Embedding interactive innovation approaches in the top-down agricultural research and extension system of Ethiopia; insights from Tigray

Mikinay Hailemariam Seifu

Propositions

1. Scaling an intermediation mechanism requires making the anchoring process an integral part of the design of an intervention.
(this thesis)
2. Systemic problems cannot be tackled by innovation platforms alone.
(this thesis)
3. Economic growth does not prevent political instability.
4. For scientists, presenting complex issues in a simple manner is much more difficult than understanding them.
5. Learning how to learn is the most difficult form of learning.
6. Presence of more women in power is not necessarily indicative of women's empowerment.

Propositions belonging to the thesis, entitled:

Embedding interactive innovation approaches in the top-down agricultural research and extension system of Ethiopia; insights from Tigray

Mikinay Hailemariam Seifu

Wageningen, 29 November 2021

Embedding interactive innovation approaches in the top-down agricultural research and extension system of Ethiopia; insights from Tigray.

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Embedding interactive innovation approaches in the top-down agricultural research and extension system of Ethiopia; insights from Tigray.

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Thesis

submitted in fulfilment of the requirements for the degree of doctor
at Wageningen University
by the authority of the Rector Magnificus,
Prof. Dr A.P.J. Mol,
in the presence of the
Thesis Committee appointed by the Academic Board
to be defended in public
on Monday 29 November 2021
at 4 p.m. in the Aula.

Mikinay Hailemariam Seifu

Embedding interactive innovation approaches in the top-down agricultural research and extension system of Ethiopia; insights from Tigray,
284pages.

PhD thesis, Wageningen University, Wageningen, the Netherlands (2021)
With references, with summaries in English

ISBN: 978-94-6395-798-4

DOI: <https://doi.org/10.18174/555203>

Acknowledgements

“It always seems impossible until it's done.” — Nelson Mandela

The last eight years were a journey filled with mixed feelings of hope and frustrations. Although I started the PhD trajectory with full confidence and enthusiasm, it was a very difficult journey for me. Finally, it is done, and I am here writing the acknowledgement!!

I would like to take this opportunity to extend my great appreciation to those who, in one way or another, helped me to finish what I started.

First of all, I would like to express my special thanks to my supervisory team: my promoter Professor Cees Leeuwis and co-promoters Dr. Annemarie van Paassen and professor Laurens Klerkx. **Cees**, I am grateful to have you as my promotor. You always made time from your busy schedule for giving feedback on my work. I am amazed by the clarity and simplicity of the comments you give in a written form and the inputs you provide during our meetings. Thank you for your understanding and unreserved support.

Annemarie, your support, guidance and patience throughout all these years are greatly appreciated. Your travel to my field research site in Tigray, Ethiopia was instrumental in shaping issues this thesis should address. The regular skype meetings and email exchanges helped me a lot to keep on going. During the write-up phase, you always made time to provide on time comments on my work. Your critical comments and your editorial work were very helpful. I really appreciate the attention you give to details of the research. Your social support was also equally important as the academic support, for me to move forward despite all the personal, social and academic challenges I have faced over the years. Thank you for your understanding and for your willingness to share my emotions and concerns. Indeed, without your supervision, my Ph.D. study would not have been completed.

Laurens, thank you for your critical comments and tough questions, which in a way pushed me to think more systematically about how to frame the scientific contribution of my work. Thank

you also for pointing me to an extensive range of literature, particularly at the early stage of the PhD research. It was helpful to anchor my work in the academic debates at that time. I would also like to mention Nicholas Parrott and thank him for the editing works of the thesis, which greatly enhanced the readability of the thesis.

I also wish to thank the secretariat team of the KTI chair group. The team includes: Inge Ruisch, Annette Dijkstra, Mirjam Cevat, Bea Prijn, Vera Mentzel and Dunselman Germaine. Thank you for facilitating all my logistical and administrative matters during my stay in the group. Thank you also for organizing the KTI outings, the potlucks and other social activities. They are among the unforgettable experiences in the KTI chair group.

My gratitude also goes to many colleagues at the KTI chair group who provided a collegial environment and always had words of encouragement along the way. These, among others, include: Mukta, Dyah, Chaniga, Tania, Mirjam, Julissa, Kelly, Sharmin and Nina. The small talks during lunch time and other get together events were helpful to get through this process. I also would like to thank other friends who have been supportive throughout the PhD journey. Amleset Haile, Afewerki Yohannes, Hadigu Hishe and Gloria Corradini; thank you very much for your continued encouragement.

Of course, this project would not have been possible without the financial support of the Capacity building for Scaling up evidence based best practices in agricultural production in Ethiopia (CASCAPE) project. I would like to thank the CASCAPE project, for awarding me the scholarship to pursue my PhD study. Let me also take this opportunity to thank my home institution, Mekelle university for giving me the study leave and supporting my research in all aspects. I, particularly, thank my colleagues and friends in the College of dry land agriculture and natural resources for their support and encouragement. Special thanks to Dr. Girmay Tesfay who was the coordinator of the CASCAPE project and dean of the college at that time. I also would like to thank Dr. Irene Koomen for her support and encouragement throughout the PhD

process. I also thank her for inviting me to her home for New Year's Eve celebrations, which are among the great memories of my stay in Wageningen.

During the fieldwork, I received invaluable support from different institutions and individuals. I would like to express my gratitude to the regional bureau and many district offices of rural development and agricultural extension in the southern zone of Tigray, CASCAPE project staff in Mekelle university, and Africa RISING project staff in Endamekoni district, for all their support during the data collection period. I am thankful to everyone who made time for the interviews, answering endless questions and sharing invaluable information. These include, among others, farmers, government officials at different administrative levels, agricultural extension and rural development bureau/office heads and staff, development agents, researchers, staff of CASCAPE and Africa RISING projects, and others, representing various NGO and GOs.

Finally, I am very much grateful to my Family. The constant encouragement and moral support of my Mom (Simiret Negash), Dad (Hailemariam Seifu), brothers (Abera, Solomon, Dawit), sisters (Tiblets, Amarech and Gidena) and my brother in-law Solomon Gebreyoahannes throughout my academic career helped me to be persistent, no matter what. And last, but not least, I would like to appreciate my husband, Welday Mesfin. Given the devastating situation in Tigray, Ethiopia, it would have been very difficult for me to get through this traumatic year and finalize the write up of my thesis. Thank you very much for all your support and encouragement at the critical time of the last stretch of the PhD.

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Chapter 1

General introduction

1.1.Introduction

The Ethiopian agricultural research and extension system remains predominantly top down, despite innovation system-based interventions of various NGO projects, and leaves little space for pluralism and inclusiveness. Spielman et al (2007) noted that the agricultural innovation system (AIS) of Ethiopia is weak and fragmented. This is due to a continuing focus on the traditional and linear transfer of technology (TOT) model and the failure to recognize the need for forging links among smallholders, extension agents, and private sector and civil society that comprise the wider AIS (Spielman et al 2010).

The TOT model has often been criticized for its top down, supply driven and technology focused approach, which does not generally consider the context of smallholders (Klerkx et al 2012). The flow of knowledge relating to innovation is conceptualized narrowly as a one-way dissemination process in which extensionists are considered as deliverers of “science and technology” to farmers (Hoffmann 2007). Yet, as Hall (2007) pointed out, most of the technologies developed through the linear model are found to be unfit to the social, physical and economic contexts in which farmers operate.

Unlike the linear models, the main concern in the innovation system (IS) model is the demand side of the innovation processes instead of the supply (Klerkx and Leeuwis 2008). Successful innovations result from an integration of ideas and insights from scientists, users, intermediaries and other societal agents; not a one-way diffusion of scientific knowledge (Leeuwis and Aarts 2011). The model underscores the importance of multi-stakeholder interactions and learning to improve the capacity of individuals and collectives to innovate, and develop the institutional and infrastructural preconditions for inclusive, sustainable development (Lundvall et al 2002; Hounkonnou et al 2012). According to Hall et al (2006, p.vi), an innovation system can be defined as “a network of organizations, enterprises, and individuals focused on bringing new products,

new processes, and new forms of organization into economic use, together with the institutions and policies that affect their behavior and performance”. Interactive, or inclusive, innovation approaches are more likely to result in solutions that are technically sound, match the aspirations and resources of farmers and are aligned with the institutional context (Schut et al 2019). Recognizing this, various development actors such as governments, scientists and donors are increasingly embracing the Agricultural Innovation System (AIS) perspective, a perspective that reflects the evolution in systems thinking in agricultural innovation over the years (Biggs 1990).

There is an evident lack of interactions and collaboration in agriculture in Sub-Saharan Africa (SSA), despite claims that it has embraced the AIS perspective. Various authors have noted that a lack of interaction among actors is due to various system failures (Hounkonnou et al 2012; Poulton et al 2010; Röling et al 2012), which include: infrastructural, institutional, interactional, and failures and a lack of capabilities (Klein-Woolthuis et al 2005). Adejuwon (2016) argued that a lack of cohesiveness among actors within AIS contributes to limited development and diffusion of appropriate innovations in the context of small-scale agricultural production in SSA, and thus the importance of linkage/partnership/interaction is becoming indisputably desirable. Kebebe et al (2015) reported that such systemic issues are associated with low adoption of technologies and the underdevelopment of the dairy sector in Ethiopia and that efforts aimed at enhancing systemic interaction in the AIS could help to improve the situation.

Linkages are usually not self-organised, which makes innovation intermediation essential (Leeuwis 2004; Klerkx et al 2009; Klerkx et al 2010). Actors engaged in coordinating and brokering relations at several interfaces in complex multi-actor configurations in the AIS (known as intermediaries or brokers) are required (Klerkx and Leeuwis 2007; Klerkx et al 2015). Ample literature exists about various intermediation approaches. Several of these studies emphasise the importance of context and the need for institutionalization (Klerkx et al 2017; Nederlof et al 2011;

Schut et al 2019; 2018). However, we know little about how different approaches actually work in specific contexts and to what extent and how successful intermediation approaches can be institutionalized. This dissertation aims at filling this gap by investigating the performance and institutionalisation of various types of intermediation approaches initiated by different types of actors (NGO projects and the government) in the agricultural sector, in the southern zone of Tigray regional state, Ethiopia.

Schut et al (2019) argued that an adequate understanding of the context of an AIS is central for appraising the performance and structural embedding of innovation intermediation approaches. According to Schut et al (2018), *ex-ante* appraisal of the historic pathways of economic and political development, may show the delineations of the types of intermediation that are acceptable. To be able to situate the case studies, the thesis starts with a historical review (chapter two) on the evolution of thinking and practice of agricultural innovation in Ethiopia.

1.2. Theoretical background, aims and research questions

1.2.1. The evolution of thinking and practice of a national agricultural innovation system in Ethiopia

The last 40 years have witnessed extensive debate over the best way for science and technology to foster innovation (Hall et al, 2006). In line with this, a wide range of approaches to agricultural innovation has emerged over the past four decades (see Leeuwis 2004; Ponniah et al 2008; Spielman et al 2008; 2009; Leeuwis and Aarts 2011; Klerkx et al 2012; Schot & Steinmeuller, 2018). The transfer of technology (TOT) approach that has existed since 1950s was the first. This reflected the idea that researchers develop knowledge and technologies, which are then transferred ‘top-down’ by extensionists to farmers, or other end-users (Rogers 1962). Many have criticized

the linear idea of innovations being developed by scientists, disseminated through intermediaries and then put into practice by users (Leeuwis 2004; Rip 1995; Röling 1988).

A growing awareness of the limitations and undesirable effects of the linear technology transfer approach led to the emergence of broader innovation perspectives (see Norman 2002; Pant and Hambly-Odame 2009; Engel 1995). The most important paradigm shift concerned the emphasis given to the involvement of the farmers in articulating their problems and needs and thereby influencing research and extension priorities (Kassa and Alemu 2017). The emphasis switched to the need to nurture actors' innovative capacity (instead of providing technical 'solutions') through participatory technology development (PTD) whereby farmers were actively involved, at an early stage in the innovation process. Farmer groups, farmer-led trials, and on-farm experimentation were used to enhance farmers' participation (Ashby 2003; Hoffmann et al 2009). This model has been coined in various ways such as participatory farming systems research (Ruthenberg 1971; Harwood 1979 and Norman 1980) and participatory technology development (PTD) (Friederichsen et al 2013).

Innovation system (IS) thinking is the most recent perspective that emerged around 2000 (Klerkx et al 2012). The concept of IS and the AIS emphasize interactive and inclusive innovation processes (for more detail on the concept of IS see section 1.1).

There is a general agreement that the TOT innovation paradigm is hegemonic in SSA countries, including Ethiopia (Spielman et al 2010; Schut et al 2016, 2019). However, there is little understanding of the historical developments of innovation systems in developing countries and how this relates to the evolution of innovation theories in the literature. To fill this gap, chapter 2 of the thesis starts with an historical account of the changing policy perspectives on the role and functioning of the public agricultural extension service in Ethiopia. As in many other developing

countries, the public extension service is traditionally considered to be the main intermediary actor supporting agricultural innovation (Kilelu et al 2013). My aim is to share a better understanding about how innovation perspectives have been taken up and innovation policy and discourses have evolved across three consecutive Ethiopian political regimes.

The major features that characterize the TOT, PTD and AIS innovation perspectives are used to characterize the successive regimes (for more details on these features see Chapter Two). This gives an overview of the broader context (which the other chapters will draw upon) from a historical perspective. The subsequent sections present a brief theoretical background for the rest of the chapters.

1.2.2. The performance of innovation intermediation approaches in terms of implementing intermediation functions

Intermediaries may take intermediation as a core or a side activity, depending on the context (Klerkx et al 2009; Klerkx et al 2015), which I refer to as the *intermediation modality*. They can also opt for various types of interventions, so-called *intermediation mechanisms*, such as innovation platforms or other problem-based *ad hoc* mechanisms to connect actors and facilitate interactive innovation processes. The intermediation modality and mechanism determine the *intermediation approach*, used to fulfil the various *intermediation functions* as defined by Klerkx et al (2009): context analysis, demand articulation and planning; network building; and innovation process management

Each modality and mechanism have its specific strengths and weaknesses (see chapter three for details). According to Klerkx et al (2009), the strengths, weaknesses and performance of different innovation brokering modalities are not only determined by their inherent characteristics but also depend on the institutional and political context in which they function. The same holds true for

the different intermediation mechanisms. For instance, several authors noted that IP based interactive processes are only effective when they fit the institutional environment (Nederlof et al 2011; Schut et al 2018; Schut et al 2016). In some situations, using a flexible, opportunity and problem-based type of intermediation might be more feasible (van Paassen et al 2014; Hermans et al 2017; Schut et al 2019). In other settings, individual champions who use their networks of influence may work better (Houunkonnou et al 2012; Jiggins et al 2016; Klerkx et al 2013).

Despite the general recognition of the influence of an AIS's context on the effectiveness of the intermediation approaches, there has been little research into how the different intermediation approaches actually work in different contexts. This thesis therefore investigates different innovation intermediation approaches and the performance of two projects, Capacity Building for the Scaling Up of Evidence-Based Best Practices in Agricultural Production (CASCAPE) and Africa RISING, in Tigray State, Ethiopia. The aim is to better understand how various intermediation approaches perform the four intermediation functions within a specific context.

1.2.3. The institutionalisation of project-based innovation intermediation approaches

Anchoring project-based innovation intermediation approaches

To ensure wider and long-term impact, innovation projects need to invest in embedding and scaling processes (Klerkx et al 2017; Schut et al 2018; 2019). Schut et al (2019), argued that local-level platforms should be well embedded in existing agricultural innovation systems to enable the scaling of innovations. Otherwise, they run the risk of remaining solitary initiatives, with a limited impact on the intended beneficiaries. This makes it essential to know 'whether and how successful intermediation approaches can be institutionalized in-context'. However, so far, there has been little research investigating the embedding or 'anchoring' process and the potential for scaling the

intermediation approaches. This thesis aims to fill this gap. It studies the process of anchoring an interactive innovation project and the effects this is likely to have on future scaling.

In line with Elzen et al (2012) I conceptualize embedding or anchoring as a pre-phase for scaling. From this perspective, anchoring is about building links between niches and regimes and how the anchoring activities and strategies employed by niche actors penetrate and influence the socio-technical regime; through the translation of niche practices into regime components. Niche innovations form the micro-level where radical changes emerge in which new, yet unstable, rules are developed by a small network of dedicated actors in protected spaces (Geels 2005; Geels and Schot 2007). The regime refers to a community of interactive groups (e.g a community of scientists, policy makers and users) with a recognized combination of stable rules that coordinate action (Geels and Schot 2007). In this study, the dominant and the novel agricultural innovation approaches are referred to as the regime and the niche innovation approaches. I identified various anchoring dimensions and related activities from the strategic niche management and innovation literature in order to develop an ‘anchoring framework’. The framework was used to assess the anchoring activities of the Africa RISING project that embraced the interactive innovation system model (by means of the Farmer Research Group *cum* Innovation Platform (FRG-IP) approach) in Tigray State, Ethiopia. The aim is to gain a better understanding of the anchoring process of a niche project; i.e. what is needed to attain wider and long-term impact (the transformation of the national Ethiopian AIS, ‘the regime’).

