transition from primary to expanded outcomes in some countries.

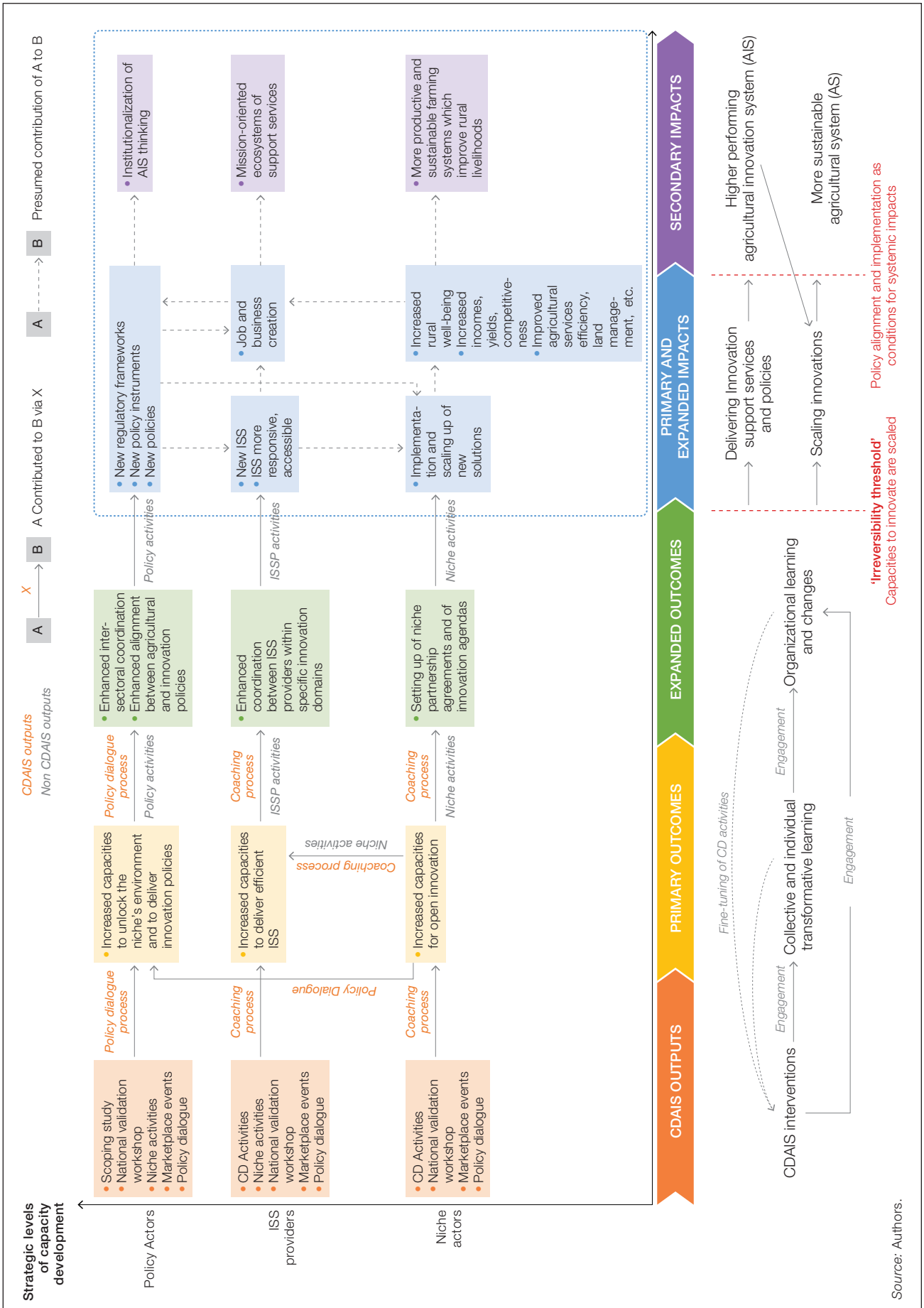
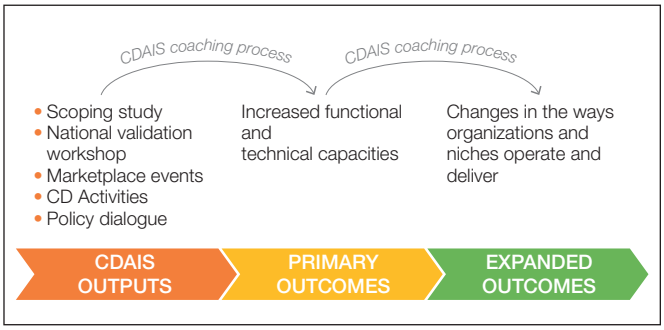


Figure 20. CDAIS ex-post impact pathway (top diagram) and Theory of Change (bottom diagram) at the country level

Source: Authors.

Figure 21. From outputs to outcomes



Different types of Impacts

We distinguish primary and expanded impacts from systemic impacts.

Primary impacts are concrete changes in the delivery of adequate innovation support services and policy frameworks, and in the implementation and scaling up of innovations.

Expanded impacts are concrete changes concerning social, environmental or economic issues to which primary impacts may have contributed. The expanded impacts identified by CDAIS partners mainly concerned changes in agricultural production (increased yields, incomes, productivity or competitiveness). Impacts on business and job creation (new opportunities for innovation facilitators and coaches in existing incubators) were also identified in some countries.

The contribution of primary impacts to expanded impacts was not so obvious. Even if some innovations had immediate effects in the form of increased yields, incomes, productivity or competitiveness, no conclusion can be made regarding their contribution to improved livelihoods, gender equity, the quality of life, well-being or environmental sustainability. For example, gender issues were not comprehensively tackled in any of the niches.

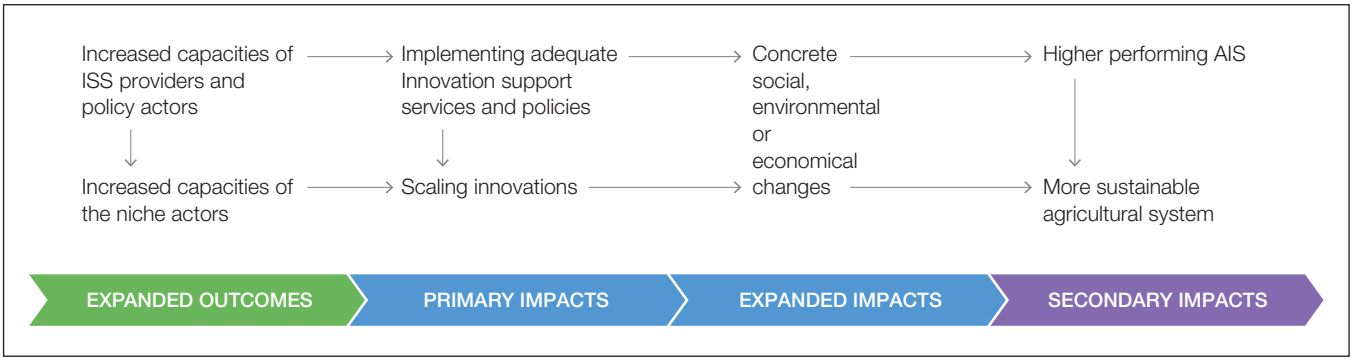
In line with the multidimensional impacts of the CDAIS project, systemic impacts fall into two domains: on the one hand, impacts on the 'performance' of the agricultural system (AS) as regards social, environmental and economic issues, and, on the other, impacts on the 'performance' of the agricultural innovation system (AIS) in terms of its ability to deliver responsible and purposeful innovations.

The timeframe of the CDAIS project was too short to observe impacts with any certainty. Thus linkages of contributions are primarily assumptions based on a range of indications made by country teams.

From expanded outcomes to primary and expanded impacts

At the level of policy actors and ISS providers, the delivery of new services or new directives was sponsored by the organizations themselves, or with the support of other development projects. The contribution of the CDAIS project to the transition from expanded outcomes to primary and expanded impacts was therefore more indirect. However, with more time and more funds, CDAIS intervention could also have supported these transitions, still using the same principles and methodologies of coaching and implementation of CD activities. That would undoubtedly have accelerated and better shaped primary impacts. As the project ended in most countries at this stage of early primary

Figure 22. From outcomes to impacts



impacts, it remains difficult to confirm the contribution of these new services or regulatory frameworks to the increased incomes or yields reported by the niche actors. Based on their statements, CDAIS played a prominent role. However, further insights based on additional *ex-post* assessments would be necessary to determine the project's exact contribution in this regard. Other projects running simultaneously may have played also an important role.

From primary and expanded impacts to systemic Impacts

Systemic impacts concern both the national agricultural innovation system (more responsive and relevant, more efficient, more effective) and the agricultural system (more sustainable).

At the level of the national AIS, the changes initiated pertained to the institutionalization of AIS thinking. In some CDAIS countries, there were no agricultural innovation policies as such. The CDAIS project helped in some ways to raise awareness among policymakers on the need to have specific policy instruments for enabling agricultural innovations. This was the first step toward a well-established innovation system. In countries in which some innovation policy instruments were in place, it was a matter of making them more efficient and responsive to the needs of the niche actors.

Support for organizations providing ISS also initiated systemic changes through new coordination initiatives between ISS providers. Some organizations adopted a vision for the setting up of a 'mission-oriented' ecosystem of support services. They were driven by innovation agendas that the niche actors set for themselves. In some cases, proposals were made to anchor such ecosystems in a geographical area in which innovation domains have been prioritized with farmer communities.

At the level of the agricultural system, innovations concerned several aspects such as farming systems, the processing industry, or breeding systems.

The duration of the CDAIS project did not allow us to observe true transitions toward systemic impacts. We cannot be certain whether the outcomes resulting from CDAIS were sufficient to enable such a transition even after the project. We looked for a 'threshold of irreversibility', which could be a number of outcomes that ensure that impacts would happen without the support of an additional CDAIS project. We assume that outcomes might be reversible if the CDAIS beneficiaries (individuals or organizations) do not have an external incentive – or overall favourable conditions in their environment – to put their newly acquired functional capacities into use. In the early stages of the project, CDAIS implementers played this incentivising role which triggered the engagement of AIS actors (see Figure 10: The engagement wheel (source: authors). CD activities undertaken by the project aimed at creating the conditions for learning and acting in a transformative way, i.e. to innovate in a collective manner, responding to farmers' needs and ensuring impacts.

It is expected that external incentives are less needed as the AIS is strengthened towards providing these favourable or enabling conditions. Accordingly, the influence of the CDAIS project should decrease as a growing number of AIS actors – including at institutional and policy-making levels – take ownership and control of the CDAIS approach themselves.

We assume that at a certain point – which may vary from one country to another – the threshold of irreversibility will be crossed and ensure the strengthening of the AIS as a whole.

We presume that this threshold is reached once transformative learning of individuals and communities have been translated into new visions, strategies, practices and routines of some key pillar AIS organizations. These pillar organizations are the ISS providers, including some traditional AIS organizations (research, extension and higher education organizations). Transforming these organizations is at the core of sustainable systemic change. The type of organizations to target may vary from one country to another. In some countries, research organizations play a greater role in agricultural innovation than extension organizations; in some countries, the situation is reversed. In other countries, NGOs play a predominant role. The respective roles of these entities in supporting innovation have to be properly assessed in advance.

An example from Ethiopia is provided in Box 3.

5.1.2. CDAIS *ex-post* Theory of Change

The contribution analyses allowed us to draw a Theory of Change of the CDAIS project (Figure 23), which is anchored in learning and behavioural change theories.

The 'engagement wheel' described in Section 3 (Figure 10, page 34) plays a central role in explaining the CDAIS project's impact pathways, and in particular the transition from primary to expanded outcomes.

The transformative action resulting from functional capacity development proceeded from a greater individual awareness which reinforced the actors' confidence, the collective experimentation which built trust and refocused

Box 3.

The transformation of public research, education and extension organizations as a key expanded outcome toward sustainable systemic changes - Example from Ethiopia

Agriculture in Ethiopia is becoming more complex. The number and types of actors in agricultural value chains is increasing, the missions of the actors are diverse and the need for interdependency is becoming obvious. In this changing context, smallholders still form the core, so to speak, of all agricultural value chains. However, public research and extension organizations seem to lack clear a direction to engage the various value-chain actors in their programmes. By legal mandate, they are mainly restricted to working with smallholders. Responding to the changing context is however critical to these organizations, simply because the agenda of smallholders could be addressed better if public organizations are able to serve the entire value chain. For example, smallholder dairy farmers can increase sales for their products if milk processing industries increase their intake. Therefore, the Ministry of Agriculture must have a stake in supporting the development of the private sector actors in milk processing. This is however not happening, not because public organizations lack interest, but rather due to the lack of knowledge, skills and attitude on the mobilization of relevant actors for collective learning, experimentation and action. The CDAIS project, since it is guided by the innovation system approach, generated important lessons in this regard. The capacities developed in the country, the experience in facilitating and managing innovation projects and the documents produced by the project are all assets to the nation. They lay a foundation for further initiatives in this regard. Unfortunately, the project did not have sufficient time to influence the institutionalization of the approach in public research, education and extension organizations. CDAIS's activity of organizational capacity development, which primarily targeted EIAR and the Ministry of Agriculture, was instrumental in working towards this goal, but the project ended before substantial results could be observed.

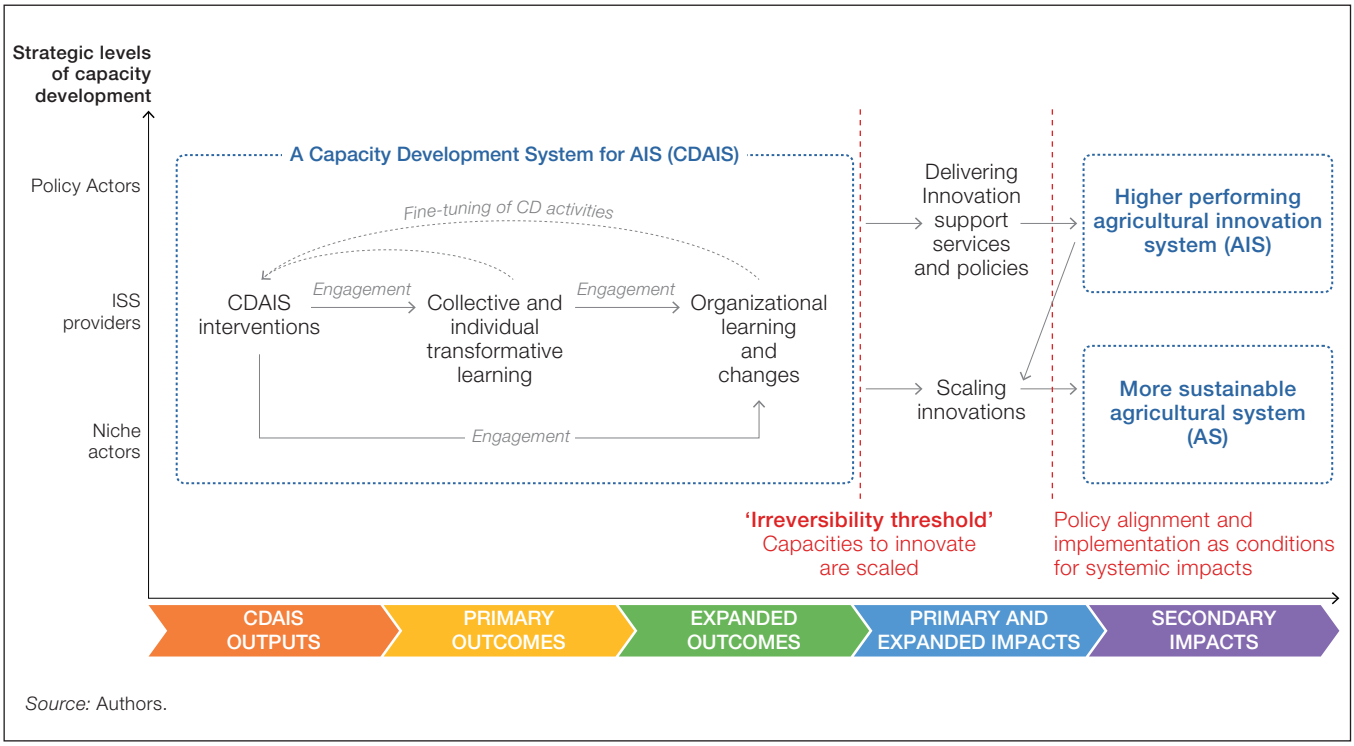
the innovation's purpose, and an engagement of more diverse types of actors which led to scalability of the AIS and made it more conducive to innovation. Transformation was achieved by bringing actors together to interact over a common objective or challenge, under the coaching of facilitators (themselves outputs of the project), while simultaneously informing this interaction with external knowledge (assessments, training, information, advice), analysing progress and providing it back to the actors, thus finally generating endogenous knowledge, motivation and empowerment (primary outcomes).

As these primary outcomes increased and consolidated, the whole group could – based on an equal footing and reinforced trust – further analyse and refine the innovation's purpose. This, in turn, provided bridging opportunities to reach out – with stronger confidence and increased ability to manage their innovation agenda and strategy – to other actors who were outside the initial boundaries, but who needed to be integrated (or had to be interested) to better achieve the evolving objectives. This asserted momentum provides the conditions for expanded outcomes, inducing changes at the policy level through dialogue and advocacy.

Expanded outcomes in the form of improved capacities therefore happened at the level of niches, leading to the delivery of innovation and primary impacts in the agricultural system. In parallel, these capacity development outcomes at the level of policymakers and organizations led to the delivery of improved innovation support services. On a global *ex-post* AIS pathway, these primary impacts are expected to generate longer-term impacts (improved livelihoods, gender equity, the quality of life, well-being or environmental sustainability) and systemic impacts with the transformation of the agricultural system supported by regular delivery of innovations, themselves more likely due to the improved performance of the AIS.

These results show that the original TAP CF perspective, according to which niche actors are supposed to adapt and engage in the 'dominant socio-technical regime' in order to scale innovation, was not entirely relevant. On the contrary, each niche actor- singular succeeded in improving their environment through the involvement of national AIS actors in their niche activities hence influencing support service delivery and policy processes. This process enabled a scaling of capacities to innovate, encompassing both

Figure 23. Ex-post-Theory of Change of the CDAIS project



Source: Authors.

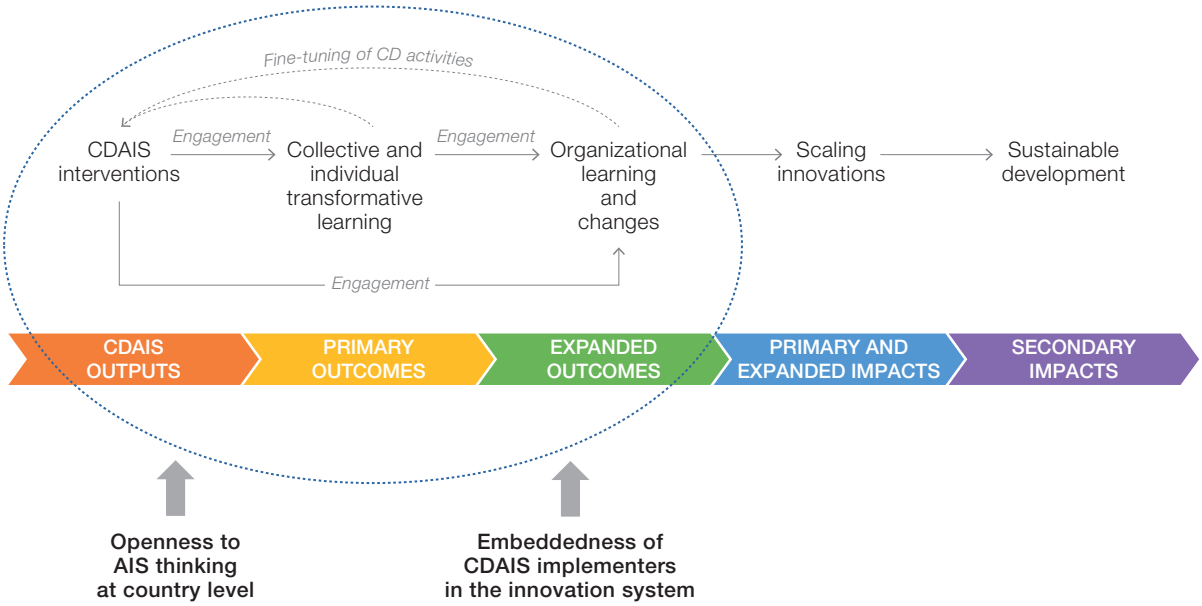
functional and technical capacities, at three strategic levels in a triple pathway where the niche plays a central triggering role to change the upper levels, where the ISS providers bring sustainable structural changes in the AIS with new ISS, and where policy actors adapt and adjust the regulatory framework to the needs of innovators and ISS providers, hence creating an overall enabling environment. This result provides new insights into the theories of transformation and the importance of identifying and reaching a threshold of irreversibility beyond which the CDAIS project will continue to spread its effects.

We gained new insights into interrelated changes between three systems: the Agricultural Innovation System (AIS), the Agricultural System (AS), and the Capacity Development for AIS system (CD for AIS). The CDAIS approach worked as a system in itself, proposing an architecture of resources, methods and inter-connected organizations with the common purpose of developing CD for AIS. The NIF network, the coaching teams and the embedded governance of the CDAIS project into national AIS played an important role in structuring this system. Outcomes and impacts were not the results of project staff alone, but instead those of the efforts of multiple individuals and organizations that purposefully spearheaded changes and mobilized cooperation through incentives developed by project staff.

We demonstrated that this CD for AIS system can lead to impacts at two levels: the AIS level and the Agricultural System level. The CD for AIS system is meant to create a high-performing national AIS, but it has necessarily to pass through the implementation of innovations with concrete positive impacts on farming systems in order to actively engage AIS actors in systemic changes.

The fact that these actors were funded by an international donor within the framework of a short-term development project raises the problem of this system's sustainability. Given that some countries hardly exceeded the threshold of irreversibility, this CD for AIS system should stay in place, if changes to the AIS are to be sustained. Options proposed by the CDAIS project implementers to consolidate these changes include the creation or the strengthening of organizations whose mandate is to support innovation niche partnerships (such as incubators). These organizations could take up the role played by the CDAIS project, therefore continuing with coaching services, training innovation facilitators or organizing bridging events such marketplaces or policy dialogues.

Figure 24. Catalyzing contextual factors of the CDAIS project's impact pathway at the country level



Source: Authors.

5.2. Catalyzing contextual factors

Several CDAIS beneficiaries noted how difficult and lengthy was the capacity development process that CDAIS was trying to push. In Angola, they perceived that the process of capacity development for innovation should be inclusive and participatory, and that changes in attitude cannot be achieved in a short duration, so it is necessary to be more insistent and expand the territorial reach. In Bangladesh too, the majority of CDAIS beneficiaries emphasized the long and slow process behind the limited changes observed.

We identified two types of contextual factors that may accelerate impact pathways and even multiply the impacts of the CDAIS project on the transformation of the national AIS (Figure 24):

- the degree of openness to AIS thinking at the country level;
- the degree of embeddedness of CDAIS project's implementers in the existing innovation system.

5.2.1. The degree of openness to AIS thinking at the country level

Most importantly, the CDAIS project did promote 'AIS thinking' in the eight countries.

The levels of understanding and appropriation of the 'AIS approach' or 'AIS thinking' over the duration of the project varied across the countries.

For instance, in Bangladesh the project's functioning was initially hampered by a lack of understanding of the relevance of the CDAIS approach and unfamiliarity with projects supporting extended dialogues, reflection and analysis rather than providing technical training or technologies. At the beginning of the project, the need to invest in strengthening functional capacities was not recognized by those used to the traditional technology transfer model.

It appears that the degree to which the transfer of technology model was entrenched in a country and the exposure of innovation actors to more collaborative and inclusive innovation approaches before CDAIS project were key in determining the ease of implementation of CDAIS and the speed of generation of outcomes.

The prevalence of the ToT model

In Bangladesh, the transfer of technology (ToT) model influenced thinking on how innovation takes place. In this model, technologies developed by scientists are assumed to be passed to extension services to be transferred to users

in a unidirectional process. This limits the engagement of farmers in identifying constraints and their ability to ask for support to address these constraints. Limited resources for innovation have also led to a focus on better-resourced, commercially oriented farmers, mainly male. Agricultural research and extension systems tended to be organized around scientific disciplines and specific sub-sectors rather than farming systems, while farmers had to grapple with a complex interaction of crops in three cropping seasons, as well as fish farming and livestock husbandry, to achieve the multiple goals of household food security, income generation and maintaining the quality of their resources.