State-driven innovation platforms (IPs) as an instrument to transform the dominant regime

Another way to institutionalize new, more interactive, forms of innovation is through the transformation of the regime itself (i.e. enforcing change from within). This will involve enhancing the capacity of the structural elements of the innovation system: the actors, infrastructure,

interaction, and institutions (Wieczorek and Hekkert, 2012). When these structural components are missing or not working well, this generates systemic problems that impede the development and functioning of the IS (Turner 2016; Wieczorek and Hekkert 2012). It has been argued that such systemic problems can be tackled through what are known as ‘systemic instruments’ (Smits & Kuhlmann 2004; Turner et al. 2016). IPs have been employed as a systemic instrument, to remedy systemic problems (Lamers et al 2017); but their contribution to IS capacity building depends on various factors, which can both enable or constrain their potential (see: Cullen et al 2014; Nederlof et al 2011; Schut et al 2016, 2019).

In developing countries, it is mostly donors who tend to promote IPs as systemic instruments; as governments have limited resources to implement the required policy and infrastructural measures (Triomphe & Rajalahti 2013). Consequently, the vast majority of the empirical studies have focused on donor-funded project-based IPs and so little is known whether and how state-initiated IPs can be used as an effective systemic instrument to transform AIS. To fill this gap, this thesis investigates the effort made by the Ethiopian government to enhance interactive agricultural innovation for farmer development, initiating IPs at different administrative levels. It seeks to gain insights into the performance of institutionally embedded state-driven IPs: whether and how they manage to tackle systemic problems and create a conducive institutional context for interactive agricultural innovation, thereby bringing a systemic change in the dominant top-down AIS.

Wieczorek and Hekkert (2012) identified the possible aims of systemic instruments in tackling systemic problems, related to each structural element of an IS. Combining the conceptualization by these authors with the enabling and constraining factors that influence the establishment of IPs as systemic instruments identified from the literature, I explore the contributions of a state-initiated platform called Agricultural Development Partners Linkage Advisory Councils (ADPLACs) in

Tigray regional state in tackling the systemic problems, alongside the structural conditions influencing its enactment. The aim is to gain a better understanding about the process of enforcing change (the transformation of the national AIS) from within, using state-initiated IPs as systemic instruments.

1.3. Research objectives and questions

The overall objective of this thesis is to explore the performance and institutionalization of various innovation intermediation approaches in the agricultural sector, in the southern zone of Tigray, Ethiopia. The specific objectives are:

1. To provide insights into the broader institutional context/regime, focusing on the agricultural extension services of Ethiopia.
2. To investigate how different types of innovation intermediation approaches perform the essential innovation functions in context.
3. To develop a framework of the critical anchoring activities of an innovation mediation project, so as to gain insights into the strengths and weaknesses of project strategies and the plausible effects on future scaling.
4. To investigate the performance of a state-driven IP in tackling systemic problems and transform the agricultural innovation regime, assessing the structural conditions that influence the actual functioning of the state-driven IP.

From these objectives, the following overarching research questions were derived to guide the different case studies reported in chapters 2 to 5:

1. How have the research and extension system and related policies and discourses in Ethiopia evolved over time, and how do these developments relate to the evolution of the innovation paradigms in the broader literature?
2. What type(s) of agricultural innovation intermediation approaches perform better in terms of providing the essential innovation functions in a government-led development context, such as exists in Ethiopia?
3. To what extent, and how can, successful intermediation approaches be institutionalized within such a context and to what extent can the anchoring framework provide useful guidance on how to create an experimental fit-with-context and a conducive institutional environment for scaling?
4. To what extent, and under what conditions, can state-initiated innovation platforms IPs be effective in tackling the systemic problems of the top-down agricultural research and extension regime and realise a transformation of the system towards interactive innovation?

1.4. Research methodology

1.4.1 Study area and case selection

Ethiopia has a population of almost 103 million inhabitants (UNDP 2019) and agriculture continues to be a source of living for the great majority of the population, of which about 82% live in rural areas (FAO 2018). The sector continues to be the mainstay of the Ethiopian economy, accounting for 37% of GDP (the highest in Sub-Saharan Africa), employing 72% of the population, of which 74% are smallholders, with an average farm size of 0.8 ha (ibid). As a consequence, smallholder agriculture has been the central focus for development and has received much attention from successive governments.

To improve the livelihood of smallholder farmers in different regions and farm systems, the Government of the Federal Democratic Republic of Ethiopia has initiated a comprehensive Agricultural Growth Programme (AGP) in 4 regional states (Tigray, Amhara, Oromiya and Southern Nations, Nationalities, and Peoples' Region) and 83 *woredas* (districts). The AGP aims to develop agricultural production and commercialization, rural infrastructure development and management and scale up the best practices to other *woredas* across the country. A project called Capacity Building for the Scaling Up of Evidence-Based Best Practices in Agricultural Production (CASCAPE) was designed to strengthen the capacity of AGP stakeholders in identifying, documenting and disseminating best practices in agriculture. In Tigray regional state, the project operated in the southern zone; in five *woreda* (districts) and 10 representative *kebeles* (sub districts) (see: CASCAPE 2014).

CASCAPE financed this research on AIS. In an exploratory study in 2014, resource persons were contacted to identify projects making use of the AIS perspective. The initial idea was to focus on the southern zone of Tigray regional state, but as there were not many AIS projects the focus was broadened to the whole state. When the actual data collection started in 2015, the CASCAPE project itself and a project called Africa-RISING-Ethiopian Highland (abbreviated as AR), both working in the southern zone of the Tigray regional state, were the only projects which had a considerable activity that were attempting to apply AIS perspective and were thus selected as cases for this research.

CASCAPE was financed by the Dutch Ministry of Foreign Trade and Development Cooperation, through the Royal Dutch Embassy in Ethiopia. Its activities in Tigray were implemented by public organisations, mainly by Mekelle University, in collaboration with the Bureau of Agriculture and Rural Development and the Agricultural Research Institute. The project embraced the interactive AIS perspective, engaging in participatory action research and supporting the development of

actors and knowledge networks at various levels in order to promote the up-scaling of innovations (see: CASCAPE 2014). AR is one of the three research-for-development projects of the Africa Research in Sustainable Intensification for the Next Generation (Africa RISING) programme in western, eastern and southern Africa, financed by the United States Agency for International Development (USAID) as part of the U.S. government's Feed the Future initiative (ILRI 2016). In Ethiopia, the AR was led by the International Livestock Research Institute (ILRI), one of the CGIAR (Consultative Group for International Agricultural Research) centres (see Mekonnen and Thorne 2015 for details). It was implemented in four regions and eight *kebeles*, of which two lay in Tigray regional state (ILRI 2013). AR operationalized the AIS perspective through the creation of commodity-based farmers research groups (FRGs) at the grassroots level, supported by strategic IPs at *woreda* and *kebele* level. The aim was to contribute to the 'Feed the Future' goals of reducing hunger, poverty and under-nutrition through *'delivering high quality research outputs by undertaking participatory action research (FRG) and applying a development partnership approach (the IP approach) to identify and validate solutions to the problems experienced by smallholder crop-livestock farmers'* (Ellis-Jones et al 2014).

As noted earlier, the literature shows that acceptance and the effectiveness of participatory approaches depends on the context. So, to understand which type of project-based innovation intermediation approach satisfactorily enhances interactive innovation in context, I selected these two projects that applied the AIS perspective, but with a different innovation intermediation approach. However, assessing the performance of different types of agricultural innovation intermediation approaches in-context was not the sole aim of this thesis. I also wanted to understand how a successful interactive innovation approach (niche) can be scaled-out, sustained in the context (up-scaling) and, maybe, transform a dominant innovation regime such as the state-led context that typifies Ethiopia. So, to understand the anchoring, out- and up-scaling, and transformation dynamics, it was essential to find a successful AIS project that attained short term

results (example: the capacity building of individuals for interactive learning), and if possible also achieved some degree of scaling. Comparing the cases, AR performed well and was therefore selected for further analysis of its anchoring and scaling dynamics.

To gain insights into such a possible transformation, or systemic change, towards an AIS-based innovation approach in the context of Ethiopia, I considered it important to not only assess the potential of donor project-based AIS initiatives, but to also study the efforts to change towards AIS made by the dominant government agricultural innovation regime. The exploratory study in 2014 therefore also included the state initiatives to realize multi-stakeholder innovation platforms. The exploratory assessment revealed that in the past 30 years the government had made various efforts to tackle the lack of linkages between stakeholders in the agricultural sector, which was perceived as the most critical systemic problems for the AIS of the country (Kebebe et al 2015; Spielman et al 2011). The most recent one involved the Agricultural Development Partners Linkage Advisory Councils (ADPLACs) that were established in 2008 to enhance collaborative agricultural innovation (Ludi et al 2013; Kebebe et al 2015). The government envisaged that ADPLAC would play the role of a systemic instrument, enhancing interactive agricultural innovation and development through improved linkages between Governmental Organizations (GOs), NGOs and other actors operating at national, regional, zonal and *woreda* (district) levels. For this reason, ADPLAC was also selected as a case study for the research.

Figure 1.1: Study area in the southern zone of Tigray regional state

1.4.2 Research approach

A case study approach was applied, as is suitable for research with a descriptive question ('what happened?') and/or an explanatory question ('how or why something happened?') (Yin 2004, p.2). The research focussed on the agricultural innovation system of Ethiopia, and various case studies of initiatives to change the dominant transfer of technology innovation regime. The aim was to describe, analyse and compare the initiatives, their local functioning and the transformative impact in the regime.

1.4.3 Data collection techniques

The research used various data collection techniques. The main techniques are introduced below, and further details are provided in the various chapters.

Literature review of the history of extension services in Ethiopia. All processes of social change are context and path-dependant. To situate the case studies, a literature review on past and current agricultural extension interventions in Ethiopia was carried out. Important journal articles, books, thesis, relevant policy documents and grey literature in the form of evaluation studies and consultancy reports for the three distinct periods (political regimes) were reviewed. The information obtained from the various sources was triangulated.

In-depth interviews. In-depth interviews are a powerful method for generating descriptions and interpretations from people's point of view (Lewis 2003, p.58), and were undertaken to collect primary data. According to Ritchie (2003, p.37), in-depth interviews can either be made with an individual or with two or three people at the same time (paired interviews). A paired in-depth interview can be valuable when dealing with people who form a naturally occurring unit (for example: work colleagues). It provides an opportunity for an individual depth of focus but also allows participants to reflect on, and draw comparisons with, what they hear from others. Hence, both individual and group interviews were used to collect the primary data for this study. The interviews were made with key informants, mostly regional and district level officials, identified through both purposive and snowball sampling. For the project and state innovation initiatives, interviewees were selected from each platform level, depending on their role and the intensity of their participation in trainings, IPs and FRGs.

In-depth interviews were used to gather insights from various actors from GOs, NGOs and farmers on the effectiveness and institutionalization of various options of innovation intermediation

approaches in the agricultural sector in the southern zone of Tigray. For instance, in-depth individual interviews with farmers helped me to get their insights on the different innovation approaches by different projects and the state and the costs and benefits of these approaches. Likewise, in depth interviews with higher level officials, who are in a position to enforce institutional changes, helped me to understand the challenges and opportunities to scale ‘novel’ innovation approaches and related policy issues.

As the research was an iterative process, I often conducted more than one interview with the same participant/s at different times to triangulate new data and insights. In addition, in most cases, there were overlaps in the sense that a person was involved in, and hence interviewed about, more than one innovation initiative. This enabled some interviewees to give a comparative assessment of the context, functioning, effectiveness and scope for the scaling of the different innovation intermediation modalities.

The in-depth interviews were done with semi-structured interview schedules, based on open-ended questions and lists of relevant topics. This allowed the interviewees to freely share their experiences and thoughts. Through further probing into the issues raised, the interviewees provided insights into the actual functioning of the platforms and stakeholders’ concerns. Open ended questions were prepared in such a way that they covered the main themes of this study. Whenever possible, the interviews were audio recorded. However, there were situations where recording was inappropriate, e.g. when people did not feel comfortable about talking while being recorded, or when the place was inappropriate (such as crowded or shared offices or coffee houses). In these situations, short notes on the key themes were jotted down and further elaborated after the interview. Sometimes I made phone calls to check whether I had correctly interpreted the discussions and/or to clarify any confusion that emerged after reviewing the field work. Non-

participant observations of AR-IP meetings and CASCAPE workshops, and numerous informal discussions have also been used as sources of information.

Secondary data sources such as project evaluation reports, diagnostic study documents, minutes of platforms and workshops, platform guidelines and government policy documents and reports have been used as complementary sources. The actual data collection process started in 2015 and continued until 2018 with the data collection and the writing of the chapters overlapping.

Table 1.1: An overview of the main data collection methods used in the 4 empirical chapters

Chapters	Literature review	Data collection methods		
		In-depth individual interviews	In-depth group interviews	Non-participant observation
Chapter 2	Desk study using survey of journal articles, books, theses, relevant policy documents and grey literature in the form of evaluation studies and consultancy reports pertaining to the three historical periods.			
Chapter 3	CASCADE and AR project documents, such as reports and reviews	In-depth individual interviews in TBOARD, with: Regional extension process owner Regional-level AGP project coordinator <i>Woreda</i> level extension office head	In-depth group interviews in WOoARD, with: DAs at <i>kebele</i> level Experts at <i>woreda</i> level	In IP meetings of AR project at <i>woreda</i> and <i>kebele</i> levels In planning and evaluation workshops of CASCADE project at <i>woreda</i> and regional levels
		In-depth individual interviews in TARI with: Part time researchers in CASCADE project	In-depth group interviews in CASCADE, with: CASCADE project innovation team members CASCADE project's beneficiary farmers	
		In-depth individual interviews in AR, with: Project field coordinator and assistant coordinator IP members: CIP project coordinator and GRAD project coordinator Beneficiary farmers	In-depth group interviews in AR, with AR project's beneficiary farmers	
Chapter 4		In-depth individual interviews in CASCADE, with: Project coordinators, Project field assistants and Project beneficiary farmers		
	AR project documents, such as reports and reviews	In-depth individual interviews in AR project, with: AR project officers in the ILRI, Addis Ababa In-depth individual interviews with AR project partners (FRG-IP members): A researcher from the Alamata research centre	In-depth group interview in AR, with: The field site coordinator and an assistant coordinator	

Chapter 5	Review of government policy document ad and reports and ADPLAC guidelines for implementation and minute	<p>Project beneficiary farmers (FRG-IP members)</p> <p>In-depth individual interviews with actors who were not members of the IP, but were involved in scaling: TBOARD's head Alamata Research Centre manager</p>	<p>In-depth group interview with AR project partners (FRG-IP members) The Endamehoni Woreda extension officer, development agents (DAs) GRAD coordinator at Endamehoni Woreda CIP coordinator and TARI representative, both based at Mekelle University</p> <p>In-depth group interviews with: Representatives of the most active FRGs (who were not members of the IPs)</p> <p>In-depth group interviews in TBOARD with: Regional extension head, Regional level extension expert Focal persons in the regional AGP</p> <p>In-depth group interviews in TARI, with: TARI's director and socio-economic director</p> <p>In-depth group interviews with AR's IP members, who also participated in ADPLAC's meetings CIP project coordinator and a researcher from TARI AR and GRAD project coordinators</p>
Remark: Interviewees were selected using a combination of snowball and purposive mechanisms			
Keys: GRAD= Graduation with Resilience to Achieve Sustainable Development; CIP=International Potato Centre; AR=Africa RISING; CASCAP= Capacity building for scaling up of evidence-based best practices in agricultural production in Ethiopia; TBOARD= Tigray Bureau of Agriculture and Rural Development; TARI=Tigray Agricultural Research Institute; AGP= Agricultural Growth Programme; DAs= Development Agents; WOoARD= <i>Woreda</i> Office of Agriculture and Rural Development; IPs= Innovation Platforms; FRGs= Farmers' Research Groups; ADPLACs= Agriculture Development Partners Linkage Advisory Councils			

1.4.4 Data analysis techniques

Most of the audio recorded interviews and discussions were fully transcribed. The rest were partially transcribed focusing on the relevant research themes. The transcriptions, together with the field notes, provided the basis for coding and analysis. The theoretical frameworks developed in each empirical chapter were the point of departure for the coding and further analysis. The coding was an iterative process in which data selection, labeling, categorization and analysis were undertaken. Quotes were selected to substantiate key insights

Similarly, information from secondary data was coded in line with the defined theoretical frameworks of the different chapters. For the historical review chapter, relevant categories for describing the broader context and extension systems of the three consecutive regimes over the past decades were identified and used to organise the data.