The public extension system had limited reach with smaller producers (especially in fish farming and livestock husbandry) and had limited communication with the research institutes, and private-, NGO- and donor-funded projects supporting farming sectors. The national agricultural innovation system did not really exploit systemic interactions. Public-private links were limited. Links between research entities, whether public and private, and universities were underexploited in the support of agriculture and stakeholder adaptation when challenges or opportunities occured. The NGO sector worked with some of the poorest farming households, particularly women, but there was no national forum to link them with public service providers.

Former exposure to open innovation approaches

In Burkina Faso, where multistakeholder innovation platforms have existed for the past 15 years, multiple actors were engaged in a collaborative process quite quickly after the first stage of the capacity needs assessment (CNA). Researchers, extension workers, NGOs, and some private companies were familiar with each other and quite comfortable in sharing their views during the problem assessment phase.

For example, during the CNA of the 'land charter' niche, several crucial problems pertaining to the capabilities of government departments to coordinate were raised and discussed in the presence of all those directly concerned. The niche actors mentioned some perverse effects of development projects which were impeding the appropriation of a national strategy for the scaling up of local land charters. These actors exhibited a high level of functional capacities, gained from numerous previous interventions. It was acknowledged by the niche's host that the CDAIS project would not really be able to help this niche actors: even though the CNA was considered a valuable exercise, a larger initiative was required, supporting training and coaching of numerous municipal teams in charge to implement the new 'Local Land Charter' instrument. In addition, a focus on organizational capacity strengthening appeared to be more useful for some of the actors. In this type of niche, where collaboration capacities are already well developed, the challenge is more about consolidating the capacities of key leading organizations rather than supporting interactions among the niche actors.

Unsurprisingly, it was easier to work in countries where the concepts of AIS, capacity development and working with farmer organizations and multistakeholder platforms were already established and where there was a recognized need for a national vision of CD in AIS. In contrast, it was challenging to explain the purpose and benefits of CDAIS in countries where AIS thinking was less developed. In such countries,the development of the transfer of technology model, delivered by state-funded researchers and extension officers, and the limited practice of extension and research playing a supporting role to value-chain actors hindered the implementation of the CDAIS project.

5.2.2. The degree of embeddedness of CDAIS implementers in the existing innovation system

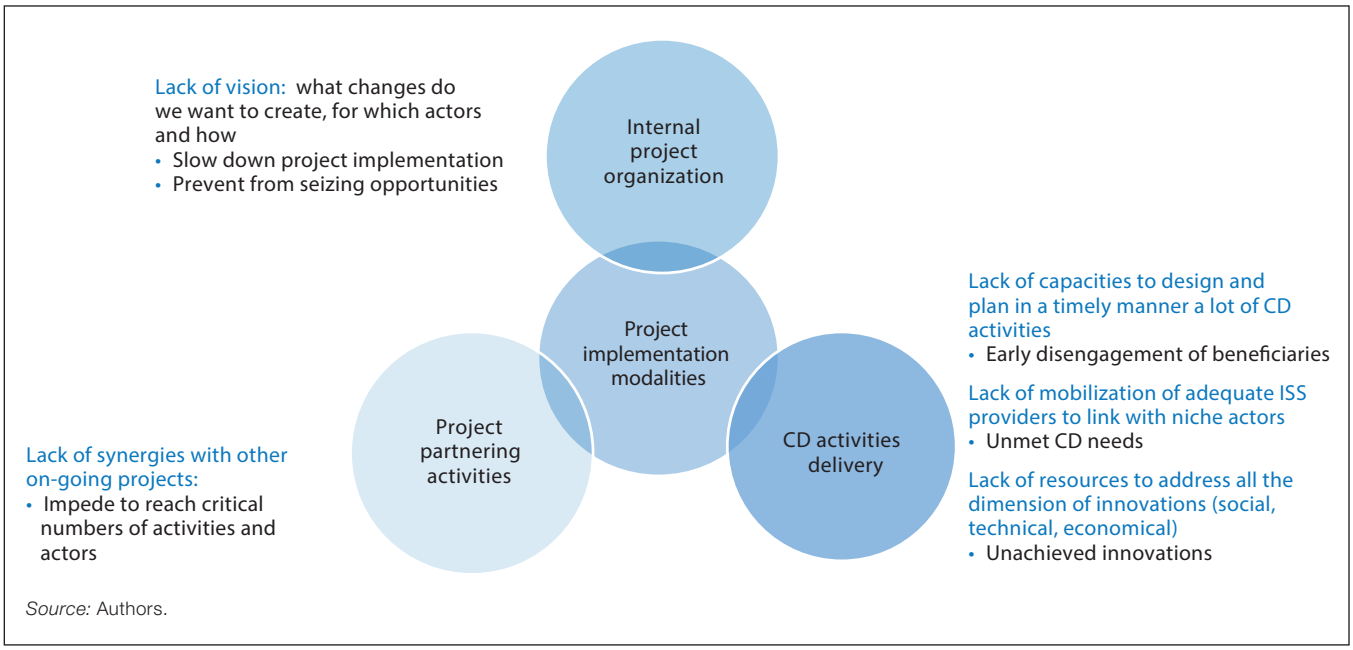
The cross-country analysis taught us that the more the project managers, the NIFs and coaching team staff were individuals in key positions and with some power in the existing innovation system, the more the CDAIS project was able to achieve expanded outcomes. This observation refers to the notion of organizational embeddedness of projects (Lawrence *et al.*, 2002).

Embeddedness of CDAIS country management teams

In Bangladesh, which is a patriarchal country, men are unaccustomed to working with women as equals. However, the CDAIS project management team was over 70 percent female. The reluctance of Bangladeshi men to work with women was thrown in sharp relief when a male European trainer was brought in. The male NIFs reaction towards him was very different; they bonded with him immediately.

This story tells us that for transforming a system, it might be a more efficient strategy to use a more evolutionary and step-by-step process, as outcomes emerge and mindsets and practices change. In Burkina Faso, an influential former agriculture minister, who was also a former head of the public agricultural research institution, was involved in the main bridging activities at the niche and system levels in order to facilitate them and also to encourage actors to

Figure 25. Hindering factors of the CDAIS impact pathway at the country level



Source: Authors.

engage with the project. After attending several of the project events, he declared that what he learnt there made him totally change his mind on the best ways to undertake agricultural research and to innovate. He realized that demand-driven and process-led approaches at the niche and policy levels were important approaches, which in turn called for research organizations to change their ways of functioning. He became an influential spokesperson for AIS thinking and he helped opened several doors for CDAIS project implementers to advocate changes at the policy level.

In Lao PDR, impressive inter-organizational momentum was attained thanks to the CDAIS National Project Coordinator, who showed an exceptionally open mind in sharing the project leadership with other key AIS-pillar organizations. This enabled multistakeholder commitment and appropriation of the CDAIS approach, thus demonstrating the importance of choosing an individual 'champion' when implementing such a transformative project.

Embeddedness of CDAIS innovation facilitators

The institutional affiliation of the national innovation facilitators was also key in outcome generation.

In Bangladesh, it was mainly government researchers who were invited to be NIFs. They had some important and relevant skills but were not very used to working with and listening to farmers and supporting their solutions. It was not their duty to interact with farmers, as that was seen to be the role of extension officers. With training and exposure, the NIFs' facilitation skills and confidence in the method improved. Most of them did not have the suitable knowledge and skills, or indeed time, to provide specific capacity development training to the niches, so external providers had to be recruited to do so. Also, if NIFs belonged to certain government organizations, it added even more obstacles to the establishment of trust-based relationships with niche actors. On the one hand, capacity strengthening of such AIS actors was key, but on the other, it slowed project implementation.

The situations in other countries were similar. It was not always possible to change the composition of the NIF team, given project arrangements with ministries. And when it was possible, it led to a high turnover of NIFs, which also slowed down the project implementation and generation of outcomes. In some countries, the use of 'external' independent consultants as 'innovation facilitators' was favoured in order to ensure project implementation in a timely manner. But in return, it cut off in some ways the CDAIS project from the national innovation system, which made it more difficult for consultants to undertake bridging activities and identify engagement strategies. They were not

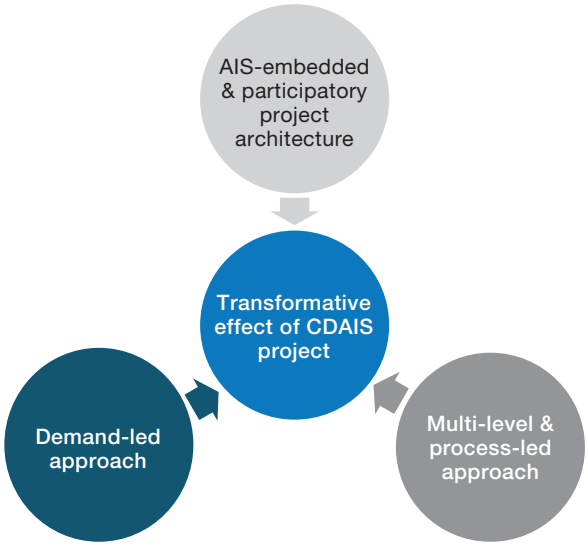
embedded enough into the national AIS, not trusted enough, or even recognized by AIS actors.

5.3. Hindering factors related to project implementation modalities

The CDAIS approach was designed to be flexible and adapted to CD needs and context characteristics. For this reason, we considered that there are no contextual hindering factors but rather weaknesses of the CDAIS approach which hindered its ability to tackle CD needs.

When the leveraging CD actions at the three strategic levels could not be fully implemented as coordinated packages, hindering factors resulting from the project's implementation modalities could be identified. They were linked to difficulties pertaining to the project's internal organization, to the delivery of CD activities, and to the project's external partnerships (Figure 25). We noticed in particular that the lack of a vision of the purposes of the CD and of the linkages between the three strategic levels (what changes do we want to create, for which actors and how) slowed down the project's implementation and prevented actors from seizing opportunities for engaging with key actors and addressing system-wide issues. The difficulties in designing and planning a large number of CD activities at different levels in a timely manner inhibited continuity among CD activities and led to the early disengagement of some actors. Finally, the lack of synergies with other on-going projects prevented the number or types of activities and actors from reaching the critical level needed to lead to systemic changes.

Figure 26. Strategies that made the CDAIS project transformative



Source: Authors.

5.4. Actions that increased the transformative effects of the CDAIS project

There is no single prescription for catalysing transformative change in an AIS. But there are actions that can increase the likelihood of transformative impacts. We highlight some of these actions, as derived from the results of the *ex-post* impact pathway, ToC and catalyzing factors.

Figure 26 encapsulates what we consider the three key strategies that made the CDAIS project transformative: an AIS-embedded and participatory project architecture, a demand-led approach, and a process-led approach.

The AIS-embedded and participatory project architecture relies on structure and rules of engagement which allow diverse and heterogeneous AIS actors to interact constructively over extended timespans, even beyond the project's life. The demand-led approach consists of designing on-demand support while mainstreaming functional capacities and AIS thinking. The multi-level and process-led approach consists of implementing iterative actions that generate small wins, promote transformative learning and increase engagement, while allowing unsuccessful efforts to be abandoned.

The three strategies are complementary, creating outcomes and impacts, which are not attainable if pursued independently. The embedded and participatory architecture gave the different AIS stakeholders the ability to perceive and declare successful outcomes and impacts. When the demand-led approach was coupled with the process-led approach, the risk of disengagement, which can easily ensue in these contexts given the diversity of interests and concerns, was reduced, thus keeping the project architecture intact. The participation of a diversity of AIS actors helped ensure that a larger number of CD activities were carried out and increased the likelihood of systemic changes taking place.

Table 10. Strategies for implementing a transformative CDAIS project

Strategies	AIS-embedded & participatory project architecture	Demand-led approach	Multi-level & process-led approach
Definition	Create the structure and define rules of engagement to allow diverse and heterogeneous AIS actors to interact constructively over prolonged timespans, even beyond the project's duration	Design on-demand support while mainstreaming functional capacities and AIS thinking	Implement iterative actions that generate small wins, promote transformative learning and increase engagement, while allowing unsuccessful efforts to be abandoned
Objective	Seek the effort of multiple individuals and organizations that purposefully spearheaded changes and mobilized cooperation through the incentives developed by project staff	Provoke CD demands and convert demands into CD needs using reflexive analytical methods	Accompany three CD processes of interest: • the setting up of functional innovation niches • the setting up of suitable ecosystems of innovation support services • the setting up of a suitable innovation policy framework
Practical challenges	Having a good understanding of the national AIS prior to taking action	Focus on concrete problems and constraints faced by innovation actors rather than discuss functional capacities even though they form the core of project action	Managing simultaneous and distributed CD processes at different levels Accepting a certain level of uncertainty and risk
Risks	Different interpretations of AIS thinking among various AIS actors, in a manner that impedes coordination	Not being able to meet demands because of project constraints	Having limited outcomes and impacts Disengagement of beneficiaries
Possible catalytic actions	• Planning an inclusive and informative inception phase • Assigning shared leaderships for project governance • Building early partnerships with other donors or project implementers with similar initiatives • Identifying some key individuals who are able to act as leaders or outsiders for triggering changes in the AIS • Imparting visibility to project activities in political agendas	• Using evaluative criteria for selecting 'demanders' • Setting up a MEL system for measuring and monitoring capacity development while enhancing reflexivity • Making available a wide range of skills and CD activities to meet needs in a timely manner	• Developing monitored coaching plans facilitated by third-parties (facilitators) • Making funding conditional on the coaching plan (commitment) • Combining focused interventions (such as CD of some key organizations or niches) with strategic thinking and approaches at upper levels. • Making available non-targeted funding in order to adapt project activities to ongoing CD processes

Source: Authors.

These strategies could be improved in future CDAIS-like interventions, as well as the possible catalyst actions to implement. Table 10 provides insights into each of the three strategies, their objectives, practical challenges, risks and possible catalytic actions to take.

5.5. Achieving impacts: combining project-based, country-based and global approaches.

Our findings on mechanisms that generated outcomes and impacts raise the question of whether the CD for AIS approach can be effectively facilitated by conventional, time bound, pre-determined and 'logframed' project mechanisms.

The transversal analysis showed that the CDAIS project contributed to various outcomes in each of the eight pilot countries. These happened at the micro level of the innovation niches, at the meso level of the ISS organisations and at the macro level of the policymakers. These outcomes were either 'primary' - when they concerned some individuals, a specific organisation or a limited number of people at policy level - or 'expanded' when they produced combined effects on the three levels together and across the various categories of actors. At that point, we refer to 'the threshold of irreversibility', which is where capacities to innovate are scaled and the actors of the AIS take ownership of CD processes initiated by the project. The multi-level coaching action of the CDAIS project then becomes less needed, and has to be supplemented or replaced by other types of interventions.

Additionally, we observed that a project-based approach has obvious limitations in the creation of enterprises or agencies that provide support services to innovators. Entrepreneurship, job creation, and financial investments need to be tackled by country-wide programs that require larger investments, long term strategies and combined action of various players in the AIS.

In this section, we review how some of the practical challenges that we identified can be better tackled by combined project-based, country-based and global approaches. The three practical challenges of interest are:

- How to sustain niche tracking beyond CDAIS project?
- How to develop and coordinate innovation support services in a country?
- How to support innovation-policy making processes and systemic changes over prolonged periods?

During final project fora in the eight countries where MEL results were shared, the CDAIS partners formulated recommendations which are presented in this section.

How to sustain niche tracking?

Each pilot country went through an innovative process to identify niches and select those who could benefit from the CDAIS coaching process.

We showed that starting from existing innovation initiatives, or demands, was quite efficient, ensuring the participation of a critical mass of actors for implementing CD activities and developing niche activities.

This selection process also helped to track a wide diversity of innovations at country level and to promote them in some ways during national visioning workshops. By taking stock of current innovation initiatives, policymakers became aware of domains in the agricultural sector where problems are being tackled and where they could provide useful support. ISS providers gained insight into innovation domains where they could advertise their services or develop new support services.

In Burkina Faso, discussions were conducted with the MESRSI to continue this innovation tracking process, through the facilitation of regular local bridging events or innovation fairs and the follow-up of innovation niche partnerships. In this perspective, specific support action should be provided to the MESRSI to play such a role. Other options could be explored in each country. Some ISS providers, such as research centres, NGOs or extension organizations could also play this role.

How to develop and coordinate innovation support services in a country?

As a project, CDAIS succeeded in helping existing organizations design new support services that were more adapted to the needs of the niche actors. However, the implementation of these new services over time require a different type of support, one that is more institutional and political. For instance, a public education centre in Burkina Faso wanted to set up an incubator but this required initiating negotiations on a new framework agreement and objective contracts with its supervising ministries. This could not be done within the project's timeframe.

The project approach was useful in designing the incubator project, in training the centre's staff in coaching methodologies and in helping the education centre get new technical and financial partners. Technical assistance on a more long-term basis will be needed to complete the process of creation of the incubator. At the policy level, a shift is needed in the way the role of educational organizations in agricultural innovation, and in particular in the setting up of regional innovation ecosystems, is envisioned and planned. This needs to be supported by specific policy processes, and perhaps also by development aid. Regional apex organizations, such as African research and extension organizations, can also play a role with a longer-term focus on how to disseminate innovation facilitation skills and innovation support facilities within a country.

As a project, CDAIS adopted another strategy to tackle the need for adequate innovation support services in a country: a better coordination of existing agricultural support services so as to create enabling environments for niches. The CDAIS project played the role of a bridging organization, especially during the marketplace events. It identified and brought together extension services, research organizations, banks and NGOs in a way that they could position themselves to fulfil the support needs of the niche actors. However, this was a difficult exercise because the CDAIS project could not generate true coordination between these actors without offering additional incentives. After a marketplace event, the commitment made by participants to actively support the niche needed to be followed up by the niche actors themselves. Some new partnerships between support services and the niche actors were created but they needed a lot of additional energy and time from the staff of the CDAIS project. At a country level, this type of effort could be facilitated if support service ecosystems were already in place, with visible and pre-discussed partnerships between ISS providers for supporting some types of innovation. National inter-sectoral bodies or public agencies could then take a lead role in these processes. In Burkina Faso, DGRSI engaged with the CDAIS project to develop a national repository of innovation support services. At the end of the project, workshops between ISS providers, facilitated by the ministry, were needed to initiate the creation of coordination mechanisms and more in-depth reflection on how to increase service accessibility throughout the country and throughout innovation domains. This would form a good new project to follow up CDAIS outcomes. At a global level, these efforts could be complemented through the development of sub-regional networks specialized in delivering ISS across many countries, such as Afric'Innov in Africa. When support services are missing in a country, they can often be found in neighbouring countries, as was done by CDAIS teams in Bangladesh, Lao PDR, Burkina Faso, Honduras and Guatemala.

To conclude, combining project-based, country-based and global initiatives can help to develop, complement or fulfil the needs for adequate innovation support services at the country level.

How to support innovation-policy making processes and systemic changes over prolonged periods?

At the policy level, the CDAIS project-based approach contributed mainly to shed light on demand-led innovation agendas, to raise awareness on the need to support innovation processes, to produce new insights into how the policy framework could be improved, and to enhance coordination mechanisms. By setting an agenda on Capacity Development for AIS, the CDAIS policy dialogue persuaded all actors of the AIS to reflect on how to articulate their actions. However, concrete achievements at the policy level required the convergence of several projects and a good alignment with existing policy agendas, at country level but also at the international level. Donors' agendas are not always well-aligned with countries' agenda in terms of innovation needs. Agricultural intensification, marketing of smallholder agricultural products, scaling of organic agriculture, digitalization of agricultural support services were the main domains of innovation that were selected by countries for CDAIS support.

Wider national programmes would be required to encompass in a timely manner the different political dimensions of strengthening an AIS. Joint innovation agendas between countries and donors should be supported and properly advertised. Research, education and extension policies would need to be simultaneously addressed in light of agricultural innovation challenges. In addition, economic policies favouring creation of jobs and business opportunities in priority innovation areas have to be adopted.

In a more operational perspective, some suggestions were made regarding possible projects that could support CD processes at a system level.

In order to mainstream functional capacities and the strengthening of AIS in political agendas, proposals were made in some CDAIS countries to involve civil society in a major way. The objectives would be to advocate for farmer-led innovations and responsible innovation and to raise awareness of societal impacts of the innovations

promoted by the government, research organizations or the private sector. This could help prioritize innovation needs and limit transfers of technologies and thus create more space for open innovation. For instance, some projects or initiatives propose to open the dialogue between science and society, organizing cycles of conferences or bridging events between innovators from civil society and researchers. These help to draw the researchers' attention to farmer-led innovation processes and to raise awareness on the need to anticipate social impacts of innovations while developing them.

Another proposal was to increase the role of civil society in the follow up of innovation policy implementation through support to democratic processes. This could be addressed through projects led by NGOs.

Finally, many projects can support systemic changes that were initiated under CDAIS. However, a shared concern across CDAIS teams was the ability of other projects to take stock of past experience and to build on previous projects without having to start from scratch. In this perspective, the objective of a global initiative would be to mainstream knowledge and lessons learnt on CD for AIS beyond projects and countries. International organizations or networks, such as TAP, have a key role to play by investing in knowledge capitalization and dissemination. However, national research and educational organizations also have an equally important role to play by producing knowledge and transmitting it to new generations.

In this context, it is crucial to convert knowledge and lessons learnt from CDAIS project into training curricula for the national universities and agricultural training centres.

To conclude, specific project-based actions with civil society and the educational sector could help to enhance policy making processes. A country-based approach is required to address the need for intersectoral policy coordination about agricultural innovation. A global initiative, involving project donors, is required to set up joint innovation agendas, and mainstream knowledge and lessons learnt beyond projects and countries.

PART 3

Recommendations for upgrading the TAP Common Framework

Part III lays out the recommendations for upgrading the TAP CF in order to improve its usefulness, usability and applicability, on the basis of the insights gained through the transversal analysis of CDAIS outcomes and change mechanisms.

6. FINE-TUNING CONCEPTS AND THEIR OPERATIONALIZATION

The TAP Common Framework brought new perspectives to AIS actors but also was sometimes a source of confusion and misunderstandings. Some clarifications and sharpening of the concepts used and their operationalization are proposed in this section. They are built on the results presented in Part II.

6.1. AIS concept and its operationalization

The 'Agricultural Innovation System' (AIS) concept was interpreted differently across countries and between actors.

Some understood it as an overarching organization, incomplete or not yet existing, that needs to be created at the country level. As a consequence, guidance was expected on 'how' to set it up. With a view toward action, the AIS was 'reduced' to its 'policy and institutional' dimensions, encompassing the research and education system, the extension system and policies that support agricultural development. Lack of guidance about possible institutional support and policy design led to shortcomings in the policy dialogue process.

On another level, an AIS approach was used as a lens for helping the niche actors identify the complex network of relationships that they needed to join to develop their innovation agenda.

When value-chain approaches were adopted, the AIS framework was used to analyse networks in order to identify the different stakeholders (academia, public sector, producer associations, private firms) involved in the targeted production sector (cocoa, bean, potato, etc.). The AIS and value chain were assimilated. A cluster approach then helped to identify 'innovation niches'. However, there were no 'innovations' per se. The focus was on market opportunities, increased production and the organization of technical assistance to producers.

Finally, the AIS lens was also used by project implementers as a guiding approach for the CDAIS intervention. It helped mainly in revealing the possible linkages between the niches and their 'environment' of policy regulations, support services and business opportunities.

In all cases, the AIS concept at first provided new insights into the types of actors to involve in innovation processes. But the rationale of the actors' involvement and the ultimate objectives for them to pursue were not always very clear, nor was the difference between agricultural development approaches, capacity development approaches and innovation approaches. At a certain stage of the project, this confusion prevented some project beneficiaries from moving forward. Some mismatches appeared between the AIS system and the CD for AIS system in which the CDAIS project was operating. This is reflected in the diverse objectives of the policy dialogue. In some countries, the policy dialogue targeted the improvement of particular agricultural policies/directives to enable agricultural development (e.g. Rwanda). In other countries, it targeted the institutionalization of AIS thinking, through the development of innovation policies (e.g. Burkina Faso). And, finally, in some countries, the policy dialogue aimed at putting in place a capacity development system based on institutionalized networks of innovation facilitators (e.g. Lao PDR). In other words, the concept of 'AIS' eventually encompassed three different types of systems: agricultural systems, innovation systems, and capacity development systems.