1.4.5 Challenges in methodological design and data collection techniques

The scope of this thesis is broad, in that it focuses on the innovation systems of Ethiopia's entire agricultural sector, rather than on a specific commodity or value chain. So, the biggest challenge of the data collection concerned the complexity of the AIS concept, which is the pillar of this thesis. The majority of the interviewees (especially those from the governmental organizations) were not familiar with the concept of innovation systems. As various respondents found it hard to grasp the issues raised in the interviews, it was sometimes necessary to further explain the questions, refer to concrete experiences, and use simple day to day language. As a consequence, some interviews took longer than expected, which was worrisome for some of the high placed, busy, regime actors. However, as I had worked several years in the study area and was familiar with most of them, they tolerated the length of the interviews. The broad and complex nature of

the concept of AIS was also a challenge during data processing and analysis, as it was during data collection.

1.5. Outline of the thesis

Figure 1.2 provides an overview of the thesis, which consists of 6 chapters, including 4 empirical studies (Chapters 2 to 5). *This chapter* has discussed the background of the research in the light of the available literature and has highlighted the main focus of the thesis: the evolution of thinking about innovations, various options of interactive innovation intermediation, and their performance and institutionalization in the context of developing countries in general and SSA in particular. It introduced the theoretical debates related to the main topics mentioned above, and the knowledge gaps the thesis intends to address. It has presented the overall and specific research objectives and research questions linked to each chapter, the originality and value of the thesis and ends by presenting the overall research methodology and this outline of the thesis.

Chapter 2 is a historical literature review and presents the history of policy and discourses about agricultural extension in Ethiopia across three successive political regimes. This chapter serves to position the empirical work in the institutional context and provides insights into how history plays a role in current day agricultural extension service provision, approaches and practices. It also shows how the evolution of innovation theories is linked with the historical evolution of policy and discourse about agricultural innovation in practice.

The subsequent *chapters (3, 4 and 5)* analyze to what extent, and how, various options of innovation intermediation approaches may work and be institutionalized in the context described in chapter 2. *Chapter 3* investigates the performance of two different intermediation approaches (modality and mechanisms) in implementing four core innovation functions F1: context analysis, demand articulation and planning process, F2: network building, F3: innovation process

management and F4: innovation scaling. The aim is to better understand which type of innovation intermediation approach (the niche) fits in with and works better in the given context (the regime). Chapters 4 and 5 focus on the possibility of a project-based (niche) and a state (regime) initiative to transform a top-down innovation regime and institutionalize the IS approach. Building on the findings of chapter 3 (performance of the various innovation intermediation approaches), *chapter 4* develops and tests a framework to analyse the anchoring of the most effective project-based innovation intermediation approach (the FRG-IP approach) to better understand how to successfully embed novel approaches at the niche level, ensuring out/up-scaling to the regime level. Using the developed framework, it first identifies the network, methodological, and institutional anchoring tasks performed by the IP-based project. Then, it analyses the extent to which the use of the framework provides insight into the strengths and weaknesses of the anchoring strategy of the project and reasonably explains the achieved level of out and up-scaling and whether it leads to useful advices for anchoring to attain an experimental fit in context, and a conducive institutional environment for scaling. The last empirical study (in *chapter 5*) focuses on a state-driven IP. The chapter explores the performance of an IP, initiated by actors of the dominant regime, to tackle systemic problems, and therewith structurally transform the dominant top-down innovation regime towards a more interactive innovation approach. The aim is to understand the structural conditions influencing the enactment of the platform in creating change within the regime.

Finally, *Chapter 6* first provides a synthesis of the main findings and answers the key research questions of the thesis. It then discusses the cross-cutting issues and additional insights gained and subsequently reflects on the implications of the study on theory, policy and practice. Next, it discusses the recent political changes in Ethiopia and their implications for the agricultural innovation system. Finally, useful issues that merit future research and concluding remarks are highlighted.

Figure 1.2. Structure of the dissertation

Chapter 2

The history of agricultural extension services in the broader agricultural development landscape in Ethiopia: exploring linkages with broader innovation paradigms

Mikinay Seifu

*This chapter will be submitted to a journal as:
Seifu, M. The history of agricultural extension services in the broader agricultural development landscape in Ethiopia: exploring linkages with broader innovation paradigms.*

Abstract

Over the last five or more decades various competing innovation paradigms have been developed that inform research and extension. We have witnessed an evolution from Transfer of Technology (TOT), to Participatory Technology Development and Extension (PTDE) and then to Agricultural Innovation System (AIS) paradigms. This historical review chapter traces how agricultural extension services in Ethiopia have evolved over the past eight or more decades, across three successive regimes in Ethiopia. This study aims to yield insights into how the Ethiopian extension system has evolved overtime, and how these developments relate to the evolution of research and extension paradigms in the broader literature.

Ethiopia has gone through radical ideological shifts over the years: from feudalism to Marxism to a more liberalised market system. With the ideological shifts, the policy and the rhetoric of the advisory approaches has changed recently towards a pro-participation and decentralization discourse. My analysis of the literature reveals that several aspects of Participatory Technology Development (PTD) and AIS paradigms were incorporated throughout the three eras, even before the AIS paradigm was developed in literature. However, the TOT paradigm on research, extension and innovation has remained dominant and hegemonic across the three periods, despite the wide range of reforms and shifts in ideologies, policies and ideas. I conclude that this might be related with the lasting legacy of the socialist background and the origin of the parties that have ruled the country for the last five decades, linked to a continued preference for command-based hierarchal and top down approaches such as TOT.

The most feasible way forward in applying the innovation system perspective in the extension system of Ethiopia is to work towards a more pluralistic system, where extension plays brokerage, intermediation and facilitation roles across all administrative levels. Playing these types of roles requires different knowledge, skills and attitudes at the level of extension professionals and agents at different levels, as well as investment in capacity building and institutional changes at policy level.

Keywords: Historical Review, Extension, Innovation Paradigms

2.1. Introduction

Agriculture continues to be the mainstay of the Ethiopian economy, providing a source of living for the great majority of the population. The sector contributes 41.4% of the country's gross domestic product (GDP), 83.9% of total exports, and 80% of all employment in the country (Matousa et al. 2013). Because of this, different regimes have made agriculture the main focus of development policy. Successive governments have introduced different agricultural extension programmes aimed at enhancing the performance of the agriculture sector and improving its contribution to the country's overall economic transformation.

This historical review chapter traces back how the agricultural extension services have evolved over the past eight or more decades, across successive regimes in Ethiopia. The aim of this chapter is to situate the case studies of this thesis in the context of the extension system, and to show the influence of the context on current research and extension interventions by Non-Governmental Organisations (NGOs), which are central to the thesis. The analysis starts from the imperial regime (1930-1974), continues with the Derg military regime (1974-1991) and ends with the Ethiopian People's Revolutionary Democratic Front (EPRDF) regime (1991-2017).

The analytical framework and research methods for this chapter are presented in sections two and three. The subsequent sections discuss important features of the extension system within the broader agricultural development landscape for the imperial, the Derg, and EPRDF regimes respectively. Such features include the government's vision for agriculture, the sector's structure, the roles and linkages among key players, the type of agricultural extension programmes introduced and the way in which these were evaluated, as reported by the literature.

The historical findings are compared and discussed in section five, and the chapter ends with conclusion and a reflection on the way forward to adapt innovation system thinking in Ethiopia.

2.2. Analytical framework

Over the years, the issue of rural innovation and agricultural technology transfer has occupied an eminent place in the study and practice of rural development (Friederichsen et al. 2013). We have witnessed an evolution from the transfer of technology (TOT) model and the diffusion and adoption of innovations paradigm (Rogers 1995) to more participatory models (Ashby 2003; Chambers and Jiggins 1987; Chambers 1994; Hoffmann et al. 2009), and eventually to the Innovation Systems (IS) perspective (Biggs and Smith 1998).

The TOT is the oldest model that is usually characterized by its top down, supply driven and technology focussed approach. The flow of knowledge relating to innovation is conceptualized narrowly as a one-way dissemination process in which extensionists are seen as deliverers of 'science and technology' to farmers, and farmers are seen as the receivers of technical advice. Despite its dominance, the TOT model gradually became the target of criticism (Hoffmann 2007).

In the late 1980s, policy makers, academicians and development practitioners started to recognise the essential role farmers can play in the process of technology identification, development and transfer. At this juncture, the research and extension system started to shift from a 'top-down' supply driven technology development and knowledge transfer, which ran through 'a pipeline', to a more demand-based system that should be tailored to local circumstances and be responsive to farmers' critical needs. This shift followed empirical evidence revealing that unresponsiveness or inappropriateness of the technologies promoted was the main source of limited adoption of these 'off the shelf' technologies. Subsequently a

different perspective of the whole process of technology development and transfer emerged, advocating equal partnerships in which farmers, researchers and development agents (DAs) could contribute their knowledge and skill, and learn from each other. The most important feature of the paradigm shift at this time was the emphasis given to involving farmers in articulating their problems and needs so as to influence research and extension priorities (Kassa and Alemu 2017). Farmers are supposed to be involved actively, widely and early in the innovation process through, for instance, farmer groups, farmer-led trials, and on-farm experimentation (Ashby 2003; Hoffmann et al. 2009). This model has been described in various ways, such as participatory farming systems research (Klerkx et al. 2012) and participatory technology development (PTD) (Friederichsen et al. 2013). For the purpose of this paper, we will refer to this as the ‘participatory technology development (PTD)’ model.

Recently, the concept of IS in general and agricultural innovation systems (AIS) in particular has become the dominant approach not only for understanding innovation processes but also fostering innovation (Friederichsen et al. 2013, Klerkx et al. 2013). The IS model acknowledges that innovation is a result of interaction among diverse actors within an innovation system. It gives due emphasis to multiple sources of knowledge and seeks to involve farmers in the innovation processes (Biggs and Smith 1998). Innovation, based on this perspective, depends on the multi-directional flow of knowledge and should be demand driven, as opposed to previous concern for the supply and one-way diffusion of scientific knowledge (Klerkx and Leeuwis 2008). Consequently, the perspective relies heavily on concepts such as networking, collaboration, bridging, and brokerage (Biggs and Smith 1998). Because of the emphasis the IS perspective gives to interaction and networking, actors who are in the position of bridging informational gaps and mediating between the interests of actors comprising the system have central roles in it. Such actors are referred to as innovation brokers or innovation intermediaries

(Sheate and Partida'rio 2010). Extensionists are among the actors that fulfil the intermediation/brokerage role in innovation processes (Klerkx and Leeuwis 2009).

The objective of this chapter is to assess the historical development and current status of the agricultural extension services in Ethiopia. To this end, it aims to answer the question: How has the Ethiopian extension system evolved over time, and how do these developments relate to the evolution of research and extension paradigms in the broader literature?

To guide the analysis of the historical periods, Table 2.1 summarizes some key features of the TOT, the PTD and the AIS models that can be derived from literature. These features include the way in which innovation is conceptualised, the overall innovation approach, the dominant types of research applied, views about the source of innovation, the dominant roles of key actors, and the types of extension and intervention methods used.

2.3. Research Methods

As part of the research process I did a survey of important journal articles, books, thesis, relevant policy documents and grey literature in the form of evaluation studies and consultancy reports pertaining to the three historical periods. The next step was the selection of the most important and most relevant literature, keeping in mind the analytical categories provided in Table 2.1, my wish to characterize the broader context (for example: understand the relevant policy directions and governance arrangements) and describe the operational features of extension systems (for example: organisational structures, methods used, funding, extensionist-farmer ratio, etc.). Relevant categories for describing the broader context and extension systems were identified during the literature review, and information identified for one historical period frequently gave rise to a targeted search for comparable information related to other periods.

Similarly, my search strategy included many attempts to triangulate information obtained from one source with that of others. Thus, the review was carried out in an iterative way.

Table 2.1: Features of TOT, PTD and AIS paradigms

Features of the perspectives	Types of perspectives		
	Diffusion of innovations (TOT Model) (since 1960s)	Participatory technology Development and Transfer (PTD) Mode (since 1990s)	Agricultural innovation Systems (AIS) (System oriented approach) (since 2000s)
Conception of innovation	Innovations are technologies/knowledge and practices	Innovations are technologies/knowledge and practices tailored based on the local context such as the agro-ecological and farm's socio-economic context	Innovations are multi-dimensional and include new technology/knowledge and practices, as well as new social, organisational and institutional arrangements (such as policy and legal rules)
Innovation approach	Top down, supply driven and one-way diffusion of scientific knowledge model with information flowing from researchers to end users	Demand driven, tailored to local circumstances and needs and responsible to farmers' critical needs.	Bottom-up, demand driven and multi-directional flow of knowledge
Typical applied research methods	Scientists/researchers design technical experiments and conduct these under controlled conditions on experimental stations	Technical experiments are jointly designed by scientists/ researchers, extensionists and farmers; Farmer-led trials (on-farm experimentation)	Technical and institutional innovations are co-developed in pilot settings that involve multi-actor processes and partnerships
Source of innovation	Scientists/researchers	Scientists/researchers, extensionists and farmers	Multiple actors, beyond researchers, extensionists and farmers
Role of actors	Scientists/researchers are innovators or the source of innovations, and they make research decisions. DAs are the deliverers of the technological innovations from research to farmers and farmers are the recipients of the research outputs (adopters)	Scientists /Researchers, DAs and farmers contribute their knowledge and skill, and learn from each other. Farmers are mainly involved in problem identification and demand articulation according to their problems and needs	Innovation is a result of interaction among diverse actors within the innovation system. Scientists/scientists are among the partners responding to demand. DAs play an intermediation role (brokering role), while farmers are partners, entrepreneurs, and innovators exerting demands
Extension methods	Training and teaching, research led demonstrations, and controlled experiments	Farmer-led trials, and on-farm experimentation	Dialogue and negotiations; stakeholder experimentation, reflection and joint learning in interactive forums such as innovation platforms or networks

Chambers and Jiggins 1987; Chambers 1994; Friederichsen et al. 2013; Hall 2006; Klerkx et al. 2012; Leeuwis and Aarts 2011; Schut et al. 2016

2.4. Findings

Below we present the findings for the three historical periods, starting with a description of the broader agricultural and policy context of the time, and then zooming in on the extension programmes carried out and the type of services provided. Where possible, this is complemented with information available on the programmes' strengths, weaknesses and constraints as reported in evaluative studies.

2.4.1. Imperial Regime (1930-1974)

The government's vision for agriculture, the sector's structure, key players and linkages

Emperor Tewdros II (1855–1868) introduced the ideology of modern state formation in Ethiopia. He is the first king who designed and introduced policy instruments to modernize the country; via centralization of power and maintenance of law and order (Teshale 1995 as cited in Bekele 2016). As part of his modernization efforts he abolished the power of local princes and kings and replaced them with administrators from his military or members of the royal family (Keller 2005). His successors, Yohannes IV (1872–1889), Menelik II (1889–1913) and Emperor Haile Selassie (1930-1974) maintained his policy of modernization of the state and centralization of power to different degrees. Emperor Haile Selassie was the last state monarch, who was in power until overthrown by a military junta (also called Derg) in 1974 (Ezezew 2014). Haile Selassie followed the political ideology of the imperial monarchy or feudal system of his predecessors (Bekele 2016; Tola 2017). In relation to economic policies, the king initiated the establishment of a modern cash crop economy and emphasised the expansion of the educational system.

According to Kassa et al. (2003), the policies during the imperial regime in general gave little emphasis to the development of peasant agriculture, despite its importance to the overall economy. The share of the state budget dedicated to agriculture was between 0.2% to 0.6% of GDP, despite the sector making a contribution of more than 60% to GDP (Dechassa and Tolosa 2015). According to Kassa (2003) almost all the investment allotted to the agricultural sector was channelled into the expansion of large-scale commercial private farms engaged in the production of cash crops for export and raw materials for local industries, in line with the determination of the regime to modernize society and the dominant imperialist view of the state (see also EEA 2004/05; Berhanu 2012).

In the years from 1968-1973, the regime induced a policy shift and started to give emphasis to the modernization of smallholder agriculture (Kassa 2003; Berhanu 2012). The policy shift, according to Kassa (2003), was because of two reasons. First: realization of the continued stagnation of the agriculture sector and second: because of pressure from international aid donors. The ambition of modernizing small holders was regarded as challenging because of human, material and financial constraints and also due to an inappropriate land tenure system. During the imperial regime land was controlled by the king and the local landlords (Chala 2016; Beshah 2003; Zerga 2016). Inequitable land holdings have been one of the key issues the people of Ethiopia have been fighting for several decades. “Land to The Tiller” was the famous slogan in the uprisings against the imperial regime.