Further clarity on the 'system' that needs to be supported and on the linkages among systems in a perspective of capacity development is thus strongly recommended in order to make the CDAIS approach both distinctive and operational. Otherwise the CDAIS approach could be simply be equated to an intervention supporting value-chain development with a special attention to 'functional' capacities and agri-business skills as key drivers of change. This implies that a significant amount of time could be saved during the

project's inception phase by not presenting all the conceptual background of the AIS approach. The new AIS-related concepts generated a large amount of confusion, without making clear what the differences were with typical value-chain approaches.

Another weakness of the AIS concept is the lack of linkages with development issues. Development and innovation are not necessarily a matter of growth and economic performance, but of improving the quality of life and well-being, resolving ecological problems and improving societal attitudes and mentalities. We must succeed in understanding how learning paths lead – or do not – to solutions of the problems encountered and how they contribute to the country's economic model. It has not yet been proven that higher income leads to better nutrition, nor that crop diversity leads to diet diversity. As a consequence, the nature of innovations promoted under the AIS framework should be further thought through, especially in relation to environmental, social and economic challenges. Envisioning and setting up 'mission-oriented' AIS would lead to more efficiency in the ways of promoting AIS thinking and of strengthening the AIS.

6.2. The niche concept and its operationalization

Many difficulties were faced in the setting up of the 'innovation niches'. What defines a 'niche'? What are the boundaries? What types of actors to involve?

In practice, a set of criteria was identified to select niche members. They included: a core group of leading actors, possibility of working in coordination with other initiatives, replicability and sustainability, capacity to build strategic partnerships with other stakeholders, and potential to influence the national innovation system.

Difficulties were encountered while translating the 'niche' concept into local languages. Several different terms were used in the countries, referring to existing similar facilities, such as:

- Clusters in a value chain (e.g. Honduras, Guatemala, Bangladesh);
- Farmer association (e.g. Lao PDR, Ethiopia);
- Territorial communities (e.g. Angola, Rwanda);

Key recommendation 1.

Further define what AIS encompasses and what it aims at in a given country

The AIS framework doesn't provide enough practical guidance for the operationalization of the concept, i.e. it does not give sense to the AIS approach in a given context. It should link the issues of development, innovation and learning.

A recommendation is that helping design and set up the purpose and 'mission' of AIS would ensure more efficiency and ownership of the CDAIS approach and would lead to ways of promoting AIS thinking and strengthening the AIS in a given country. The issues of ethics and the concept of responsible innovation should be introduced (should we promote any type of innovation?) and linked to specific innovation support services, which would ensure better participation of civil society and potential 'end-users' – such as urban consumers in broader food systems – in agricultural innovation processes

In addition, the differences in perspectives and approaches between 'agricultural system', 'innovation system' and' capacity development system' should be further emphasized to help actors obtain a new perspective on how to innovate for sustainable development. A system for developing innovation capacities needs to be set prior to the setting up of the innovation system itself. Specific enabling functional and technical capacities are required so that actors become able to operationalize the AIS thinking in light of priority objectives for the sustainable development of the agricultural system in their country.

Finally, in the context of external project-based interventions for AIS strengthening, new approaches should be proposed to support the elaboration of joint innovation agendas between countries and donors. These approaches should support link building between countries' innovation strategies and continent-wide strategies such as the EU Green Deal, the African Union's Climate Change Strategy or the UN 2030 Agenda for Sustainable Development.

- Ad-hoc multistakeholder partnerships (e.g. Burkina Faso, Ethiopia);
- Innovation platforms (e.g. Ethiopia)
- Facilitated innovation networks (e.g. Burkina Faso).
- Local innovation situations (e.g. Burkina Faso).

Whether a niche was framed as a situation, a cluster or an innovation platform depended partly on the language preferred by the actors, but it also tells something about the characteristics of the niches and the drivers that underpinned the collaborative work. The term 'niche', originating from the 'niche regime' perspective, implies that at a certain stage of the innovation process, the niche will be absorbed by the dominant regime and will become normality. Our empirical results showed a different process: the niches influenced the system toward a more favourable environment for their activities. This implies that changes happen within the dominant regime itself. This has theoretical implications for current knowledge on how innovations can be brought to scale and the role of niches.

In this context, we thus suggest expanding the definition of niches to include the diversity of existing arrangements for collaborative innovation in a country. In order to avoid confusion or misunderstanding, the term 'niche' could also be replaced by a neutral umbrella term such as 'multistakeholder innovation partnership' or 'innovation community'.

Key recommendation 2.

Stick closer to reality by acknowledging the diverse nature of 'innovation communities'

The term 'niche' is very conceptual and not easy to put into practice without concrete contextualized examples. It created confusion for the project's implementers and beneficiaries, and it delayed in some ways the identification and setting up of the niches for capacity development. We suggest the use of a neutral umbrella term, such as 'multistakeholder innovation partnership' or 'innovation community', and letting implementers use existing or local terminology adapted to their realities.

6.3. Functional capacities, technical capacities and other capacities needed for agricultural innovation

The development of functional capacities was not sufficient in itself to 'realize the potential of innovation' and explain the observed outcomes in the niches. In the niches, and with niche partners, it was also necessary to simultaneously strengthen technical capacities (how to produce and process products) and a diversity of mainly agri-business skills in the numerous value-oriented niches (e.g. how to market production, operate as a business, etc.). Focusing on functional capacity is indeed very important, since this is a critical limitation in many cases, but it is not necessarily sufficient to facilitate innovation effectively. Improving capacity on technical issues and market issues is still needed.

Also, the functional capacities empirically developed at the different levels (individual, organizational, niche, system) and which led to outcomes were not the same as those proposed by the TAP CF.

At the system level, we identified enabling capacities for the identification and setting up of favourable environments for innovations niches. At the niche level, i.e. the innovation community level, we identified enabling capacities for initiating, managing and scaling innovation processes. At the level of organizations, i.e. innovation support service providers, we identified capacities for delivering adequate and sustainable support services to innovation niche actors, in coordination with other ISS providers.

Key recommendation 3.

Differentiate the capacities needed across individuals, organizations and communities

The capacities and skills needed should be differentiated according to the level being addressed (individual, organization, innovation communities and system).

In addition, they should be well-linked to issues of innovation development and AIS strengthening.

6.3.1. Capacities at the niche level: capacities for joint innovation

At the niche level, the key empirical functional capacities common across niches were (see Part II):

- The capacity to engage in collaborative activities, as a key enabling capacity for developing the other following capacities;
- The capacity to develop and manage an innovation agenda and strategy;
- The capacity to deliver intermediate results;
- The capacity to mobilize new partners and expand the niche as needed;
- The capacity to influence the niche's external environment to make it more favourable.

The five functional capacities proposed by the TAP CF lack the degree of specificity required in the context of agricultural innovation and are redudant to a certain extent. The capacity to collaborate is very general and runs through all other capacities, which makes it difficult to plan specific CD activities pertaining to this capacity. The capacity to experiment and learn is part of the capacity to develop an innovation agenda. Moreover, the capacity to learn should be considered as a much more systemic capacity, promoting the diversity of learning modes for innovation (science-based or experience-based learning modes) across all the AIS-pillar organizations. Management capacities are missing in the list of the TAP CF even though they are crucial. The capacity to engage in political processes is indeed important but the purpose lacks clarity, thus making it difficult to design the appropriate CD activities. Also, the capacity of niche actors to engage policymakers in their innovation agenda appeared to be closer to what actually happened in developing the innovation. Finally, the capacity to navigate complexity is too abstract and refers mainly to individual skills for systemic thinking. Collective capacities and individual skills should be better distinguished when proposing CD activities, as the types of CD activities will not be the same.

Key recommendation 4.

Further articulate capacities needed, phases of the innovation processes and the types of possible CD activities

Technical and functional capacities must be promoted together and must be specific to the level at which they are developed.

In addition, a hierarchization of capacities over time is required: some functional capacities (capacity to engage in collaborative action, capacity to develop and manage an innovation agenda) should be developed as a priority, in order to then better target technical capacity needs.

Finally, functional capacities should be clearly defined in a way that they are easily translatable into different languages and can facilitate the identification of related CD activities. The list above is proposed as a starting point.

6.3.2. Capacities at the individual level: technical and social skills

At the level of a niche's individual, a number of required skills were identified and are listed in Part II. It is important to note that not all actors need to have these skills, but the individual who takes the lead in the niche's or the organization's activities must have them.

In addition, very specific skills are required for three categories of key actors for transformative changes to take place at the AIS level:

- National innovation facilitators;
- Researchers and extension workers;
- Policymakers.

A preliminary set of capacities have been listed in Part II of this report but further insights are still needed.

Key recommendation 5.

Define a set of skills for individuals

The specific skills for NIF, researchers and extension workers and policymakers should be further explored and identified in order to support the development or improvement of training curricula by universities and other educational centres. It will help the emergence of professions dedicated to innovation.

6.3.3. Capacities at the level of organizations: capacities to provide innovation support services

At the level of organizations, the capacities identified as key were:

- The capacity to organize internally;
- The capacity to deliver innovation support services;
- The capacity to relate to external actors.

Key recommendation 6.

Specify a set of capacities for ISS providers

The specific functional capacities for organizations that provide ISS should be included as key capacities to innovate at the country level. They refer to organizational strengthening aspects, including meeting challenges from within and outside of the organization.

6.3.4. Capacities at AIS level: to be further explored

At the system level, the functional capacities developed were:

- The capacity to lead, engage and create bridges between AIS stakeholders;
- The capacity to assess a situation, create a vision and a mandate;
- The capacity to coordinate innovation support service providers (ISSP);
- The capacity to organize and deliver while being responsive to niche needs;
- The capacity to formulate comprehensive and inclusive innovation policies and strategies.

Increased functional capacities enabled AIS actors to identify and create conditions conducive to more favourable business and technological environments for niches. However, they are not all very specific to the system level and overlap with capacities identified at the niche level and at the level of the ISS providers.

More exploration is required here on what these systemic capacities should be in a high-performing and mission-oriented AIS. This will help refine the concepts of system, systemic capacities and enabling environment, which are not addressed sufficiently in detail by the TAP CF, so as to be able to design adequate CD strategies at the system level.

Project implementers often played it by ear in their attempts to trigger systemic changes. Also, the demand of the countries in terms of technologies was not sufficiently assessed and these needs not properly addressed in CDAIS.

Just as observed at the niche level, we expect that the development of some key functional capacities at the system level can help fine-tune the requirements of technical capacities at the country level.

The targeted capacities at the system level should refer more explicitly to the functions expected from a high-performing innovation system, such as the capacity to deliver demand-driven innovation, the capacity to produce endogenous knowledge, the capacity to appropriate technologies, etc. The capacity to learn and the technical or technological capacities should be addressed here, within this systemic perspective. The diversity of learning pathways for producing and disseminating knowledge should be acknowledged at the system level and should guide the innovation strategies of firms, research institutions and farmer organizations. Moreover, technological capacities, understood as the capacity to absorb new technologies as well as the capacity to produce endogenous new technologies, should be better acknowledged and assessed at the AIS level, in a perspective of evolving from the transfer of technology innovation model.

Key recommendation 7.

Define specific capacities and interventions at the national AIS level

The systemic capacities should be included as specific capacities to innovate at the country level. They should be explored and specified in greater detail, in relation to the capacity to learn and technological capacities, which are overarching capacities that reflect the main modes for innovation – transfer of technology or open innovation.

6.4. The 5-steps and the coaching approach

The five stages promoted by the TAP CF were not followed linearly in the CDAIS project. Instead iterations of CD activities and learning cycles took place as CD needs emerged and as actors progressed.

At the end of the project, with more insights into the different capacities required to innovate, we could identify specific types of CD activities more easily. The 5 'stages' of the TAP CF appear to constitute an overly rigid approach; it needs to be adapted in reference to adult learning theories and behavioural change theories. The 'learning by doing' approach implies several iterative learning cycles based on practical technical or business activities (that need to be financed otherwise) and supported by a MEL system that helps to monitor and enhance progress.

As an example, the activity of visioning and action planning was undertaken several times, during the Reflection & Refinement workshops, as the engagement of actors grew, their understanding of functional capacities improved, and their innovation agenda became more refined.

Furthermore, the capacity needs assessment process also needed to be revised. At the beginning of the project, actors expect a lot of 'traditional' support from a development project, hence shaping their 'needs' according to what they expect to receive from the project. The CNA at t_0 does not enable real understanding of the 'functional problems'. It is while implementing collaborative activities that the facilitator can observe emerging problems in, and propose solutions to, the manner in which individuals and organizations actually interact to innovate.

Another bias regarding the capacity assessment pertained to the initial difficulties that the niche actors had in understanding the '4+1' functional capacities. For example, the 'capacity to navigate complexity' was very difficult to translate and to explain. The evaluation of the need for such a capacity became an extremely hazardous exercise.

Finally, the transversal analysis results showed that adult learning theories (learning by doing) and behavioural change theories (knowledge-attitude-practice) that we brought to light based on empirical evidence, should be considered to drive the design of CD interventions. The engagement wheel – motivation-empowerment-knowledge – should be applied in all four dimensions (individuals, multi-actor partnerships, organizations, systems) in order to cause behavioural shifts and systemic transformations. Targeted capacities to develop should be easily understandable by actors and more clearly related to individual, organizational and collective (niche) dimensions.

Key recommendation 8.

Ground CD approaches in learning theories

The 5 stages are a kind of theory of action on how to operationalize a CD intervention, but this formulation has several limitations and will necessarily have to be adapted to each context. It is better that the TAP CF focuses on theories of change, putting emphasis on the different possible processes through which change might take place.

The TAP CF should emphasize different processes of learning and capacity development at the various levels (individual, organizational, community, system), grounded in experiential learning theories, behavioural change theories and innovation theories.

6.5. Innovation facilitators and coaching teams

The 'cycles of action, reflection and learning' needed intensive coaching by a 'coaching team' and not by a single 'innovation facilitator'.

The concept of 'innovation facilitator' seen as a bridging actor across levels was very challenging to put into practice. Facilitation, bridging and intermediation are foundations of any system. And once again, defining the purpose and levels of facilitation activities was key for effective implementation. Based on the project's results, we suggest forming coaching teams rather than relying on individuals to cover all necessary activities at the niche and organizations levels: coaching, facilitation, training, and MEL.

Different types of skilled and knowledgeable persons were required in order to coach a niche:

- a facilitator;
- a designer of the coaching process;

- CD experts whose profiles depend on the nature of the innovation (i.e. technical and social dimensions).

The required capacities and skills for such teams should be determined and a training process to acquire or reinforce them should be developed.

The functioning of a coaching team should be further explained and experimented, in relationship with capacity development issues of innovation support services providers.

Preparation of the NIFs and the coaching team is critical and requires time and development of skills which can only be acquired through experience – specific curricula and 'learning by doing' methods proved to be successful and should be developed more extensively through targeted interventions in partnership with national vocational education centres.

Skillsets and capacities should be packaged and adjusted to fit the needs of niches, ISS organizations and also those of other actors in the broader AIS, such as policymakers. This will reinforce the credibility and recognition of innovation facilitation through introduction of high professional standards, and ensure that facilitation plays its role in connecting the three strategic levels in the AIS.

Key recommendation 9.

Narrow the roles of innovation facilitators and promote coaching teams

The concept of 'innovation facilitator' is too loose and requires further insights from practitioners. A coaching team, including amongst others managerial activities, MEL and facilitation activities, proved to be necessary and quite efficient. Such a coaching team, instead of an individual acting as a facilitator, should be promoted as a key aspect of the theory of action of CDAIS-based projects.

6.6. From a dual to a triple pathway of change for scaling capacities to innovate

It was demonstrated in the eight pilot countries that it was very useful and highly transformative to work at both levels at the same time (niche level and institutional/policy level) in order to raise the awareness of policymakers on the basis of concrete activities in the niches. However, in order to scale innovation processes and capacities, ISS providers were identified as key actors. They should therefore also be considered as a key level of intervention.

Key recommendation 10.

Promote a triple pathway of change

In order to reinforce AIS sustainably, a key objective is not to scale innovations (too many different cases and needs across countries) but to scale the coaching processes that allow multistakeholders' endogenous and grassroots innovation initiatives to be supported with customized approaches.

As a consequence, ISS providers should be considered a key level of intervention in a triple pathway approach: multistakeholder innovation partnerships; ISS providers; government agencies and the regulatory environment.

6.7. M&E for learning rather than M&E for accountability

The notion of long-term transformative change includes the idea that fundamental changes in agricultural innovation systems are needed, such as changes in the mandates of researcher and extension agencies, transformation of mindsets and practices of researchers and extension workers, creation of agricultural innovation policies and systemic policy instruments, creation of new types of organizations providing services to innovation promotors.

There are several types of transformations to consider: at the level of systems, individuals and organizations. They do not all require the same type of support. Moreover, they require demand-driven processes in order to ensure country adherence and support to these transformations.

A MEL system is useful, even quite essential, in order to build a vision of the 'overall' desired/desirable changes so as to be able to trace progress towards these 'overall' changes and to equip the project implementers with the ability to steer and adapt their intervention according to the progress made and the changes in paths that are actually taking place.

However, several improvements of the MEL tools developed under the CDAIS project are required. For research purposes, MEL tools helped to generate the necessary data for analysing and comparing impact pathways. They helped to showcase how changes were generated. They also helped to shed light on the progresses made by project implementation teams. The comparison of *ex-ante* and *ex-post* ToC illustrates what the project implementation team did learn. However, from the perspective of several project implementers, there is a need to make them simpler, less academic and more articulated. As an example, the *ex-ante* ToC of the project proved not to be useful for guiding project implementation. Even the impact pathways were not as informative as expected because they traced the assumed linkages between CD activities, functional capacities and changes at individual and organizational levels. The diversity of learning mechanisms was not anticipated by the *ex-ante* design of impact pathways. Real-time approaches were more relevant. Progress markers and outcome harvesting proved to be useful to the reflexive assessment of the capacity developed and of these approaches' contributions to the niches' activities. 'Capacities' are a moving target that require non-sequential and non-linear M&E structures.

Finally, following the MEL system can become a burden if people are not well-trained and able to adapt schedules, workshops and processes to the learning dynamics of niche actors. Well-trained MEL teams are therefore key, as well as clear objectives on what the MEL is for. In piloting experience, such as the CDAIS project, we needed to generate a lot of data for the purpose of TAP CF 'validation'.

We propose to embed the MEL system in the capacity development process as it facilitates the 'understanding of the how', helping each type of actor play its role more efficiently, eliminating misunderstandings and overlaps. MEL also provides the metrics on the basis of which capacity development can be continuously adjusted and ultimately scaled up from micro to meso and macro AIS levels.

Key recommendation 11.

Foster real-time MEL tools for supporting the implementation of a CD intervention

M&E is good at knowing the known. The unexpected and unknowns are outside the scope of normal monitoring and evaluation systems. Systemic transformation falls into the 'unknown' category. Several pathways of changes are possible/needed at multiple levels. Monitoring and evaluation systems should therefore focus on processes of change in order to capture behavioural responses to CD interventions. These are also key inputs for supporting transformative learning at individual and organizational levels.

Embedding MEL into CD activities is therefore crucial.

7. MAKING THE TAP CF MORE APPLICABLE

The TAP CF – as formulated at the beginning of the CDAIS project – still lacks practical guidance, especially from a more managerial perspective (what changes do we want to create and how). The TAP CF manuals are quite academic in nature. Practical guidance with concrete examples will be required for the dissemination of the CDAIS approach.

Some manuals were produced during the CDAIS project. Additional manuals on the following topics would be useful:

- The coaching of some specific types of innovation niches (such as innovative entrepreneurs, business clusters or facilitated innovation networks) for which the coaching process is quite different;
- The activities and training of a coaching team;
- The development and management of an innovation agenda;
- A training kit for researchers and extension workers exposed to open innovation processes.

Furthermore, the TAP CF and practical guidelines require continuous improvement on the basis of the CDAIS experience in these eight countries, as well as of other projects. In order to do so in practice, it may be possible to mobilize the TAP members, Agrinatura members and the CD expert network as a meta-support infrastructure for projects, initiatives or organizations in order to strengthen AIS: collecting lessons learnt; organizing cross-country analyses; sharing, producing or identifying methodological references; and organizing training.

8. INCREASING THE USE OF THE TAP CF

Communication, access to trainings and joint applied-research projects could help increase the use of the TAP CF.

Several actions or interventions are suggested:

1. Communication on the lessons learnt from CDAIS and other similar projects;
2. The integration of the TAP CF and associated tools into agricultural development projects and organizations, especially the ISS providers;
3. The integration of the TAP CF and associated tools into the curricula of higher education institutions and universities;
4. The development and access to training on CD for AIS (either virtually or physically, and in different languages);
5. The co-design of additional tools dedicated to CD for AIS by researchers and practitioners in charge of supporting agricultural innovation; attention has to be paid to mixing European and national teams from countries where the TAP CF is intended to be used;
6. The development of a joint research agenda on CD for AIS between Agrinatura and national research institutions, for gaining insights into effective ways of strengthening AIS and then supporting evidence-based project design and innovation policy making.

References

REFERENCES

Cap, J. P., Blaich, E., Kohl, H., Von Raesfeld, A., Harms, R. & Will, M. 2019., Multilevel network management–A method for managing inter-organizational innovation networks, Journal of engineering and technology management,51, 21-32

Chesbrough, H., Vanhaverbeke, W. & West, J. (Eds.). 2006. *Open innovation: Researching a new paradigm.* Oxford University Press on Demand.

Eisenhardt, K. M. 1991. Better stories and better constructs: The case for rigor and comparative logic. *Academy of Management Review,* 16(3), 620-627.

Elzen, B., Enserink, B. & Smit, W. A. 1996. Socio-technical networks: How a technology studies approach may help to solve problems related to technical change. *Social Studies of Science*, 26(1), 95-141.

Ferru M., Grossetti M. & Bes M.-P., 2011.'Measuring social embeddedness: how to identify social networks in science-industry partnerships? ERSA conference papers 11 p 971, European Regional Science Association.

Gassmann, O. 2006. Opening up the innovation process: towards an agenda. *R & d Management,* 36(3), 223-228.

Geels, F. W. 2002. Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research policy,* 31(8-9), 1257-1274.

Grin, J., & Van de Graaf, H. 1996. Technology assessment as learning. *Science, Technology, & Human Values,* 21(1), 72-99.

Grin, J. (2008). The multilevel perspective and design of system innovations. *Managing the transition to renewable energy: theory and practice from local, regional and macro perspectives,* 47-8

Hall, A., Sulaiman, R., Beshah, T., Madzudzo, E., & Puskur, R. 2009. Agricultural innovation system capacity development: Tools, principles or policies? Capacity.org, Issue 37 (pp. 16-17).

Heemskerk W., Klerkx L. & Sitima J., 2011. Brokering innovation. In Nederlof, S., Wongtschowksi, M. & van der Lee, F. (eds.) Putting heads together: Agricultural innovation platforms in practice. Amsterdam, KIT Publishers: 43-54 Kemp, R., Schot, J., & Hoogma, R. (1998). Regime shifts to sustainability through processes of niche formation: the approach of strategic niche management. *Technology analysis & strategic management,* 10(2), 175-198.

Klerkx, L. & Leeuwis, C. 2009. Establishment and embedding of innovation brokers at different innovation system levels: Insights from the Dutch agricultural sector. Technological forecasting and social change, 76(6), 849-860

Laperche, B., Munier, F. & Hamdouch, A., 2008. The collective innovation process and the need for dynamic coordination: general presentation, *Journal of Innovation Economics & Management,* 3-13.

Lamprinopoulou, C., Renwick, A., Klerkx, L., Hermans, F. & Roep, D. 2014. Application of an integrated systemic framework for analysing agricultural innovation systems and informing innovation policies: Comparing the Dutch and Scottish agrifood sectors. *Agricultural Systems,* 129, 40-54.

Lawrence, T. B., Hardy, C. & Phillips, N. 2002. Institutional effects of interorganizational collaboration: The emergence of proto-institutions. Academy of management journal, 45(1), 281-290.