Centralisation of state power, whereby the emperor concentrated all power in his own hands characterizes the overall governance structure of the imperial regime (Van der Beken 2007). Tola (2017) reported that, even the first written constitution of the country that was introduced in 1931 was taken as a means of consolidating the power of the Emperor; as it did not provide representation of civil liberties or a representative legislature.

Coming to the organisational structure of the agricultural extension sector, Haramaya University, then the Imperial Ethiopian College of Agriculture and Mechanical Arts (IECAMA), led the coordination of the National Extension System until 1963 (Beshah 2003) and was the key player in providing research and extension services. In 1963 the mandate of agricultural extension service provision was transferred to the Ministry of Agriculture (Kassa 2003; Gebremedhin et al 2006). This move was as a result of a suggestion to the government that it would be better if the college concentrated its efforts on outreach and helping farmers residing in the neighbourhood of the College only. Since then, the Ministry of Agriculture (MOA) has been responsible for national extension activities. In 1971 the then MOA established a department known as Extension and Project Implementation Department (EPID), as an implementing structure (Gebremedhin et al 2006). The ministry decentralized its departments by establishing provincial offices and assigning provincial extension supervisors in 13 provinces of the country. The supervisors were in charge of supervising the DAs and were mainly located along the main roads in the country. Figure 2.1 shows the organisational structure of extension service during the imperial regime.

Figure 2. 1. Organisational structure of agricultural extension and research during the imperial regime: Own elaboration based on literature

As it can be seen in Figure 2.1, research and the extension fell under separate management structures. The agricultural research system in Ethiopia and its organizational capacity and processes evolved over time. First, agricultural schools and the then Alemaya College of Agriculture (now Haramaya University) were established with the triple function of education, research and extension between the 1940s and the early 1950s (Mengistu et al 2017). In the early 1960s a small unit of agricultural research was established under the Ministry of Agriculture (ibid). In 1966, the Institute of Agricultural Research (IAR) was established as a semi-autonomous public organization, with various old and newly established research centers underneath it (Beintema and Solomon 2003; Mengistu et al. 2017). This resulted in a greater distance between research and extension. The IAR took some measures to tackle the pertinent issue of research-extension linkages by establishing an internal extension research unit that was made responsible for undertaking on-farm technology evaluation. In addition, research and extension divisions were established in the various research centres (Mengistu et al. 2017).

There were a limited number of NGOs active in Ethiopia at that time and few formally organized modern civil society organisations (CSOs) (Kassahun, 2002 and Berhanu 2012). Those that existed were originally foreign-based, and mainly focused on addressing the pressing needs of vulnerable groups by providing aid, educational and health services, and vocational training services. The chiefdoms and other traditional centres of power had a role in policy making and exerted considerable influence (PMAC 1975 as cited in Berhanu (2012). Similarly, in the agriculture sector, the Ministry of Agriculture was the dominant organisation and responsible for the national agricultural extension system, with only a few non-governmental organizations engaged in agricultural development and extension activities (Kassa 2003).

Table 2.2. Summary of overall context, vision for agriculture, organisational structure and key players of the sector during the imperial regime (1930-1974)

Major features	Characteristics of the imperial regime (1930-1974)
Overall context	
Ideology	Imperial monarchy or feudal system
Land tenure policies	Privately controlled by the king and local landlords
Governance structure	Centralized state power and decision making
Players/actors	Few foreign-based CSOs that were mainly engaged in aid provision
Agriculture	
Direction of the development	Modernizing the Ethiopian small holder agriculture from 1968 onwards
Focus /priorities/targets	
<i>food/consumption versus for market</i>	Cash crops for market, mainly for export
<i>Type of farmers</i>	Landlords and commercial private farmers
The main players/actor	Ministry of Agriculture (MOA) was the sole authority Few Non-Governmental Organisations (NGOs)
Interaction/linkage among players	No mechanisms for interactions reported in the literature

The agricultural extension services and programmes introduced during the imperial regime

Agricultural extension works in Ethiopia began in 1931 with the establishment of the Ambo Agricultural School, which was the first agricultural high school to offer general education. The school was undertaking demonstrations of improved varieties and agricultural practices to show the potential effects to the farmers in the surrounding area; in addition, it was also mandated to train students. In 1943, with the creation of the Ministry of Agriculture, different services were made available to farmers by the various divisions in the Ministry, even though there was no separate division responsible for extension work (Kassa 2003; Kassa and Alemu 2017). The main goal of the extension services by then, according to Haile Selassie (1959, as cited in Kassa 2003 and Kassa and Alemu 2017) was to conserve and manage natural resources (e.g soil conservation). The services included a grow-more-trees campaign, provided advice on seeds and seedlings and also on seed cleaning and seed selection, and offered information on the protection of game fish, the preservation of hides and skins, etcetera. Table 2.3 summarizes the

features of three major extension-related initiatives that were launched during the imperial regime. They are discussed in more detail in the sections below.

Table 2 3. Characteristics of extension programs introduced during the imperial regime (1930-1971)

Characteristics of the programs	Imperial Ethiopian College of Agriculture and Mechanical Arts (IECAMA) (1953-1963)	Comprehensive Package Programmes (CPPs) (1968-1986)	Minimal Package Programmes I (MPP-I) (1971-1974)
Objectives	Improving poultry, horticulture, apiculture and wheat varieties, and tree seedling production and distribution	Improving agricultural production on the farms of individual households as means of improving the standard of living of smallholders	Increasing production on farms of organized groups as a means of improving the standard of living of smallholders
Main target group	Farmers residing close the college	Wealthy smallholders and those engaged in commercial agriculture	Wealthy smallholders and those engaged in commercial agriculture
Funding sources	Donors	Donors	Donors
Extension advisory services provided	Dissemination of local research outputs and knowledge / technology to farmers	Promotion of marketing and credit services	Provision of agricultural credit, marketing and extension advices
	Introducing technologies and improved practices imported from abroad to farmers	Popularization of appropriate, well-tested and locally-adapted improved agriculture technologies.	Dissemination of technologies such as fertilizers and high yielding hybrid seeds
	Provision of adult education to farming communities	Provision of inputs such as fertilizers, improved seeds and improved farm implements to model farmers	
	Supporting the formation of agricultural youth clubs	Provision of advice and instruction to farmers on how to apply new technologies and practices	
Extension methods	Demonstrations Regular visits to model farmers Field days	Demonstrations Field days Group based methods	Demonstration and model farmers extension approach
Level of trainings of DAs	Trained in modern techniques of crop production, modern animal husbandry practices, the operation and maintenance of small, improved farm implements; and trained in extension methodologies	No specific information available	No specific information available
Number of DAs	132 DAs (in 1963)	No specific information available	330 (in 1971)
Grass roots organisation of services	Youth clubs	No specific information available	Crop demonstration plot and a marketing centre in each extension area, where the DAs sold fertilizer and seeds on credit
Coverage of extension services	Concentrated in areas where the college had experimental stations	Concentrated in strategically-selected high potential areas where the results could be seen easily	Covered 280 of the 580 woredas (districts) by establishing 55 minimum package areas

Ratio of DAs to farmers	No specific information available	No specific information available	One DA to an area of 10 to 15 km radius of all-weather road.
Source of technologies (innovations)	Local research centres Importing technologies and improved practices from abroad	Local research centres Importing technologies and improved practices from abroad	Local research centres Importing technologies and improved practices from abroad
Role of actors in technology/knowledge development/generation and transfer/dissemination	DAs undertook demonstrations and helped farmers use new techniques, tools and machinery, apply insect and disease control and improved practices	Model farmers undertook demonstration together with DAs	Model farmers undertook demonstrations together with DAs
Reported weaknesses	Limited coverage	Mainly targeted the landlords and commercial farmers instead of smallholders	Minimal attention to the livestock sector Overlooked smallholders and farmers in lowland areas

Imperial Ethiopian College of Agriculture and Mechanical Arts (IECAMA) (1953-1963)

In 1953, the then Imperial Ethiopian College of Agriculture and Mechanical Arts (IECAMA), now known as Haramaya University, was established with the support of United States of America, marking the start of relatively systematically organised agricultural extension services (Kassa 2003; Kassa and Alemu 2017 and Gebremedhin et al. 2006). IECAMA started to provide various extension services with a focus on improved poultry production, horticulture, tree seedling production and distribution, improved wheat varieties and apiculture (Gebremedhin et al. 2006). The services provided by the college as reported in the literature, are summarized in Table 2.3 (see: Davis et al. 2010:8; Ibrahim 2004). When the college started to provide extension services, the number of DAs was very limited. It started by employing two graduates of the then Jima and Ambo Agricultural High Schools as DAs in 1954. In 1963, with an increase in the number of the experimental stations, the number of DAs increased to 132 DAs operating in 77 extension posts (Kassa 2003; Gebremedhin et al. 2006). The DAs were trained in various fields, such as modern techniques of crop production, modern animal husbandry practices, the operation and maintenance of small, improved farm implements and trained in extension methodologies (Kassa 2003). The main responsibilities of the DAs, the main extension methods used and the coverage of the extension services by the college are summarized in Table 2.3

(see: Kassa 2003; Gebremedhin et al. 2006). The youth clubs, grass roots level organisations, were used as focal points to disseminate technologies to the wider farm communities (Kassa 2003; Gebremedhin et al.2006).

Gebremedhin et al. (2006) reported that the needs for service delivery were far greater than the college could provide. Severe shortage of manpower; limitations in new/improved technologies; lack of complementary institutional support services such as input supply and credit services; treating extension service only as a source of information and knowledge and assigning the responsibilities for input supply and rural credit to other bodies were reported as key constraints (*ibid*).

Comprehensive Package Programmes (CPPs) (1968-1986)

The policy shift towards emphasising smallholder agriculture during the third five-year development plan (1968-1973) that was not backed up by sufficient trained manpower, material and financial resources pushed the government towards package project approaches named as the Comprehensive and the Minimum Package Programmes (Kassa 2003). When launching the comprehensive package approach, the regime envisioned modernizing Ethiopian smallholder agriculture by implementing the package in selected pilot areas and then scaling up the approach to cover about 90% of the farming community within 15-20 years (Gebremedhin et al. 2006). As its name indicates, the Comprehensive Package Programme is more than an extension program but aims at general socio-economic development (Kassa 2003; Gebremedhin et al. 2006). Chillalo Agricultural Development Unit (CADU), which later became Arsi Rural Development Unit (ARDU) was the first comprehensive package. The CPP was generally financed by donors (Davis et al. 2010), and the CADU in particular was financially backed up by Swedish International Development Authority (SIDA) (Kassa 2003; Gebremedhin et al. 2006). The main goal of CPP, the services that are related with extension and the extension

methods used, as reported in the literature, are summarized in Table 2.3 (see: Kassa 2003; Berhanu 2012; Davis et al. 2010; Gebremedhin 2006).

The main reported weakness of the CPP, particularly the CADU was its failure to meet the needs of its intended principal beneficiaries (Kassa 2003). The extension services mainly targeted landlords and commercial farmers (through e.g. loans), instead of tenants and small-scale farmers, who were supposed to be the main target groups (Kassa 2003; Berhanu et al. 2006). The success of the CPP was constrained by different factors. The high requirements of modern agricultural inputs and skilled human power (related with its comprehensive nature), an unfavourable land tenure regime, and poor infrastructural and market development are among the issues reported as constraints (EEA 2004/05). In relation to these resource requirements, the programme was seen as too expensive, which made it difficult to scale the plan out and up (Kassa 2003; Gebremedhin et al. 2006).

The comprehensive packages were phased out in 1986. However, as reported by Kassa et al. (2003), other donor supported projects with very similar approaches were commenced succeeding CADU. CPP's reported weaknesses are summarized in Table 2.3.

Minimum Package Programmes I (MPPI) (1971–1974)

The Minimum Package Project I (MPP-I) was the first nationwide extension programme, designed for the period 1971–1979 as an alternative to the comprehensive package programmes (Gebremedhin et al. 2006). Its main goal was to increase production on farms of organized groups as a means of improving the standard of living of smallholders (Berhanu 2012; Davis et al. 2010: 8). Unlike the comprehensive package, the MPP-I was designed to provide services considered as basic elements for agricultural development to small-scale farmers (Mengisteab 1990, Schulz 1981). Fifty-five minimum package areas, that covered 280 of the 580 *woredas*

(districts), were established. Each MPP-I area had five extension areas, and was designed to serve about 10,000 farm families (Kassa et al. 2003; Gebremedhin et al. 2006). Each extension area had a crop demonstration plot and a marketing centre (where DAs sold fertilizer and seeds on credit). A DA under MPP-I was expected to cover an extension area of about 10 to 15 km radius from an all-weather road. Similar to CPP the MPP-I was financially assisted by SIDA (Kassa et al. 2003; Gebremedhin et al. 2006). Towards the end of the regime (in 1971), there were only 330 DAs (Berhane et al. 2018). The summary of the extension services provided, and the major technology transfer methods employed as reported in literature (Kassa 2003; Davis et al. 2010: 8; Gebremedhin et al. 2006) are presented in Table 2.3.

On paper, the MPP-I was supposed to reach a very large number of farmers and promote the use of the technologies generated and tested by the comprehensive package projects. In practice, the MPP failed to cover the majority of the country, although it had wider coverage than the CPP (Gebremedhin et al. 2006). Some of the reported drawbacks of the MPP-I (see Table 2.3) include minimal attention given to the livestock sector; targeting better off farmers who had access to modern inputs, while overlooking the smallholders; and concertation of extension activities in mixed farming system areas, while overlooking farmers in the lowland areas who are engaged in animal production (Gebremedhin et al. 2006; Tesfai, 1975).

Factors that are reported as having constrained MPP- I in meeting its objectives were the unwillingness of the government to reform the land tenure system (based on feudal tenant landlord relationships) and a similar hesitance to address the poor coordination between the various organizational and administrative systems of the different institutions assigned for the agricultural development of the country (Harbeson 1990, Mengisteab 1990, Schulz 1981). Other specific constraints such as insufficient and low-quality research work aimed at

developing technological packages adapted to the different ecological zones of the country are also mentioned in the literature (Tesfai, 1975).

2.4.2. The Derg regime (1974-1991)

The government's vision for agriculture, the sector's structure, key players and linkages

In 1974, state power was assumed by a military committee which was inspired by Marxism-Leninism and established a 'People's Democratic Republic of Ethiopia'. This regime followed a communist ideology, and Ethiopia's economic and political policies during this regime were geared to fit to the principles of this doctrine (Ezezew 2014), including agricultural sector policies (Berhanu 2012). The military regime, which came to power toppling the imperial regime, ruled Ethiopia until 1991 (Tola 2017).

In line with the change in ideology that came with the regime change in 1974, radical agrarian changes were introduced by the DERG regime. The Land Reform Act was one of the radical changes. The reform was expressed in the nationalization and equitable distribution of land that vigorously reshaped the pattern of relations between the state, smallholders, landlords and tenants (Hussein 2006,147-149; Berhanu 2012; Clapham 1987; Ezezew 2014). It banned private ownership of land, distributed to the tillers without compensation to landlords, limited the land size to be allotted to any single family, and prohibited the transfer of land in every conceivable form such as: sale, exchange succession, mortgage lease or other means (Kassa 2003; Pickett 1991).

Yet agricultural development still received only 3% of GDP (Dechassa and Tolosa 2015). As a result of the land reform, MOA started to target smallholder farmers, who used to be the tenants of the feudal landlords (Ezezew 2014). Collective (producers' cooperatives) and state farms

were established as part of further reforms to transform smallholder agriculture. The state and cooperative based farms were given privilege to access improved inputs and technical services, irrigation facilities, productive land, and higher farm-gate prices (EEA 2004/05, Brune 1990). In addition, service cooperatives were also formed to facilitate smallholders' access to basic goods and services (EEA 2004/05).

As part of state reform, the military regime announced a more decentralised exercise of state power. However, in practice the government power remained strongly centralised (Van der Beken 2007). As reported by different writers, the new government extended the intrusive powers of the state even more than the imperial regime (Berhanu 2012; Clapham 2017). There were many more activities that contributed to the effective penetration of society by the state, than under imperial rule. The first activity was to create a structure of administrative control that reached down to the *kebele* by establishing peasant associations (PAs) and mass organizations (ibid). The other activity was the replacement of the administrative apparatus of the imperial regime at all levels by extending party membership to Pas' leaders and grassroots communities. The PAs were used as the nuclei of administration that served as a means for controlling grassroots and local communities (Rahmato 2009; Berhanu 2012).