Mezirow, J. 1991. *Transformative dimensions of adult learning.* Jossey-Bass, 350 Sansome Street, San Francisco, CA 94104-1310.

Mayne, J. 2001. Addressing attribution through contribution analysis: using performance measures sensibly. *Canadian journal of program evaluation*, 16(1), 1-24.

Pasiecznik, N., ed. 2018. *Building Competence and Confidence in Agricultural Innovation Systems.* Stories of Change. Agrinatura, Paris, France, and FAO, Rome, Italy. 196 pp

Paschke, M., Pfisterer, A., Hirschi, C., Last, L., Pauli, D., Studer, B. & Mc Nally, K. E. 2019. Evidence-based policymaking. Engaging in the Science-Policy Dialogue

FAO & Agrinatura. 2019 a. *Organising a Marketplace* – A practical guide. Rudebjer P, Bucciarelli M, Nichterlein K, Saley Moussa A, eds. FAO, Rome and Agrinatura, Paris. 28 pp.

FAO & Agrinatura. 2019 b. *Organising a Policy Dialogue – A practical guide.* Rudebjer P, Bucciarelli M, Nichterlein K, Saley Moussa A, Hawkins R, eds. FAO, Rome and Agrinatura, Paris. 20 pp.

Schot, J., & Geels, F. W. 2008. Strategic niche management and sustainable innovation journeys: theory, findings, research agenda, and policy. *Technology analysis & strategic management,* 20(5), 537-554.

Smits, R., & Kuhlmann, S. 2004. The rise of systemic instruments in innovation policy. International journal of foresight and innovation policy, 1(1-2), 4-32

Temple L., Barret D., Blundo Canto G., Dabat M.-H., Devaux-Spatarakis A., Faure G., Hainzelin E., Mathe S., Toillier A., & Triomphe, B. (2018). Assessing impacts of agricultural research for development: A systemic model focusing on outcomes. *Research Evaluation*, 27(2), 157-170.

REFERENCES

Toillier, A., Guillonnet R., Bucciarelli M., Vermeulen H., Wopereis-Pura M. 2019. Monitoring, evaluation and learning - Concepts, principles and tools. Paris: Agrinatura-FAO, 28 p. (Manuals and Guidelines / CDAIS) ISBN 978-2-35709-006-4; 978-92-5-131494-4. https://cdais.net/wp-content/uploads/2019/08/CDAIS-M6-MEL-Monitoring-Evaluation-and-Learning.pdf

Toillier, A., Faure G., Chia E. 2018. Designing and organizing support for collective innovation in agriculture. In: Innovation and development in agricultural and food systems. Faure Guy (ed.), Chiffoleau Yuna (ed.), Goulet Frédéric (ed.), Temple Ludovic (ed.), Touzard Jean-Marc (ed.). Versailles: Ed. Quae, 108-121. (Synthèses: Quae) ISBN 978-2-7592-2960-4. https://www.quae.com/produit/1540/9782759229604/innovation-and-development-in-agricultural-and-food-systems

Tropical Agriculture Platform (TAP). 2016. *Common Framework on Capacity Development for Agricultural Innovation Systems: Conceptual Background.* CAB International, Wallingford, UK. https://www.cabi.org/Uploads/CABI/about-us/4.8.5-other-business-policies-and-strategies/tap-conceptual-background.pdf.

Vermeulen H., Toillier A., Kola N. P., Zerfu E., Hawkins R., D'Aquino P., Furlan N., Wopereis-Pura M. 2019. Innovation niche partnerships - A guide to the coaching process. Paris: Agrinatura-FAO, 36 p. (Manuals and Guidelines / CDAIS) ISBN 978-2-35709-002-6; 978-92-5-131493-7. https://cdais.net/publications/guides-manuals/

Weber, K. M. & Rohracher, H. 2012. Legitimizing research, technology and innovation policies for transformative change: Combining insights from innovation systems and multi-level perspective in a comprehensive 'failures' framework. *Research Policy,* 41(6), 1037-1047.

Wieczorek, A.J. & Hekkert P., 2012. Systemic instruments for systemic innovation problems: a framework for policy makers and innovation scholars. Science and Public Policy 39: 74-87

Woolthuis, R.K., Lankhuisen, M., Gilsing, V. 2005. A system failure framework for innovation policy design. Technology 25: 609-619

Wopereis-Pura, M., Kola, N.P., Toillier, A., Ekong J., Hawkins R., Eshetu S., Dobson, H. 2019. Organisational strengthening - A guide to the coaching process. Paris: Agrinatura-FAO, 52 p. (Manuals and Guidelines / CDAIS) ISBN 978-2-35709-003-3; 978-92-5-131526-2

World Bank, 2016. Supporting Transformational change for poverty reduction and shared prosperity, WB, Washington DC, 121p.

Annexes

ANNEX 1. MEL TOOLS FOR DATA COLLECTION

- MEL data collection at the system level

Table 11. Minimum common tools for MEL at the system level in the eight pilot countries

Time	Tool	Short description	Learning events
BASELINE (t_0)	**Scoping study**	A study based on interviews with key informants was used to map agricultural innovation system stakeholders, identify innovation political agendas, and assess strengths and weaknesses of the agricultural innovation system	National validation workshop Presented the results of the capacity needs assessment to agricultural innovation system stakeholders and jointly validated pre-identified possible impactful capacity-development interventions
	NIF radar	The 'NIF radar' was a self-assessment tool for National Innovation Facilitators (NIFs), which focused on and showed progress made in their skills, knowledge and attitudes	
MONITORING (t_1, t_2)	**Stories of change**	'Stories of change' were used as a tool for communicating progress and the value of the CDAIS project in an accessible way. Stories were regularly collected and written by country teams	Meetings of the technical project committee The country team met regularly to adapt the implementation strategy on the basis of feedback from participants and the identified capacity-development needs
	Event log	The event log was an online system that captured (i) information on the organization of events (when, what, why, how), and (ii) the participants' evaluation and learning after each workshop or event	
ASSESSING (t_3)	**Self-assessment radar for NIFs**	NIFs assessed their progress in key skills for the facilitation of innovation processes	Final assessment workshop and national CDAIS forum Validated the *ex-post* impact pathway and designed an exit strategy using inputs from the results of the MEL system
	Enabling environment questionnaire	A study based on interviews with key informants, used to assess changes in the institutional and policy context that enable innovation in the country	
	***Ex-post* impact pathway**	Drew the causal relationships between inputs, outputs, outcomes and potential impact, thus documenting how change was generated in the agricultural innovation system through intervention at all levels (individuals, innovation niche partnerships and organizations) and policy-dialogue activities	

Source: Authors.

- MEL data collection at the niche level

Table 12. Minimum common tools for MEL at the niche level in the eight pilot countries

Time	Tool	Short description	Learning events
BASELINE (t_0)	**Innovation timeline**	The timeline was used as a method for joint reflection on a network process. It helped participants share perceptions on what is going on. It uncovered the history of the network and pivotal moments and suggested the next steps	Capacity needs assessment workshops and outcome mapping With the help of the facilitator, translate the project's Theory of Change into actions Design a coaching plan, including vision, capacity needs, capacity-development strategies and progress markers
	Network analysis	Network analysis took stock of who forms the network of innovation actors and the nature of interactions between them (provision of services, information and knowledge, funding, etc.) and whether they are actually supportive to the innovation project	
	Capacity assessment questionnaire and scoring tool	This was an individual evaluation of the functional and technical capacities of the group that formed the innovation niche partnership. A scoring tool and a coxcomb graph were used to represent the level of capacities	
	Progress marker identification	Identify progress markers according to the capacity-development strategy	
MONITORING (t_1, t_2)	**Progress marker evaluation and refinement**	Assess whether progress markers were met, exceeded, or whether there was a deviation from the initial progress markers which were identified	Reflection and refinement (R&R) workshops Based on the monitoring results, reflect on the coaching plan and refining it if needed
	Enriched innovation timeline	Collect stories of small victories, learning situations, and failures with partnerships, organizations, and other stakeholders including direct beneficiaries Help stakeholders select the stories that drove the most significant changes in the innovation process and in their innovative capacities Report them on the timeline drawn during the capacity needs assessment. Wrote the associated stories	
ASSESSING (t_3)	**Capacity assessment questionnaire and scoring tool**	Assess the progress made for each functional capacity in the course of the project, based on individual perceptions A scoring tool and a coxcomb graph were used to represent the level of capacities	Evaluation workshop Based on the assessment of progress made, identify with innovation niche partnership actors how they can continue by themselves without external support
	Updated NetMap	Assess the current actors in the network: who dropped out and who joined? Assess the nature of relationships between actors (interpersonal, influenced by market stakes or organizational stakes) Assess whether these relationships evolved during the project	
	Contribution analysis diagram	Contribution diagram linked the project's outputs to changes in capacities and related outcomes. It sought to describe and weigh the contribution of the former to the latter	

Source: Authors.

ANNEX 2. LIST OF INNOVATION NICHE PARTNERSHIPS IN THE EIGHT CDAIS PILOT COUNTRIES

Country	Innovation niche partnerships	Objectives	Initial priority objectives identified from the capacity needs assessment	Observed or reported outcomes at the end of the project after the acquisition of functional capacities
Angola	**Rice development**	Increase rice production in Huambo province and improve producer production techniques	Formalize the partnership and include more strategic partners (SENSE, private sector, producer of inputs) Establish coordination mechanisms and define incentives to engage partners Strengthen mechanisms to share information and knowledge Train farmers in post-harvest techniques, e.g. processing and packaging.	Rice producers in the first village were organized into a cooperative. Together they could prioritize and decide their activities. Partners assisted in accessing financial support services to acquire a rice mill. At the end of the project, they have increased their production from 350 kg/ha to 2.5 t/ha and acquired a rice mills. Four other villages are requesting similar interventions.
	Rural entrepreneurship	Provide business opportunities to new agricultural entrepreneurs and encourage large-scale production of gramineae crops and legumes	Develop strategic and business plan for a farmer cooperative and its partnership with other actors Strengthen capacities to design project proposals and manage projects Find financial support mechanisms to improve farm management.	Not recorded.
	Seed cooperative	Commercialization (multiplying) of high-quality seeds, produced by small producers and evaluated by the National Seed Service (SENSE)	Formalize the partnership with IIA and SENSE for seed certification Create mechanisms for information sharing (including training of actors in information sharing) Training on seed processing and marketing	Strengthened organizational and administrative process of the group. Involved young entrepreneurs. As a result, they learnt about crop rotation and the quality of seeds produced improved.

Country	Innovation niche partnerships	Objectives	Initial priority objectives identified from the capacity needs assessment	Observed or reported outcomes at the end of the project after the acquisition of functional capacities
Bangladesh	**Mango**	Development of Shibganj mango association (SMA) to support safe and quality mango production, processing and marketing	Develop capacity of SMA and its members in organization and business management skills Develop skills of SMA to operate as a multistakeholder platform with a strategy and a cluster business plan Learn practices to improve mango quality and to add value through processing, branding and marketing	Shibganj Mango Producers Cooperative Society (Ltd) was established. As a group, they were able to influence policies e.g. standard weight for a mound of mango and engage with development partners. For example, Swiss Contact and Solidaridad are interested in continuing to work with the group.
	Fish	Make aquaculture sustainable by quality fish fry and feed production and fish cultivation at Trishal, Mymensingh	Learn about group involvement in improving quality (seed and feed) and adding value through processing, branding and marketing Develop capacity of farmers in organization, cluster networking and financial assessment Develop skills to operate as a multistakeholder platform with a strategy and a business and marketing plan	Trishal Fish Farmers' cooperative was established. As a group, they became able to negotiate fish selling prices and learned to reduce the use of chemicals in fish farming.
	Pineapple	Strengthen existing producer organization for safe and quality pineapple production, processing and sustainable marketing, Bandarban, CHT	Develop capacity of the farmer group in organization and business management skills Learn about group involvement in improving quality and adding value through processing, branding and marketing Develop skills to operate as a multistakeholder platform with a strategy and a cluster business plan on pineapple processing, branding and marketing, while addressing sustainability issues	Bandarban Pineapple Growers' Association was established. Farmers learnt to work as a group i.e. in negotiating selling prices, accessing technical assistance, and processing.