Coming to the organisational structure of the agricultural sector, a reorganisation dissolved the Extension and Project Implementation Department (EPID) within MOA in 1979. Domain-based departments were formed under the MOA and the extension was split across the domain-based departments. Thus, the provision of the extension services became the responsibility of the domain-based specialized departments in the Ministry: crop production and protection, livestock production, soil and water conservation, forestry development, and co-operative promotion departments. Similar structures were adopted by the regions. Extension personnel were assigned at the *woreda* level (Gebremedhin et al. 2006) and DAs were deployed, with one

agent assigned to undertake multiple tasks with at least 5 PAs, which further reinforced the control of the state at the grassroots level (Rahmato 2009; Berhanu 2012) (see figure 2.2).

Figure 2.2. Organisational structure of agricultural extension and research during the military regime: Own elaboration based on literature

Similarly, to the previous regime, the research and extension fell under separate management structures (see figure 2.2). In the mid-1980s (six years after the regime change), the IAR was restructured. It was geographically decentralized, and the research centres underneath it started to undertake research tailored to specific agroecological zones (Mengistu et al. 2017). The lack of a strong linkage between research and extension remained an essential issue, and various attempts were made to address the linkage problems. National and zonal level research and extension liaison committees (RELC) were formed during the implementation of the Peasant Agricultural Development Programme (PADEP), one of the extension programmes introduced by the military regime (Gebremedhin et al. 2006; Mengistu et al. 2017). The purpose of these committees was to help ensure that researchers and DAs addressed the real problems of farmers. However, these bodies were repeatedly reported as ineffective and their existence was short-

lived. Absence of some crucial actors (e.g. of research stations in some of the newly created zones), a lack of budget, and limited backing up from the relevant public authorities were the major reasons for their limited effectiveness and discontinuity (Kassa 2003). Similarly, the fact that research and extension resided under different authorities and was accompanied by an absence of structurally organized functional relations contributed to the limited effectiveness of the linkage efforts (Berhane et al.2018).

Because of its communist ideology, the Derg regime appropriated all private possessions including industries, banks, commercial farms, transport companies, urban houses and so on (Ezezew 2014; Dechassa and Tolosa 2015). The intervention of foreign NGOs was allowed only to deal with threats of drought and food insecurity (recognising the limited capacity of the government) (Rahmato 2002:106; Berhanu 2012). The role and influence of chiefdoms and other traditional centres of power on policy was minimized following the land reform that transferred land ownership to the public/state (Berhanu 2012; PMAC 1975 as cited in Alemu and Berhanu 2018).

Table 2.4. Summary of overall context, vision for agriculture, organisational structure and key players of the sector during the military regime (1974-1991)

Major features	Characteristics of the military (communist) regime (1974-1991)
Overall context	
Ideology	Communist/ socialist
Land tenure policies	Nationalization and equitable distribution of land
Governance structure	Decentralised exercise of state power in theory, but remained strongly centralised in practice
The main players/actors	Absolute domination of the state, except intervention of foreign NGOs was allowed only in cases of threats of drought and food insecurity
Agriculture	
Direction of the development	Bring visible changes in peasant agriculture through rigorous and harmonised efforts in the areas of agricultural research and extension
Focus /priorities/targets	Cash crops for export and raw materials for domestic industries;
<i>Food/consumption versus for market</i>	Increasing food production at least to the level of self-sufficiency
<i>Type of farmers</i>	Smallholder farmers (former tenants)
Main players/actors	Complete state domination
Interaction/linkages among players	National and zonal level research and extension liaison committees to support researchers and DAs ensure the real problems of the farmers are addressed.

The agricultural extension services and programmes introduced during the Derg regime

Minimum Package Programmes II (1980-1985)

The Derg regime continued to implement the MPP-I for four years (until 1979), although its scope was constrained by political instability and governmental structure changes. In 1980, the Minimum Package Project II (MPP II) was developed (Gebremedhin et al. 2006). Like the MPP-I, the MPP II planned to cover the significant majority of the districts of the country (440 out of 580) and reach as many farmers as possible (Kassa 2003) in promoting the use of the technologies generated and tested by the comprehensive package projects. The main goals of the MPP-II were to improve crop and livestock productivity, to increase the production of agricultural raw materials for domestic use and for export, to enhance soil and water conservation activities, to establishing various farmer organizations and to construct rural roads, grain stores and agricultural offices (Gebremedhin et al. 2006). PAs and cooperatives were used as the entry points for advisory work and the transfer of technology. The programme was financed by the World Bank, the International Fund for Agricultural Development (IFAD) and, to a small extent, by SIDA (Berhanu 2012; Gebremedhin et al. 2006).

MPP-II did not attain its stated objectives. Various studies have reported that the agricultural development strategy in general and the extension services in particular engaged primarily with state farms and collective farms. Even though smallholder farms accounted for more than 90% of the cultivated area, the state and collective farms were given priority in accessing subsidized agricultural inputs such as agricultural credit, fertilizers, improved seeds and training (Kassa 2003; Clapham 1987; Pickett 1991). Table 2.5 summarizes the features of two major extension-related programmes that were launched during the Derg regime. They are discussed in more detail in the sections below.

Table 2.5: Characteristics of extension programs introduced during the Military Derg regime (1971-1991)

Characteristics of the programs	Minimum Package Programmes II (1980-1985)	Peasant Agricultural Development Programme (PADEP) (1985-1991)
Objectives	<p>Improving crop and livestock productivity.</p> <p>Increasing the production of agricultural raw materials for domestic use and for export.</p> <p>Enhancing soil and water conservation activities.</p> <p>Establishing various farmer organizations.</p> <p>Constructing rural roads, grain stores and agricultural offices.</p>	<p>Increasing primary food production at least to the level of self-sufficiency.</p> <p>Developing the production of cash crops for export and raw materials for domestic industries.</p> <p>Increasing rural sector employment opportunities.</p> <p>Supporting and encouraging the development of rural co-operatives.</p> <p>Preventing further soil depletion and introducing suitable farming systems in erosion-prone areas of the country.</p> <p>Large scale state farmers and collective farms</p>
Main target group	Collective and state farms engaged in the production of cash crops for export and raw materials for local industries	
Funding sources	Mainly donors	Mainly donors
Extension advisory services provided	Provision of advice on improved inputs and techniques of production	Provision of advice on new technologies and techniques of production (such as types and rates of fertilizers, improved seeds and pest-control packages, forage production, livestock breed improvement and veterinary services) from research organizations and deliver them to farmers
Extension methods	Quasi-participatory extension approach via peasant associations and cooperatives	<p>Providing organisational support (e.g. establishing and supporting cooperatives)</p> <p>The overall method was Training and Visit.</p> <p>Regular visits of contact farmers organized into groups.</p> <p>DAs and the zonal subject matter specialists (SMS) get training on a monthly and quarterly basis respectively.</p>
Level of training of DAs	No specific information available	Visits to DAs
Number of DAs	No specific information available	No specific information available
Grass root organisation of services	PAs and cooperatives used as the channels of focal points of technology transfer	No specific information available
Coverage of extension services	Significant majority of the districts of the country (440 out of 580)	Concentrated in high potential areas
Ratio of DAs to farmers	One DA for at least 5 PAs (during MPP I)	One DA to 1300 peasant households (during the PADEP), through contact farmers organized into groups
Role of actors in technology/knowledge development/generation and transfer / dissemination	No specific information available	No specific information available
Source of technologies (innovations)	Research organisations	Research organisations
Reported weaknesses	The state and collective farms had priority access to extension services while private farmers (small holder farmers) were almost ignored	Favouring the development of state and collective farms, while smallholder farmers were almost ignored

It is reported that many issues constrained the MPP-II from meeting its objectives. These included a shortage of extension personnel and inadequate facilities and logistical support, DAs being burdened with non-extension activities, such as the collection of taxes and loan repayments, limited government budgets in general as well as limited capacity and resources for developing socially and ecologically suitable innovations (Gebremedhin et al. 2006; and Task Force on Agricultural Extension 1994b, as cited in Kasaa 2003). Some writers attribute the problems experienced to the Marxist ideology of the military regime (Ibrahim 2004).

Peasant Agricultural Development Programme (PADEP) (1985-1991)

MPP-II phased out in 1985 and was replaced by a new programme called the Peasant Agricultural Development Programme (PADEP) (Gebremedhin et al. 2006). Building on the critical evaluations of past extension strategies, this programme was designed to bring visible changes in peasant agriculture through rigorous and harmonised efforts in the areas of agricultural research and extension. It was initiated by the MOA to introduce the Training and Visit Extension System (see Benor and Baxter 1984; Benor and Harrison 1977; Leeuwis 2004) that was developed by the World Bank for Ethiopia. This system entailed a highly standardized process for delivering research-based technologies and to advise smallholder farmers (Ezezew 2014).

The primary objectives of the PADEP were to increase food production to at least the level of self-sufficiency, and to develop the production of cash crops for export and raw materials for domestic industries. In addition, attention was paid to increasing rural sector employment opportunities, supporting and encouraging the development of rural co-operatives, preventing further soil depletion and introducing suitable farming systems in erosion prone areas of the country. Because of funding limitations, PADEP mainly focused on increasing production and productivity of high potential areas by concentrating on the scarcely available resources and

extension services on these (Gebremedhin et al. 2006). Like many of its predecessors, PADEP was a foreign aid project, primarily funded by the European Economic Commission, IFAD, Italy, the African Development Bank, Sweden and the World Bank (ibid).

With regard to extension methods a modified training and visit (T and V) was used where a DA was assigned to serve 1300 peasant households (the conventional T and V system recommends one DA for 800 farmers) through contact farmers organized into groups (Kassa 2003). The assigned DA and the zonal subject matter specialists (SMS) were to receive training on a monthly and quarterly basis, instead of the fortnightly and monthly frequency proposed in the original T&V model. One extension co-ordinator was assigned in each district to visit 10 DAs once a week, and DAs worked with 48 contact farmers, who in turn were supposed to have 26 follower farmers each. The agent was expected to visit six contact farmers per day (30 minutes each) on four days per week. Each contact farmer was therefore visited twice a month (Kassa 2003; Gebremedhin et al. 2006).

According to the literature, PADEP did not do well in terms of meeting its objectives. This is attributed to a mixture of policy related issues and resource constraints. According to Davis et al. (2010:8) agricultural policy focussed more on implementing the Land Reform Proclamation than on promoting agricultural extension. In addition, favouring the development of state and collective farms led to situation in which individual small-scale farmers still largely lacked access to credit services and improved inputs (Kassa et al. 2003), leading to a production decline during most of the years of the Marxist government (see also Brune 1990; Clapham 1987). Writers link this to the agricultural development policy priorities anchored in the ideological doctrine of the Marxist military government (Kassa 2003; Gebremedhin et al. 2006).

Among the resource-related constrained reported were the limited number of DAs, lack of financial resources and incentive mechanisms (Befekadu and Berhanu 2000). The programme's dependence on donor finance also arguably affected its implementation. It is reported that there was a long delay in implementing the programme as there was tension between the donors and the government on agricultural policy issues. Donor organisations and countries asked for the compliance with the conditions they had put, which included shifting from the focus on state and collective farms to a more liberalized agricultural policy with greater emphasis on small scale farmers. Another weakness relates to the content of the extension messages which were arguably coloured by political objectives, resulting in farmers seeing DAs as government spokesmen rather than as development workers (Kassa 2003). Overall, the extension approach during the military regime is reported to be flawed, as it was, inflexible and top down in nature and not participatory (Befekadu and Berhanu 2000).

2.4.3. Ethiopian People's Revolutionary Democratic Front (EPRDF) regime (1991-2017)

The government's vision for agriculture, the sector's structure, key players and linkages

After 17 years of armed struggle against the military regime, the Ethiopian People's Revolutionary Democratic Front (EPRDF) came to power in 1991. During the incumbency of the Transitional Government of Ethiopia (TGE) that lasted between 1991 and 1995, several reforms were introduced based on principles of federalism, liberal political and socio-economic policy directions, and primacy of ethnic rights up to self-determination. This culminated in the creation of the Ethiopian Federal Democratic Republic of Ethiopia.

The ideology of the EPRDF regime is 'revolutionary/developmental democracy', which considers both democracy and development as indispensable. Although some economic liberalisation reforms have been introduced since 1992, the government, as a developmental

state, has continued to assume a strong role in almost all development interventions (Clapham 2017; Ezezew 2014; Vaughan 2011). In relation to politics, the EPRDF regime advocated multiparty democracy, although many argue this has failed in practice (e.g. Clapham 2017).

The EPRDF-led government's development approach can be characterized as rural centred and agriculture-led, paying significant attention to rural infrastructure development and the promotion of agricultural growth and modernisation (MoFED 2006 as cited in Ezezew 2014). The EPRDF regime has been allocating a bigger budget to the agriculture sector compared to the preceding regimes. For instance, in the period 1992-2006 the budget share of the sector was 7.4% of GDP (Dechassa and Tolosa 2015).

The Agricultural Development Led Industrialization (ADLI) was the first comprehensive economy wide policy formulated by the EPRDF regime in the mid-1990s. Taking the ADLI as a basis, the Sustainable Development and Poverty Reduction Program (SDPRP) was designed in 2000/2001 and was implemented until 2004/2005. SDPRP laid the ground for Ethiopia's agriculture sector growth and accelerated rural development. While continuing to refine works started during the SDPRP, the Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) was designed in 2005/2006 and its implementation continued until 2010. The plan incorporated new strategic directions aimed at speeding up the overall economic growth generally and the growth of the agriculture sector in particular (Chanyalew 2017). Through PASDEP, Ethiopia hoped to realize most of the targets enshrined in the Millennium Development Goals (MDGs) (Berhanu 2012).

PASDEP was later replaced by the Growth and Transformation Plan I (GTP I), designed for the period 2011–15 (Ezezew 2014). The overall aim of GTP I was to ensure self-reliance and to stop the need for food aid coming into the country, and to finally eradicate the famine and

food aid history of the nation (ibid). GTP I provides directions for the formulation of sector-specific policies in the country. The agricultural sector first growth and transformation plan I (AGTP 1) was launched as part of the GTP I. The goal of AGTP I was to ensure the continuity of the rapid growth of the agriculture sector witnessed in the PASDEP period by accomplishing the goal of achieving food security at household, regional and national levels (Chanyalew 2017). The plan suggested massive up-scaling of technology, improving access to, and capacity for using, irrigation schemes by smallholder farmers, and a steady reorientation of smallholder farming to high value products to exploit remunerations from the local and international market (PANE 2011). Ethiopia is implementing the GTP II, designed for the period 2015-2020. In GTP II, the agricultural sector remains seen as the main driver of rapid and inclusive economic growth and development. It is also considered to be the main source of growth for modern productive sectors (notably agricultural industries) which are envisaged as having the potential to make a significant contribution to creating jobs and strengthening rural-urban linkages. Consequently, encouraging manufacturing industries which are labour-intensive and use agricultural products as inputs is the first priority in GTP II (Chanyalew 2017).

Another important government multi-sectoral policy is the Science Technology and Innovation (STI) policy (Ethiopia's Science, Technology and Innovation Policy 2012). The STI policy proposes the adaptation of technologies from other countries as a key solution to generate technologies that could spark rapid growth and economic transformation, as the current capacities of the national research and university systems is considered very low in this regard (Ezezew 2014).

The EPRDF regime maintained the Derg's state ownership of land and controlled all urban and rural land as well as natural resources. However, in line with the emphasis to the small-scale farmers, rural peasants and pastoralists are guaranteed lifetime 'holding rights' that gives many

rights (such as the right to make use of hired labour), except the right of sale and mortgage (Berhanu 2012; Chala 2016; Zerga 2016). The quest to control the peasantry and ensure the sustained dependence of rural producers on the state for accessing land (Rahmato 2009) is mentioned as the key reason for the EPRDF resisting calls to resolve the inconsistency between economic liberalization and state control of the land, despite the pressures exerted by western governments and international financial institutions such as the World Bank and IMF (Gudina 2006). Nonetheless, allocation of land to local investors for the purpose of commercial sale has been increasing (Rahmato, 2008), and the country has become one of the major targets of transnational investment in land (Anseeuw et.al. 2012). Clapham (2017) suggests that it is because of the enormous struggle to improve the productivity of peasant agriculture that the regime has opted for large-scale commercial agriculture in the southern and western part of the country, which are essentially considered as virgin lands. The government claims this is a policy complementary to enhancing smallholder agriculture productivity rather than a policy shift (Berhanu 2012).