Country	Innovation niche partnerships	Objectives	Initial priority objectives identified from the capacity needs assessment	Observed or reported outcomes at the end of the project after the acquisition of functional capacities
Burkina Faso	**Family micro-enterprise**	Strengthen innovative and women-led agri-food family microenterprises	Improve the quality of processed products Access financial services Improve the availability of quality inputs and adapted equipment	Business clusters made up of 10 women food processors were established. As a group, they were able to access credit from the bank and improved their processing operations resulting in increased sales and income
	Advisory services	Modernization using ICT in providing agricultural advisory services by producer organizations	Boost the network management of farmer organizations Modernize and sustain agriculture advisory services	Seven farmer organizations and an ICT solution designer were able to co-design and operationalize a digital platform for extension workers. As a result, a revenue-generating digital platform is operational in Burkina Faso, and IT equipment by some farmer organizations has been acquired.
	Sunflower	Development of the sunflower sector by creating new forms of producer organizations	Produce adapted and high-yielding seeds from a local variety Guarantee producers' access to quality inputs (seeds, organic and chemical fertilizers, phyto products) Ensure the organization and training of actors in the sunflower sector	Not reported.
	Organic agriculture	Establish a participatory guarantee system in organic agriculture (SPG-Agri-Bio)	Improve the organization of the organic agriculture sector Define mechanism to scale the SPG practice Reinforce the skills of the actors on SPG practices	A network of 15 organizations was able to operationalize and improve the certification procedure for the first national organic farming label. As a result, 10 farms acquired labels as organic farms and the creation of regional markets was supported.
	Drip irrigation	Establish sustainable drip irrigation systems for small family farms	Promote low-cost drip irrigation markets for small family farms Increase access and financial support to improve the ability of small family farms to invest in drip irrigation Organize smallholders and train them in management of drip irrigation	Micro-irrigation for family farms was promoted.

Country	Innovation niche partnerships	Objectives	Initial priority objectives identified from the capacity needs assessment	Observed or reported outcomes at the end of the project after the acquisition of functional capacities
Burkina Faso	**Land tenure**	Appropriation of the land charter approach (CFL) by municipalities.	Create an approach to help the municipalities already involved to appropriate the Local Land Charter Disseminate the Local Land Charter process to all municipalities.	Increased awareness of a local land charter for crop-livestock integration.
Ethiopia	**Milk demand stimulation**	Milk demand stimulation partnership.	Implement school milk feeding practices in primary schools in Addis Ababa Promote pasteurized milk through a media campaign Increase the volume of processed milk sold in Addis Ababa.	Working relationships between ministries and agencies working in the milk sector were improved. As a result, a school milk labelling decree was drafted that should increase the demand for quality milk.
	Malt barley	Establish vibrant malt barley seed producer and marketing cooperative.	Improve and strengthen the actors' partnership linkages Enhance the production and supply of quality malt barley seed and grain to satisfy domestic demand Improve the human, financial and physical capacity of seed producer cooperatives.	Improved cooperation among seed producers and buyers was achieved. Better communications between partners improved the quality of seeds provided to malt barley producers, and increased the supply of quality malt barley.
	Chickpea	Build partnership to enable the region of Dembia Woreda to account for 35% of the country's chickpea production and marketing.	Farmers in chickpea clusters should be able to access technological chickpea inputs, extension services, technical support for chickpea disease control and the skills to produce chickpea Agri-businesses should be able to sell large quantities of inputs and to buy adequate quantities of chickpea at Dembia Woreda on a regular basis.	Improved communications and relationships resulted in improved access to, and increased use of, better quality seeds provided on time to the farmers. In addition, the number of farmers practising cluster farming increased, which resulted in increased chickpea production and farm incomes in the region.
	Livestock feed	Assured livestock feed safety and quality.	To develop a legal framework on feed risk assessment, risk management and risk communication To develop feed risk assessment, risk management and risk communication guidelines.	Guidelines on feed risk assessment, management and communication were developed.

Country	Innovation niche partnerships	Objectives	Initial priority objectives identified from the capacity needs assessment	Observed or reported outcomes at the end of the project after the acquisition of functional capacities
Ethiopia	**Seeds**	To set up a self-sustained cooperative-based seed system which satisfies up to 70% of regional seed demand.	The partnership should acquire the capacity to address the challenges of seed marketing by establishing legally enforceable contract-based seed marketing system.	A regional and legally enforceable seed marketing system, involving forward contracting of seed supplies from farmers, was introduced.
Guatemala	**Honey**	Strengthen the entrepreneurial capacity of the organization.	Strengthen strategic planning and corporate management of the organization Identify and develop new production and marketing alternatives Optimize the production and commercialization of beehive products.	CIPAC as a cooperative was strengthened, encouraging other cooperatives and leading to a revitalization of the National Honey Producers Association. As a result, farmer cooperatives have greater capacities in engaging in political processes and increasing production and marketing of products.
	Cacao	Strengthen the cacao north working group	Strengthen organizations of cocoa producers in agri-business (North Working Group) Strengthen its access to national and international markets with value-added products.	Relationships were established between north and south working groups on cacao. As a result, there is a diversification of quality products, industrialization of cocoa and other alternative crops. A national strategy for the cacao sector was developed.
	Avocado	Establish a viable avocado network	Establish the legal status of the avocado producers' organization Improve the production (quantity and quality) of the avocado crop Improve avocado marketing and processing.	The Integral Development Association of the Altiplano was established. As a result, there is improved market access and markets for avocado.
	Beans	Increase the production and commercialization of bio-fortified beans	Establish a mechanism to organize a financially stable network or organization of bio-fortified bean producers Strengthen the commercialization of bean seeds and fortified grains.	Producers formed alliances with the Ministry of Agriculture and health centres. As a result, nutritionally improved beans were increasingly included in school meal programmes.

Country	Innovation niche partnerships	Objectives	Initial priority objectives identified from the capacity needs assessment	Observed or reported outcomes at the end of the project after the acquisition of functional capacities
Honduras	**Cacao**	Improve production and post-harvest management of cacao in the region	Improve the relationships between the actors for the dissemination of good agronomic practices and access to adequate genetic material Strengthen cacao producers' capacities of post-harvest management.	The Cacao Producers Cooperative was legally registered. As a result, producers were able to negotiate with international buyers. Public institutions providing policy support to chocolate companies were acknowledged and registered. The Centre for the Atlantic Zone of the National Autonomous University became a regionally recognized player in cacao development and training, attracting new development projects.
	Beans	Establish a network of actors of the bean value chain.	Strengthen the capacities of the actors in the bean value chain at different levels (local, regional and national) Improve the bean value-chain actor's capacity to build relationships with government agencies, international organizations and private sector entities.	The National Bean Commercial Chamber was established with legal status. As a result, there was increased marketing and purchasing of beans, as well as access to finance for irrigation infrastructure for bean producers.
	Coffee	Establish sustainable production of and market for coffee from the region.	Empower the producers through better coordination of their needs and activities Define the unique qualities of the region's coffee Establish an institutional guarantee mechanism for coffee producers and buyers.	Producers in the niche identified and made deals with international markets for their coffee. As a result, coffee producers increased their income.
	Potato	Improve business opportunities of potato producers	Strengthen capacities of producers to work together and improve their business skills (planning, negotiation, marketing) Strengthen individuals' ability to meet credit requirements.	Producers were legally organized as a result of better understanding of legalisation processes and benefits of working together as a group. The niche led to the establishment of the gazetted potato value chain. As a result, strong linkages were formed with partners to improve production, and producers gained a voice in the policy process.

Country	Innovation niche partnerships	Objectives	Initial priority objectives identified from the capacity needs assessment	Observed or reported outcomes at the end of the project after the acquisition of functional capacities
Lao PDR	**Pig**	Strengthen the small-scale pig farm business in Dong Ka village	Farmers should be able to raise pigs at a lower cost and make higher profits.	Pig farmers were empowered to work together and they acquired technical skills through their own negotiation on type of training required. Business skills were enhanced to be able to negotiate in new markets and to sell more. As a result, pig raising was extended to four other villages, with increased production and income, and expanded markets.
	Cattle	Strengthen the Ban Kean cattle production farmers group	Farmers should be able to use appropriate and low-cost local feeds to raise and fatten exotic cattle Farmers should be able to increase exotic cattle breeds' reproduction and improve their health Farmers should be able to manage their exotic cattle production, investment and markets.	Acquired skills for the critical analysis of situations, improved group management, identification of new business for cattle farming i.e. sale of manure to vegetable growers and new contracts for male calf raising and expansion of crossbred cattle to other provinces. As a result, farmers now have regular income.
	Vegetables in Non Tae	Strengthen Non Tae organic vegetable production farmer group	Farmers should be able to use effective organic fertilizer and be able to control pests, insects and disease Farmer group committee should acquire capacities for systematic internal quality control and management Farmers should be able to access finance and greater market opportunities.	Improved working together resulted in organized training and understanding of organic agriculture. Farmers acquired organic agriculture certificates and increased production and incomes.
	Vegetables in Tongmang village	Organic vegetable production in Tongmang village (farmer network)	Farmers should be able to cultivate more vegetable varieties in the monsoon season Farmers should be able to have access to finance Farmers should be able to have more market opportunities	Farmers became empowered to enter into new partnerships with restaurants and wholesale markets. They acquired improved technical skills to expand areas of cultivation and enhanced business skills to negotiate loans and acquire organic cultivation certification.

Country	Innovation niche partnerships	Objectives	Initial priority objectives identified from the capacity needs assessment	Observed or reported outcomes at the end of the project after the acquisition of functional capacities
Lao PDR	**Aquatic animal proteins**	Improve sustainable production and marketing of aquatic animal proteins from rice fields	Access to water and application of local knowledge on water and aquatic animal management techniques and technologies using existing resources to diversify their income (natural and unnatural aquatic animals in the rice fields) Adaptation of conservation practices by local communities to ensure balanced agro-ecology in the rice field Access to credit with affordable conditions for the farmers to be able to pay back and make a profit from their loaned investment.	Acquired critical thinking to fulfil the potential and realistic farming. Joint analysis resulted in a change in focus towards vegetable and chicken farming. As a result, farmers gained new income and registered as a local production group to negotiate sales with traders and other buyers.
	Rice	Rice millers' association	Improve organization and administration of all group members Strengthen management of the rice supply chain Improve the association's visibility to the public and increase trust and collaboration within the association Improve rice quality for export.	Strengthened collaboration between farmers led to improved access to commercial loans from banks. Improvement in technical skills led to improved rice quality supplied to customers, and availability of quality seeds for farmers.

Country	Innovation niche partnerships	Objectives	Initial priority objectives identified from the capacity needs assessment	Observed or reported outcomes at the end of the project after the acquisition of functional capacities
Rwanda	**Rwangingo district water catchment area**	Improved livelihood for the niche actors through higher crop and animal yields and reduction of post-harvest losses	Improve collaboration amongst the catchment occupants To put in place an effective water supply and management system (water sharing schedule and infrastructure improvement with efficient inspection) To identify potential actors to support post-harvest activities and establish a proper network/ partnership	Coaching on governance, partnerships and business development resulted in improved market access for animal and crop products.
	Ruhango district cassava	Establish a well-functioning partnership between actors: i) Farmers & research & extension; ii) Farmers and Kinazi Cassava Plant, Ltd - Availability of clean cassava planting material	To improve collaboration and contractual arrangements with the Kinazi processing plant To have access to disease-free and tolerant planting material as well as other useful cassava technologies resulting from research aimed at helping farmers become compliant with standards To have a well-managed and properly functioning MS partnership whose activities are well-documented and which communicates internally and externally in a transparent and effective manner	Coaching on partnerships and business development resulted in increased cassava production to meet the full capacity of cassava plant and revitalization of the cassava market.
	Burera milk processing centres	Establish a well-functioning partnership among the Burera community processing centres (CPC) to improve milk production and milk trading systems	To improve the Burera CPC milk supply chain To increase capacity of veterinarians and other services providers in pursuit of effective service delivery and change management To strengthen the innovation partnership in pursuit of effective communications and service delivery in the milk value chain	Coaching on partnerships and business development, in conjunction with improved technical knowledge, resulted in improved quality and quantity of milk production, diversified products, and improved trading of milk and milk products.

Source: CDAIS Final Report, 17 January 2020

CDAIS project was implemented with the financial assistance of the European Union

ISBN 978-92-5-133375-4

9 789251 333754

CB1251EN/1/11.20