With the formulation of the ADLI in 1991, investment in extension grew promptly after 1991. Since 2004 Farmers Training Centres (FTCs) have been established to transfer improved agricultural technologies at a nearer reach to smallholder producers (Yonas 2006). Physical construction of around 6500 FTCs had occurred by 2009, with around 2400 of these already offering some form of training, and it was intended to increase this number to around 15,000, i.e. one for every *kebele* in the country (Davis et.al. 2010). In order to train sufficient front-line development workers, the Ethiopian government established 25 Agricultural Training and Vocational Education and Training (ATVET) colleges (Kassa and Alemu 2017) where agricultural manpower is trained in different fields such as animal health, animal sciences, cooperatives, natural resource management and plant sciences (Berhanu 2012). Tens of thousands of DAs have graduated from these colleges and have been deployed in nearly all the

rural areas in all the regional states. The number of DAs continued to increase over the years: from 2500 in 1995 to 15,000 in 2002, 47,522 in 2008, and reached 72, 402 in 2014/2015 (Berhane et al. 2018).

Decentralisation, pluralism and continued state dominance in agricultural development

Once in power, the EPRDF introduced several policy changes in the governance structure of the Ethiopian state and state-society relations. The transformation of the unitary state into a federal state, composed of nine ethnically divided administrative regions and two chartered cities was the most striking reform (Clapham 2017; Ezezew 2014; Van der Beken 2007). The constitution provided the regional states with decentralised powers and functions (Kassa 2003). Despite these reforms, however, the vanguard role of the ruling party remained intact as the party's fundamental principles are still anchored in its Marxist-Leninist past. This gave rise to a form of democratic centralism that is characterised by an emphasis on the ruling party's leading role in socio-economic and political processes on the one hand, and a continued mixing of the structures of ruling party and the state on the other (Berhanu 2012).

Coming to the organisational structure in the sphere of agriculture, there have been continuous changes at the federal and regional levels throughout the EPRDF regime. According to Chanyalew (2017), the agriculture and allied sectors of Ethiopia have experienced changes more than fifteen times in the last two decades. The MoA, for example, was renamed Ministry of Agriculture and Rural Development (MoARD), and then back to MoA in GTP I. In GTP II, MoA was reconfigured into three core ministries: Ministry of Agriculture and Natural Resources (MoANR), Ministry of Livestock and Fisheries (MoLF) and Ministry of Public Enterprise (MoPE) (ibid). The decentralisation has extended to giving full autonomy for the planning, execution, monitoring and evaluation of extension programmes to the regional level agriculture and rural development bureaus. Nevertheless, the extension division at the central

MOA continues to have significant responsibilities, including coordination of interregional extension work, provision of policy advises on extension related issues (including on extension management and administration) at the national level, extension materials development, and the organisation of training programmes to the regional bureaus (Ponniah et. al. 2008). Zone Offices of Agricultural Development (ZOAD) have also been established at the zonal level with the intended roles of linking regions and *woredas* concerning national and regional development policies, strategies, and programmes, and harmonizing the bottom-up and top-down planning systems (Leta et al 2017). The actual extension services are provided by the Offices of Agriculture and Rural Development at *woreda* levels, which are supported by the regional level Bureaus of Agriculture and Rural Development (BoARD) (Gebremedhin et al. 2006). The BoARDS have a similar structure as the MoANR, but -due to the decentralized governance system, - regions can reform the structure to suit their own context up to *kebele* level (Chanyalew 2017; Leta et al. 2017). While there is some variation in the structure of the *woreda* level Offices of Agriculture and Rural Development (OoARD) the most common set-up is that the OoARD consists of four teams (crop production, livestock production, natural resource management and extension). The *woreda* level offices have SMS, and DAs are assigned at *kebele* levels (Gebremedhin et al. 2006). Figure 2.3 presents the organisational structure of extension service during the EPRDF regime.

Figure 2.3. Organisational structure of agricultural extension and research during the EPRDF regime: own elaboration based on literature.

Recently, following the declaration of GTP I (2011–15), special emphasis was given to strengthening a unified, national level and highly structured governance system that is in charge of the state-led social mobilization against poverty (Ezezew 2014; Leta et al. 2017). Every member of the rural community has to join a network that consists of six people. One among these six, who is supposed to be a model farmer, is the leader of the network. The leaders of the networks form a higher hierarchal group, which receives training and directives on leadership roles. The second level of hierarchy makes six networks of 30 people, each known as farmers development groups (FDGs). The government considers this model as a tool of coordinating relationships between the government and the public and creating a broad space for the people to participate in the implementation of the GTP (Ezezew 2014; MoARD 2011; MoANR, & ATA 2017). However, others have argued that the massive increase in the number of DAs and the creation of the highly structured local level governance system reflects a political attempt to control people and information flows (Berhanu et al. 2014; Rahmato 2009; Ezezew 2014).

Similarly, Kassa (2003) noted that neither farmers nor frontline development workers are consulted structurally about the course of policy formation. Thus, it is clear that the existing extension system has both centralized and decentralized features (Ezezew 2014). The key messages and work plans are decided at a higher political level and filter down to the lower levels of the system, indicating that the flow of information and political leadership is centralized. The bodies of the government at regional, district, and village level are responsible for leading and managing the social mobilization, which shows that the management of day-to-day activities is decentralized.

As with the two previous regimes, research and extension has continued to be under separate jurisdictions and without structurally organized functional relations during the EPRDF regime (See Figure 2.3). The Ethiopian National Agricultural Research System underwent administrative decentralization, which created separate federal and regional research institutions. Following the administrative decentralization, a number of IAR centers were transferred to regional states and in 1997 the institute was renamed the Ethiopian Agricultural Research Organization (EARO) and made accountable directly to the Prime Minister. In 2004 EARO came to reside under the administrative responsibility of the Ministry of Agriculture and Rural Development (MoARD) after an amendment of the institute's proclamation. In 2007, EARO was renamed as the Ethiopian Institute of Agricultural Research (EIAR) and made answerable to the Ministry of Agriculture (MoA). Despite the administrative decentralization and changes in accountability from the Ministry to the Prime Minister and vice versa, there is no evidence of clear functional relationships between MOA and EIAR in general, and research and extension in particular. At present, the Ethiopian NARS comprises the federal and regional research centers and universities with agricultural departments (Mengistu et al. 2017; Alemu and Berhanu 2018). Weak linkages among research, extension and farmers persist and are one of the constraining factors for the national innovation system, despite efforts to improve the

linkages during the EPRDF regime (ibid). The RELC was reformed and Research-Extension-Farmer Advisory Council (REFAC) came into being at three administrative levels: federal, regional and zonal. REFAC was later replaced by the Agriculture Development Partners Linkage Advisory Council (ADPLAC) in 2008, as the former was not as successful as anticipated. ADPLAC, a council which engages actors beyond research, extension and farmers, continues to function to date (Kassa and Alemu 2017; Mengistu et al. 2017). Recently, research centres have established extension-oriented units under different names such as extension research, technology transfer and commercialization directorates (Mengistu et al. 2017).

Beyond the activities of the state, formal civil society organisations have flourished exceptionally since the EPRDF came to power due to the liberalising reforms and the broadening of public space. This was expressed in the formation of several professional associations, NGOs, and private sector operators. However, new legislation that increased state control over how, and on which issues, these CSOs may operate was introduced in 2009 (FDRE 2009 as cited by Berhanu 2012). Following this, donors can influence agricultural policies and extension programmes only when donor interventions are aligned with the preferences of the EPRDF regime.

In his recent study Clapham (2017) reported that the Ethiopian government formally recognizes the need for the private sector to take up an active role in developing the economy, and the need to limit its own role. In relation to this, the government has looked to Foreign Direct Investment (FDI) more than to domestic entrepreneurs as the main engine for growth: this for two reasons. First, the historical weakness of the indigenous businesses in mobilising capital, and; second, the more politically controllable nature of foreign investors (Clapham 2017). According to the same author, despite interest and efforts to attract FDI, the principal outlook remains statist, and the government's view on the relationship between economy and politics is still profoundly

instilled with marxian attitudes. Consequently, several key sectors in Ethiopia continue to be effectively monopolised by the state.

To a large extent this holds true for the agricultural sector. The government not only funds but also provides the extension service almost exclusively, through the OoARD at *woreda* levels with limited and isolated activities from NGOs (Gebremedhin et al. 2006). Despite suggestions in the late 1990s from a number of donors to create a situation that allows the private sector to play a major role in agricultural input markets, the role of the private sector in the provision of extension and other complementary services has remained limited (Berhanu 2012). Regardless of the liberalisation reforms introduced in 1992, private companies were pushed out under pressure from monopoly state organisations (ibid). For example, the fertilizer market was controlled by the state-owned Agricultural Input Supply Enterprise (Yonas 2006; Befekadu and Berhanu 2000; Abera 2001; Abegaz 2011). Similarly, the production, sale and distribution of improved seeds also remained dominated by a government owned firm known as the Ethiopian Improved Seeds Enterprise (Befekadu and Berhanu 2000: 192; Berhanu 2012).

Notwithstanding the above, the number of NGOs and projects involved in extension work has increased in the EPRDF period (Ezezew 2014). The SaSakawa Global 2000 (SG-2000) programme that commenced in Ethiopia in 1993 was implemented jointly by SG 2000 and Ministry extension staff and represents one of the first non-state initiatives engaged in provision of extension services (Gebremedhin et al. 2006). The work of SG 2000 in eleven African nations, including Ethiopia, was an example of the implementation of the Green Revolution model in Africa using the TOT approach (Borlaug 2000 as cited in Ezezew 2014). Similarly, SOS Sahel, Farm Africa, and Save the Children are also among the NGOs which have started to provide extension services to farmers, mostly in more drought prone and food insecure areas (Ashworth 2005 as cited by Gebremedhin et al. 2006). These NGOs were applying different

approaches than the public extension system, using more participatory approaches under different names such as: Participatory Action Planning and Implementation (PAPI), Participatory Land Use Planning and Implementation (PLUPI), and Farmer Field Schools (FFS) (ibid). Recently, some NGOs have made efforts to introduce more market-oriented and commodity-based extension models, such as the value-chain approach that emphasises the fostering of linkages among players who have roles in the value chain (starting from production to consumption) and aims to ensure a fair distribution of benefits along the chain (Ezezew 2014). Several authors have reported that many of these NGO programmes are not well integrated with the public system (Gebremedhin et al. 2006; Ezezew 2014; Leta 2018; Seifu et al. 2020). While the government seems interested in the new approaches in view of its policy to shift agriculture from a subsistence into a market-oriented business, there has been no structural uptake of such approaches in the extension system (Ezezew 2014).

Table 2.6. Summary of the overall context, vision for agriculture, organisational structure and key players of the sector during the EPRDF regime (1991-2017)

Major features	Characteristics of the EPRDF regime (1991-2017)
Overall context	
Ideology	Revolutionary/developmental democracy and developmental state
Land tenure policies	State ownership of land, with lifetime “holding” right to the small-scale farmers, rural peasants and pastoralists
Governance structure	Pro decentralization and popular decentralization policy and rhetoric, but dominantly top down in practice where the flow of information and political leadership is centralized, Some level of decentralization where the management of day-to-day activities is decentralized.
Main players/actors	The diversity of actors has increased and includes multilateral, bilateral and other donors, NGOs and investors.
Agriculture	
Direction of development	Modernizing traditional smallholder agricultural production Making agricultural market-oriented business into a base for industrialization Reorientation of smallholder farming to high value products to exploit remunerations from the local and international markets
Focus /priorities/targets <i>Food/consumption versus for market</i> <i>Type of farmers</i>	Mainly food, and export of cash crops for market Mainly smallholders Large-scale commercial agriculture as a complementary effort in enhancing smallholder agriculture productivity
Main players in agriculture	The diversity of players has increased from time to time, although the state remains the main player
Interaction/linkage among players	Federal, regional, zonal and <i>woreda</i> level Agricultural Development Partnership Linkage and Advisory Councils were established as a space for interaction among stakeholders NGOs have emphasised fostering linkages among players who have roles in the value chain (starting from production to consumption).

The agricultural extension services and programme s introduced during EPRDF regime (1991-2017)

Participatory Demonstration and Training Extension System (PADETES) (1994/95)-2004

EPRDF continued to implement the PADEP programme for four years, until it was replaced by a new extension programme called Participatory Demonstration and Training Extension System (PADETES) in 1994/95 (Gebremedhin et al. 2006; Ezezew 2014; Tesfaye 2003). After a critical evaluation of the past extension approaches and the experience of SG 2000, several objectives were set to be achieved by the PADETES extension system, as detailed in (Task Force on Agricultural Extension, 1994b, cited in Kasaa 2003). The features of PADETES as reported by

Berhanu (2012), are summarized in Table 2.7 and PADETES is discussed in more detail in the following sections.

Table 2.7: Characteristics of extension programmes introduced during the EPRDF regime (1991-2017)

Characteristics of the programs	Participatory Demonstration and Training Extension System (PADETES) (1994/95-2017)
Objectives	<p>Increasing the production and productivity of small-scale farmers through research-generated information and technologies</p> <p>Increasing the level of food self-sufficiency</p> <p>Increasing the supply of raw materials for domestic use and export</p> <p>Ensuring the rehabilitation and conservation of the natural resource base of the country</p> <p>Empowering farmers to be active participants in the development process</p> <p>Encouraging farmer organizations</p>
Main target group	Smallholder model farmers
Funding sources	Mainly government, but also donors
Extension advisory services provided	<p>Assisting smallholder farmers to access agricultural inputs through the provision of loans.</p> <p>Providing technologies such as fertilizer, improved seeds of different commodities, pesticides, livestock technologies, high economic value crops, post-harvest technology and agro-forestry</p> <p>Providing market-oriented extension services in places where marketable commodities exist</p>
Extension methods	<p>Identifying farmer's production problems and channelling them to the attention of relevant organizations such as researchers and district agricultural officers</p> <p>Demonstrations on plots established and managed by participating farmers</p>
Level of trainings of DAs	Individual, group, and mass media approaches
Number of DAs	Diploma graduates from the ATVETs
Grass root organisation of services	83,000 DAs have been trained and graduated, of whom about 56, 000 were working in agricultural extension in 2017
Coverage of extension services	Every farmer is a member of a network lead by one model farmer, and the networks create a Farmers Research Group (FRGs)
Ratio of DAs to farmers	Focusing on model farmers (farmers who can use all inputs included in the extension package): 15,200,000 extension beneficiaries as of 2017
Source of technologies (innovations)	21 per 10,000 farmers as of 2017
Role of actors in technology/knowledge development/generation and transfer/dissemination	Researchers, NGOs
Reported weaknesses	<p>Farmers manage demonstrations</p> <p>DAs facilitate the management of the plots, facilitate (organise) demonstration trials; assist farmers in obtaining agricultural inputs; promote improved technologies; identify farmer's production problems and channel them to the attention of relevant organizations such as researchers and district agricultural officers</p> <p>Top-down, non-participatory and supply driven approach</p> <p>DAs overly involved in non-extension activities</p> <p>Lack of market orientation of the services</p> <p>Weak coordination and linkage among actors in the research and extension system</p> <p>Limited logistics and facilities for DAs</p> <p>Substandard extension services in pastoral, urban and semi-urban areas</p> <p>Low incentive mechanisms leading to high turnover of staff</p> <p>Limited use of communication media and ICTs; limited number of technology multiplication centres</p> <p>Limited engagement of the private sector</p> <p>Inequitable access to services and benefits of the system and slow progress</p>

PADETES was based on the principles of the TOT model and little was changed in terms of strategies. It merged the Training and Visit approach and the experiences of SG 2000 (Kassa 2003; Gebremedhin et al. 2006). SG 2000 demonstrated the possibility of increasing yields by supplying huge amounts of external inputs through the provision of loans to smallholder farmers. Building on this experience, PADETES considered the provision of loans for agricultural inputs as necessary to achieve its goals (Ezezew 2014). The tremendous yield increments of farmers participating in the SG 2000 programme persuaded the Ethiopian government to believe that self-sufficiency in food production could be achieved by adopting the programme's extension approach. Consequently, the government decided to run the programme on its own in 1995 and launched PADETES as a national extension system (Gebremedhin et al. 2006).

The main feature that distinguished PADETES from its predecessors was its emphasis on selected farmers (also called model farmers) to use all the inputs included in the extension package. Another issue that made this programme special is the introduction of the concepts of diversification and specialization in the early 2000s. The aim was to set specific priorities for different intervention areas based on their agricultural potential, as defined by agro-ecological features and regional market conditions. While the concept of specialization was introduced to provide market-oriented extension services in places where marketable commodities were growing abundantly, the target of diversification was to enhance the growing of diverse food items in order to meet the food-security needs of the people (Ezezew 2014).

PADETES gave special consideration to the package approach to agricultural development. Initially, it promoted cereal production packages and the beneficiaries were mainly those farmers who live in high rainfall areas of the country. The major elements of the package were: fertilizer, improved seeds of different commodities, pesticides and better cultural practices,

mainly for cereal crops. As the area coverage of the programme expanded, packages became more diversified (including livestock, high economic value crops, post-harvest technology and agro-forestry), aimed at satisfying needs of farmers residing in different agro-ecological zones. Improving access to inputs was a key objective, and to this end group-based credit systems were used that included the possibility of getting credit in kind (Ibrahim 2004; Alemu and Demese 2005).

Overall, according to Davis et al (2010), the PADETES approach offered three main extension packages: household, regular, and minimum. Household package extension programs were based on the selection of a package of technologies from a menu of choices provided to farmers, depending on the context (e.g. ensuring access to different forms of irrigation such as river diversion or irrigation dams in moisture-stressed areas). The aim of household packages was to raise the annual household income to 18 thousand Ethiopian Birr by 2006. This is equivalent to daily per capita income of just above 1 USD, which is defined as the poverty line in the country. Regular package extension programmes aim at enabling farmers to adopt improved seeds with commercial fertilizer, improved management practices and soil moisture conservation practices. Finally, the minimum package programmes stimulated farmers to adopt improved seeds with traditional soil fertility management practices (e.g. the application of compost and manure) and traditional soil moisture conservation practices (Gebremedhin et al.2006).

In terms of the coverage, the programme started in 1995 in seven regions with technology packages for a few crops such as wheat, maize, sorghum and tef in high rainfall areas. At this point, the program targeted only 32,000 participants. The area coverage of the programme expanded, and the number of participants increased to about 4.2 million in 2002 (Ibrahim 2004). In line with the notable rise in the number of participants in the PADETS program, the number of DAs also increased, as presented above.

With regard to the extension methods the PADETES extension system, as also mentioned earlier, combined the Extension Management Training Plot (EMTP) approach from the SG 2000 experience with the modified T and V from the TOT model (Kassa 2003; Davis et al. 2009; Gebremedhin et al. 2006). EMTPs were at the heart of the SG 2000 technology transfer method and constituted on-farm technology demonstration plots established and managed by participating farmers who were selected by the local DAs and SG 2000 personnel (Kassa 2003; Gebremedhin et al. 2006). The demonstration plots were used to train farmers to help them implement the entire package of recommended practices. To deliver knowledge to farmers, the extension services make use of individual, group and mass media approaches (Gebremedhin et al. 2006). The major responsibilities of the DAs during the implementation of PADETES (as reported by Kassa) (2003), along with other important features such as the extension methods applied are summarized in Table 2.7. It is relevant to note that PADETES was the first extension programme developed and financed by the government, without foreign assistance (Ibrahim 2004).

Several governmental actors play different roles in the implementation of the PADETES, with special emphasis on the provision of credit to farmers. Loans were taken up by the regional governments, as farmers were not able to directly borrow from banks due to lack of collateral. The administration of the credit was taken care of by the regional governments and the two government banks (the Development Bank of Ethiopia and the Commercial Bank of Ethiopia). The regional governments channelled the loans through the district administration offices. Subsequently, the distribution of the loans and the collection of repayments was carried out by administrative and peasant organizations (cooperatives). Farmers participating in PADETES received credit in kind, via the district agricultural and finance offices. The selected farmers were then expected to allocate a half-hectare of land as a demonstration plot, and to make a 25–

50 percent down payment for the inputs at the time of planting, with the balance due after harvest at an interest rate of 10.5 percent (Kassa 2003; Ezezew 2014).

Several issues are reported as strengths of PADETES such as its decentralized, well-structured and organised extension system, the existence of significant number of agricultural universities, ATVET colleges and FTCs (in almost each *kebele*), the huge amount of DAs, and the strong social networks that were established through farmer-group formation and peer-to-peer learning (ATA and MOA 2014; Davis et al. 2009 and MoANR and ATA 2017)

Notwithstanding the various strengths, several weaknesses have been reported on the extension programmes introduced during the EPRDF regime by Gebremedhin et al. (2006). According to these authors, the main weakness of PADETES remains its top-down, non-participatory and supply driven approach to extension service delivery across various levels, including the DAs and farmers interface, and also between the *woreda* and the regional level offices. As reported by Kassa (2003), farmers are hardly involved in designing and formulating extension programmes/activities. Technology packages are prepared and transferred based on the available new/improved technologies without incorporating the needs and preferences of farmers. DAs in many parts of the country promoted technologies as “blanket recommendations” (ibid). In relation to this, Sandford (1997), as cited by Kassa (2003), reported that the new technologies which were promoted by the extension system were developed and tested only in particular areas, despite the agroecological diversity in the country. Furthermore, despite the understanding and recognition of the importance for voluntary adoption of technologies through time, various forms of pressure and coercion have been used by DAs to push farmers towards adopting technologies. Arguably, this is related to the performance evaluation system for DAs, in which the fulfilment of quotas (the number of farmers who take up technologies) is an important criterion. Gebremedhin et al. (2006, p. 18)

reported that “pressure still appears to exist on DAs to fulfil [their] quota of farmers expected to join the extension package programmes, since fulfilment of quotas still remains a criterion in DA performance evaluation.”

Another weakness reported is that DAs are highly involved in non-extension activities such as credit distribution, collection of repayment, forecasting of input demands and input delivery, and *kebele* administration and adjudication. Some of these activities make it difficult for them to act as independent development workers in the interest of their clients, resulting in a sub-optimal reputation and tensions in their relationships with farmers (Kassa 2002, 2003). In addition, these input delivery activities distract from the knowledge brokering and facilitation roles which are generally seen as critical in agricultural extension. In fact, it can be argued that during the EPRDF regime there has been little recognition of, or appreciation for, agricultural extension as a separate discipline and area of expertise, and it was basically assumed that extension programme planning and the choice and implementation of communication approaches could be handled by any agriculturalists (Kassa 2003; Gebremedhin et al. 2006).

A poor market orientation of the extension services is another drawback reported (Gebremedhin et al. 2006). The agricultural development programmes of the government give special emphasis to achieving food security. In line with this, extension plans were heavily focusing on improving production and productivity, while overlooking the market aspect. Market oriented strategies only started to be developed on prioritized commodities after 2003. However, the extension service was not adapted simultaneously. For instance: facilitating linkages between producers and market parties is not considered as a mandate of extension services. More in general, limited engagement with the private sector is reported as an ongoing weakness in the EPDRF period (*ibid*).

Human and financial resource gaps have also been reported as constraints for the effective implementation of extension services during the EPRDF regime in general. Despite the huge investment in capacity building mainly through ATVETs, there are still not sufficient numbers of DAs, and the ratio of DAs to farmers ratio is still low, even by the standards of sub-Saharan Africa. Even though most of the extension personnel have training at certificate and/or diploma level, they lack adequate and appropriate technical and communication skills (Kassa 2003). The courses provided have been criticised for being too focussed on theories rather than on practical issues, while little attention is paid to the principles of extension education and participatory and innovative extension approaches in the curricula (Gebremedhin et al. 2006). In addition to the human resource related constraints, financial shortages and lack of incentive structures is seen to affect the moral and motivation of SMSs and DAs, resulting in a high turnover of staff (*ibid*).

At a broader level different reports signal several organisational and inter-organisational constraints, including a focus on short-term rather than long-term issues, weak coordination and linkage among actors in the research and extension system, limited communication & coordination between federal and regional bureaus of agriculture and unclear lines of command for extension management, particularly at *woreda* and *kebele* levels (ATA and MOA 2014; MoANR and ATA 2017). Similarly, it is argued that innovation in the use of media and ICT is lagging behind, and that there is limited capacity in the system to mainstream concerns and policy directions related to gender, nutrition, climate and environment. (see: ATA and MOA 2014; Davis et al. 2009, 2010 and MoANR, and ATA 2017). Over all, inequitable access to the services and benefits of the system and the slow progress made by the PADETES necessitated systemic reforms (Leta et al. 2018). The reported weaknesses of PADETES are summarized in Table 2.7.

Participatory Extension System (PES) (from 2010 onwards)

With the replacement of the PASDEP by the GTP I and the newly introduced governance system at the grassroots level (the organization of farmers into development groups and social networks, mentioned above) a participatory extension system (PES) -a modified version of PADETES- was launched in 2010. According to Leta et al. (2017, 2018, 2019) PES is the most recently adopted extension approach endorsed by the Ethiopian government. For the state, PES is a means to reach a large number of farmers and improve their access to agricultural extension services (Leta et al. 2018). The main aim of PES is to promote the upscaling of technologies and best practices by enhancing farmer participation and collective action in agricultural extension and rural development (MoA 2010).

As a result of increasing attention for the involvement of citizens in local planning and needs-based extension services at the policy level, explicit mechanisms such as the development groups, model farmers, and farmer training centres were put in place to enable decentralized planning (De Roo 2020). FDGs, each headed by a model farmer, were established in every *kebele* to facilitate participation of the farmers (Leta et al. 2017). Model farmers demonstrate new technologies and stimulate technology upscaling by using direct persuasion or by exerting pressure on follower farmers. Farmer groups are instrumental to the implementation of the PES and are locally known as “development armies” (Leta et al. 2018).

Like previous extension programmes, the PES also prioritised the adoption and application of new technologies and knowledge as the major approaches to end poverty and food insecurity among smallholder farmers. The usual extension methods such as group training and demonstration have been used. Nevertheless, there are also features that make PES different from the previous extension programmes. First, the emphasis on displaying technologies and best practices through model farmers and farmer training centres (FTCs) was a novel way of

upscaling. Secondly, the role of DAs has been limited to training and mentoring model farmers, unlike in previous approaches where the DA had many more roles to play (e.g. tax collection, fertiliser distribution and overseeing loan repayment). A third change is that model farmers are assumed to act as leaders of development groups and share tasks with DAs (Berhane et al. 2018; Davis et al. 2020; De Roo, 2020; Leta et al. 2018), giving them a stronger role in the system. However, most of the envisioned goals of PES have not been realized. According to Leta et al. (2018) the interdependence between DAs and model farmers, which is vital for the implementation of the PES, is poorly designed and realized. Decentralization is limited to administrative facilitation and mainstreaming the provision of public services, while collective decision-making and inclusiveness within the extension system largely remains rhetoric rather than practice (*ibid.*). In practice, community involvement is only in implementing plans that are developed in a top-down fashion (*ibid.*). Similarly, the development groups and one-to-five networks are established from above and without real community involvement in decision-making (Leta et al. 2019). The efforts made to encourage technology adaptation, farmer's creativity, and the promotion and application of the use of local knowledge and materials are reported to be insufficient (Leta et al. 2018).

Overall, regardless of the effort made to adopt a participatory approach, PES is reported to have failed to meet the needs of farmers (Leta et al. (2019) and reports show the persistence of the legacy of PADETES (MoA 2010; MoANR and ATA 2017). Leta et al. (2018) reported that experts at different levels still refer to PADETES, despite its formal termination in 2004 following the reform of MoA to the Ministry of Agriculture and Rural Development (MoARD).

Constraints hindering the effective implementation of PES reportedly include a limited level of actual decentralization, rigidity in governance paths, a lack of expertise relevant to implementing the approach, and the top-down planning tradition that is long-established in

Ethiopia's agricultural extension and rural development governance (Leta et al. 2019). Other factors mentioned are inadequate human resources and poor planning capacities (Debebe 2012) as well as poor engagement with non-state actors such as the private sector and civil society in co-designing policies and interventions.

Table 2.8 presents a summary of the various weaknesses and constraints of the different extension programmes, introduced across the consecutive regimes.

Table 2.8: Weaknesses and constraints of agricultural extension and advisory services across the three regimes, as reported in the literature

Categories of weaknesses and constraints	Regimes	
	Imperial regime (1930-1974)	Military regime (1974-1991) Weaknesses
Targeting/priorities	Targeting the better off farmers who had access to modern inputs as the principal beneficiaries and failing to reach the vast majority of the smallholders. Concentration of extension activities in mixed farming system areas, while overlooking farmers in the lowland areas who are engaged in animal production. Little attention paid to the livestock sector	Targeting the state farms and collective farms, while overlooking smallholder private farmers. Emphasising on large-scale commercial farms engaged in the production of cash crops for export and raw materials for local industries. Favouring the development of state and collective farms led to the situation whereby individual small-scale farmers were largely deprived of access to credit services and improved inputs.
Extension professionalism/neutralit y	Treating extension service just as a source of information and knowledge, and assigning the responsibilities for input supply and rural credit to other bodies	DAs burdened with non-extension activities such as tax and loan repayments collection. Messages not entirely devoid of political objectives
Extension approach	No specific information available	Not-participatory, inflexible and top down extension approach.
Policy related	Unfavourable land tenure regime and unwillingness of the government to reform the land tenure policy and tenant landlord relationships.	<p>Top-down, non-participatory and supply driven approach of the extension services. Inadequate consideration given to farmers' needs in research agenda setting in extension package development. Promoting technologies as "as blanket recommendations", without proper prior adaptability trials.</p> <p>Performance evaluation that encourages DAs to force farmers to take up technologies, rather than following participatory and demand-based approaches.</p>

Research method/ technology development	Limitations in new/improved technologies, and insufficient and low-quality research works, aimed at developing technological packages adapted to the different ecological zones of the country.	No specific information available	Low motivation leading to high turnover of extension staff, mainly DAs Inadequate pilot testing of technologies in different contexts (lack of prior adaptability trials). Technologies are developed and tested only in particular areas Lack of vibrant linkages and poor coordination
Structural issues	Disintegration of extension services and hesitancy to change the organizational and administrative systems of the different institutions assigned for agricultural development. Poor infrastructural and market development. Lack of complementary institutional support services such as input supply and credit services.	No specific information available	
Infrastructure		Inadequate facilities and logistical support.	Poor functioning of FTCs to provide demand-based extension services. Limited use of communication media and use of ICTs. Limited technology multiplication centers such as for livestock Limited access to improve agricultural knowledge, information and technologies Financial shortage and lack of incentive structures. Limited logistics and facilities for frontline development workers
Financial resource related	No specific information available	Lack of financial resources and incentive mechanisms. Dependency on donors for finance. Limited budget of the government in general and limited capacity and resources of the country to develop socially and ecologically suitable innovations. Shortage of extension personnel	
Human resource related	Severe shortage of manpower		Capacity gaps of the DAs Insufficient number of DAs (too low a ratio of DAs to farmers). Limited capacity private sector and ????

2. 5. Analysis and Discussion

This study aimed to yield insight into how the Ethiopian extension system has evolved over time, and how these developments relate to the evolution of research and extension paradigms in the broader literature. In this part of the chapter, we will answer this question by referring to the features of TOT, PTD and AIS presented in the analytical framework section, and systemically assess the different regimes by reflecting on what elements of the TOT, PTD, and AIS they seem to incorporate. The summary of the features that characterize the three regimes is presented in Table 2.9.

To begin with the concept of innovation, our results indicate that the conception of innovation has always been somewhat beyond the classical knowledge and technology components that are mostly emphasised in the TOT paradigm. During the imperial regime, there were already concerns for input and loan provision in addition to the provision of improved technologies and advisory services to farmers. New social arrangements such as peasant associations (PAs) were introduced, as new social arrangements during the military regime. During the EPRDF regime, broader issues such as marketing, organising farmers in groups, cooperatives, and unions has been emphasized, along with attention for institutional issues related with input provision such as fertilizers and loans.

With regard to the innovation approach the results clearly show that the public extension system was firmly top down, supply driven and oriented towards one-way diffusion of scientific knowledge during the imperial regime and military regime. During the EPRDF regime, the approach remained dominantly top down in the sense that there has been a centralised flow of information and steering of the public extension system, even though the management of day-to-day activities has been decentralized. This is despite the pro-participation and pro-decentralisation discourses that appeared in policy documents. This points to a contradiction or

tension between discourse and practice in the public extension system, which may be attributed to a political and organisational culture with a strongly ingrained belief in the benefits of central control and planning.

Putting aside the dominance of top-down and less participatory advisory approaches of the public extension system, international development organisations, engaged in agricultural research and extension activities in Ethiopia have been championing participatory approaches, particularly in the last two decades. The existence of different life worlds in terms of the extension approach suggests that the EPRDF regime is to some degree interested in more recent ways of thinking about extension and innovation but has not been willing or able to integrate such approaches into their own systems, possibly due to gaps in human capacity and a lock-in with hierarchal traditions.

With regard to typical methods used by applied researchers that are close to extension practice, our data suggests that these remained in line with a TOT paradigm across the three regimes. During the imperial regime the major activities were experiments in research stations in strategically-selected high potential areas that were then demonstrations by DAs and model farmers. During the military regime the focus was on experiments in stations, while the EPRDF regime started to (again) support jointly managed on-farm technology demonstrations in addition to the station-based experiments. However, doing applied research according to a demonstration logic essentially remains a top-down endeavour rather than a form of participatory research in which farmers have the ability to shape research agendas and collaborate on an equal footing in the preparation and analysis of research activity.

Concerning the source of innovation, we see that policy documents and the contents of extension programmes across all three periods reflect the TOT idea that research centres (either

local or international) are the key source of innovation. In all periods innovations have been seen as something that comes from outside, and none of the regimes has recognised the important role that farmers, DAs and other relevant actors might play in developing innovations.

During both the imperial and EPDRF regimes farmers were or are seen as participating in the implementation and management of demonstration plots and had a much lower level of participation during the military regime. Throughout all the eras, the extensionists have been regarded predominantly as agents for promoting and disseminating new technologies and improved management practices, although in the EPRDF period there has been greater recognition (at least in policy documents) that extensionists can also play useful roles in identifying farmer's production problems and channeling them to the attention of relevant organizations such as researchers and district agricultural offices.

Table 2.9: Features that characterize the three regimes, linked to different paradigms in the literature on research and extension.

Features of the perspectives	Regimes		
	Imperial regime (1930-1974)	Military regime (1974-1991)	EPRDF regime (1991-2017)
Conception of innovation	New or improved technologies and technical advice; institutional issues related with input provision; such as fertilizer and loan are considered (More TOT than PTD)	New technologies and techniques of production New social arrangement such as PAs and cooperatives at the grassroots level were emphasised (More PTD than TOT)	New technologies and techniques of production Institutional issues related to input provision, such as fertilizer and loan are considered, as are market issues Organizing farmers in networks, groups and cooperatives and unions at the grassroots level (More AIS than PTD)
Innovation approach	Top down, supply driven and one-way diffusion of scientific knowledge (TOT Model)	Top down, supply driven and one-way diffusion of scientific knowledge (TOT Model)	Dominantly top down where the flow of information and political leadership is centralized, while the management of day-to-day activities is decentralized. NGOs have used more bottom up, demand driven and participatory approaches. (More TOT than PTD)
Typical applied research methods	Experiments in stations Demonstration by DAs and model farmers (More TOT than PTD)	Experiments in stations (TOT model)	Experiments in stations On-farm technology demonstration which DAs and model farmers jointly manage (TOT with some PTD)
Source of innovation	Researchers (TOT model)	Researchers (TOT model)	Researchers (TOT model)
Role of actors	DAs are responsible for disseminating or popularizing new or improved technologies and provide technical advices as well as providing market and credit services Model farmers undertake demonstrations together with DAs (TOT with some PTD)	DAs are responsible for providing advice on new technologies and techniques of production from research organizations and deliver them to farmers (TOT model)	Extensionists are responsible for promoting various extension packages and introducing new technologies and techniques to farmers; for facilitating the management of the demonstration plots and to identify farmers' production problems and channelling them to the attention of relevant organizations such as researchers and district agricultural offices. Farmers are involved in management of demonstrations (TOT with some PTD)
Extension and intervention methods	Demonstration Field days Regular visits to individual farmers Organizing groups of farmers and youth clubs (TOT model)	Modified T and V via contact farmers, organized into groups PAs and cooperatives used as the channels of focal points of technology transfer (TOT model)	T and V approach merged with on-farm technology demonstration plots with high level supply of external inputs through the provision of loans to smallholder farmers. Individual, group, and mass media approaches (TOT with some PTD)
Predominant models	More TOT than PTD	TOT model	More TOT than PTD

Note: options in the predominant model: TOT, More TOT than PTD, more PTD than TOT, PTD, More PTD than AIS, More AIS than PTD, AIS

Over time more and more space has been created for non-state actors, (NGOs, cooperatives and private companies) to become involved in research and extension activities. However, in terms of their actual overall contribution it is hard to yet speak of a pluralistic extension system. In theory, establishing a government-led pluralistic extension service has been one of the key principles guiding the development and implementation of the national agricultural extension system in Ethiopia (ATA and MOA 2014; MoANR and ATA 2017). In practice, public organisations continue to be the most important players, especially in the production and delivery of inputs for smallholders (e.g. in production and the sale and distribution of improved seed and fertilizer). A key factor underlying this discrepancy is arguably the government's focus on strategic goals such as fostering state–farmer ties in order to secure a strong support base and a stable state (Leta et al. 2017). The same authors (*ibid*) also note the need to develop a national agricultural extension strategy that gives space for pluralistic advisory services while nurturing the efficiency, effectiveness and inclusiveness of the public agricultural extension service.

Recognizing the importance of linkages among various actors, there have been attempts to create interaction forums during the military and EPRDF regimes, with the forums during the latter period extending beyond researchers, extensionists and farmers. However, several such forums have been discontinued due to systemic bottlenecks, and today similar forums are reported to be unsuccessful because of similar constraints (ATA and MOA, 2014 and MoANR and ATA 2017).

Concerning the extension and intervention methods, we can see that more or less similar methods such as demonstration, individual and group contact methods have been used across the different regimes. There is little attention for the kinds of learning-oriented methods and/or multi-stakeholder dialogues that have been proposed as ways of moving beyond the TOT paradigm.

In sum, Ethiopia has gone through radical ideological shifts in the past eight or more decades, from feudalism to Marxism to a more liberalised market system. In line with the ideological shifts, the policy and the rhetoric of the advisory approaches has recently changed towards a pro-participation and decentralization discourse. However, the dominant practice mostly remained the same across the three periods. This might be related to the socialist background and origin of the parties that have ruled the country for the last five decades, linked to a continued preference for command-based hierarchal and top down approaches, such as TOT.

The domination of the state in general and the Party in particular shows, on one hand, the commitment to provide all the support that farmers require, and at the same time a tendency not to count on or trust non-state actors, particularly those in the private sector. This is despite rhetoric that advocates liberal economic policies and democratic reform.

Reflection on the way forward

In a context where the governments are greatly influenced by ideological legacies, where the private sector is highly profit oriented, and the majority of farmers cannot afford to pay anything for extension and advisory services, there are obvious reasons for the domination of the state in the delivery of agricultural extension services. In such conditions, the major characteristics of the state (e.g. its top down approach) is likely to be reflected in the extension system. In terms of a way forward, the most realistic way to applying the innovation system perspective in the extension system is to work towards a more pluralistic system, where extension plays brokerage, intermediation and facilitation roles across all administrative levels, ranging from the Ministry level to the grass root *kebele* level where the DAs are assigned.

As the findings in this study show, the space for non-state actors has increased over time, indicating small steps towards a more pluralistic system. However, playing the types of brokerage roles

described above in this new setting requires different knowledge, skills and attitudes among extension professionals and agents at different levels. This in turn requires investments in capacity building and institutional changes at policy level (e.g. a change in incentive mechanisms and evaluation criteria) to create a conducive environment for the extension service to have a function in a different way. Further systematic assessment of the existing institutional structure and the broader functioning of the AIS of the country is required to generate more specific recommendations, and this could be an area for future study.

2. 6. Conclusions

In the past eighty years or so, Ethiopia has witnessed major political and economic reforms, including changes in agricultural development policies and administration. The country has evolved from a feudal system with a landlord-based economy, via a command-led communist military regime, towards a democratic republic with considerable space for market liberalization. Although agricultural development policies have shifted along with these regime changes, the TOT paradigm on research, extension and innovation has remained dominant and hegemonic. It is important to note, however, that the scale and magnitude at which the public extension system and other governance mechanisms operate has increased meaningfully over the past decades, following considerable investment in vocational training. Despite the strong role of the state and party several aspects of PTD and AIS paradigms have been reflected or incorporated throughout the three eras. Most significantly, public agricultural innovation support services have emphasised institutional and market issues even before the AIS paradigm was developed in the literature. Similarly, we see that non-state actors with different approaches have played roles in all three periods, indicating that different paradigms can co-exist in relative isolation from each other.

Chapter 3

Intermediation approaches in agricultural innovation processes: Comparative case studies from Tigray, Ethiopia

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*This chapter will be submitted to a journal as:
Seifu. M., Klerkx., L., van Paassen, A., and Leeuwis, C.
Intermediation approaches in agricultural innovation processes:
Comparative case studies from Tigray, Ethiopia.*

Abstract

Given the often-occurring problem of fragmentation in the innovation system, there is a consensus on the need for intermediation. However, as characteristics of innovation systems are different in different countries, the modalities and mechanisms of intermediation need to be tailored to the specific context. Despite the existence of multiple studies on intermediation mechanisms in different contexts, there has been little comparative research between different intermediation modalities and mechanisms in particular contexts. This study aims to fill this gap by comparing two projects working in the Ethiopian agriculture sector: Africa Research in Sustainable Intensification for the Next Generation (Africa RISING-AR) and Capacity Building for Scaling up of Evidence-based Best Practices in Agricultural Production (CASCAPE).

This study reveals that the *approach to innovation intermediation* employed by AR (which had innovation intermediation as a core activity, via an orchestrated innovation platform (IP) which acts as a brokerage mechanism) performed better than that of CASCAPE (which had innovation intermediation as a side activity via problem-based, *ad hoc* type of brokerage mechanism). The IP mechanism enhanced the strengths of having intermediation as a core activity such as: preventing neutrality tension and providing more freedom to act as an innovation catalyst. In addition, the IP intermediation mechanism creates space to learn by doing/interacting, and in a way that contributes to building the interactive innovation capacity of actors by exposing them to different ways of doing things.

Nevertheless, embedding such a dedicated innovation *intermediation approach* sustainably in a context such as that in Ethiopia, where the linear innovation approach and hierarchical and top down culture is dominant, demands extra efforts. It requires translation to the local context by creating the space to learn and reflect and building connections with people who are in the position of facilitating institutional change in organisations and innovation systems. It is also essential to create connections with people who have decision-making power in order to bring structural changes in organisational mandates, and to provide incentives, procedures and funding for learning and capacity development.

Keywords: Innovation Intermediation, Intermediation Mechanisms, Intermediation Modalities, Intermediation Functions

3.1. Introduction

The lack of linkages among actors within Agricultural Innovation Systems (AIS) inhibits the development and diffusion of appropriate innovations in Sub-Saharan African (SSA) countries (Adejuwon, 2016). As such linkages are not usually self-organised, intermediation is essential (Leeuwis, 2004), creating a vital role for ‘innovation intermediaries’. Innovation intermediaries are actors who coordinate and broker relations at different interfaces in the AIS’s complex multi-actor configurations (Klerkx and Leeuwis, 2007; Klerkx, Álvarez and Campusano, 2015), and sometimes are also called innovation brokers (Adejuwon, 2016, Klerkx and Leeuwis, 2009; Klerkx, Hall, and Leeuwis, 2009; Klerkx and Gildemacher, 2012). Intermediaries may engage in intermediation activities as a side activity (in addition to another core activity) or as a core activity, depending on the context. In this study we refer to these different patterns of intermediation (as either a core or side activity) as *intermediation modalities*. In the Global South innovation intermediation mostly occurs as a side activity (Klerkx, Hall and Leeuwis, 2009; Klerkx, Álvarez, and Campusano, 2015). The intermediary role is usually taken up by local and international NGOs, projects, farmers’ organisations, research organisations and affiliates such as International Potato Centre (CIP) and International Livestock Research Institute (ILRI) (see Klerkx, Hall and Leeuwis, 2009 and Klerkx and Gildemacher, 2012 for examples).

Innovation intermediaries can fulfil a range of innovation intermediation functions in agricultural innovation, which are described in the literature (Howells, 2006; Klerkx & Leeuwis, 2007; Klerkx, Hall and Leeuwis, 2009; Kilelu et al, 2011). Intermediaries (actors who take up intermediation roles) may do brokering through different sorts of interventions, which we refer to as *intermediation mechanisms* in this study. Through these intermediation mechanisms, they facilitate innovation processes and perform various intermediation activities,

which we label *intermediation functions*. One mechanism is through orchestrated, formal innovation platform gatherings (Adekunle and Fatunbi, 2012; Nederlof et al, 2011; Swaans et al, 2014; van Paassen et al, 2014); also referred to as innovation networks (Leeuwis and van den Ban, 2004), or formalized public–private partnerships (PPPs) (Hall et al, 2001; Spielman et al, 2010). Another mechanism is via a more flexible, opportunity-and problem-based type of brokerage (van Paassen et al, 2014), which we see as a problem-based, *ad hoc* intermediation mechanism. Among the examples are: joint agenda setting and reflection through Rapid Appraisal of Agricultural Innovation Systems (RAAIS) workshops (Schut et al, 2015), informal networking events, capacity development activities such as training sessions, participatory on-farm activities, appointing or contracting individuals to act as innovation champions (technology, process and network champions) or communication through medias such as posters, flyers, email, phone, radio, or videos (Lamers et al, 2017; Sanyang et al, 2014; Zossou et al, 2009).

Despite consensus on the importance of linkage building and the need for intermediation to foster this, it is usually challenging for policy makers and development agencies to identify the appropriate intermediation modalities and intermediation mechanisms that suit a specific context and a specific objective. Multiple studies exist on innovation intermediation in general (see: Klerkx and Leeuwis, 2007, 2009; Klerkx, Hall and Leeuwis, 2009; Kilelu, et al, 2011; Poncet, Kuper and Chiche, 2010; Klerkx, Álvarez and Campusano, 2015); and on Innovation Platforms (IPs) (see: Davies et al, 2017; Kilelu et al, 2013; Swaans et al, 2014; Sparrow & Traoré, 2017). The different characteristics of AISs in different contexts (for example: developed and developing countries, public and privatized extension services, the presence or absence of a culture of collaboration, different stages of innovation system development, etc) make a context specific design crucial (Adejuwon, 2016; Klerkx, Hall and Leeuwis, 2009; Klerkx, Aarts, and Leeuwis, 2010).

In addition to this there are few comparisons of the performance of different brokerage modalities (as a core or side role) and different intermediation mechanisms (via orchestrated formal IP based brokerage or via problem-based, *ad hoc* mechanisms) in implementing various innovation intermediation functions. Documentation of cases in different countries and agricultural systems is essential to understand innovation processes and how they are affected by different innovation brokerage arrangements. Lessons can be drawn that can inform policy formulation (Hall, 2006; Klerkx, van Mierlo and Leeuwis, 2012). The purpose of this study is to fill this gap by comparing two projects: the Africa Research in Sustainable Intensification for the Next Generation (Africa RISING) Programme and Capacity Building for Scaling Up of Evidence-Based Best Practices in Agricultural Production (CASCAPE), both working in Ethiopia. CASCAPE was hosted in higher education institutions and organised its networking through its coordinators and an innovation team (IT). AR pulled stakeholders together in Innovation Platforms (IPs) to identify priorities and implement its activities. This study aims to examine whether and how the implementation of innovation *intermediation functions* in agricultural innovation systems depends on the type of intermediation modalities (brokerage as a core activity or a side activity) and the *intermediation mechanisms* (brokerage via an orchestrated IP or via a problem-based or an *ad hoc* type of brokerage) in the Ethiopian context. Drawing on the lessons learned from these projects, this study goes on to reflect on the most appropriate intermediation modalities and intermediation mechanisms (which we label *innovation intermediation approaches*) in the context of Ethiopia, in particular, and sub-Saharan African countries in general.

This chapter is organised as follows: section 2 draws a theoretical framework that guided the analysis. This is followed by a presentation of context, case selection and research design in section 3. Major findings are presented in section 4. In section 5, an analysis and discussion of the major differences and similarities of the different innovation intermediation modalities and

mechanisms is presented. We present our conclusions in section 6, where we highlight the wider theoretical and practical implications of the findings.

3.2. Theoretical Framework

In this part of the chapter, we will review the various intermediation functions that should be fulfilled in innovation intermediation processes. We will then focus on the weaknesses and strengths of the two distinct intermediation modalities (intermediation as a core activity and as a side activity); and intermediation mechanisms (via an orchestrated formal IP based brokerage and, a problem-based, ad hoc type of brokerage), in effectively implementing the innovation intermediation functions. We finally developed a theoretical framework for analysing our data.

3.2.1. Innovation intermediation functions

Innovation intermediation involves several detailed functions (Howells, 2006; Kilelu, et al., 2011; 2013). Building on comprehensive categorisations of functions of other authors (e.g. Howells, 2006), Klerkx, Hall and Leeuwis, (2009) reduced the categorization to three generic functions: Demand articulation, network brokerage or network building, and innovation process management. According to these authors, demand articulation involves articulating innovation needs and visions and corresponding demands in terms of technology, knowledge, funding and policy. Network brokerage refers to facilitation of the formation of linkages amongst relevant actors, i.e., the scanning, scoping, filtering and matchmaking of possible cooperation partners (Howells, 2006). Innovation process management is about enhancing alignment among networks of heterogeneous actors who may have different conceptual frames related to norms, values, incentives and reward systems.

In this study we basically stick to these three generic functions, but with a slight change of a name for the first intermediation function: ‘demand articulation’ which we change to ‘context analysis, *demand articulation and planning process*’. Thus, the definitions of our three intermediation functions are as follows. First, *context analysis, demand articulation and planning process* (F1) is defined as the facilitation of the process of identifying innovation challenges and opportunities as perceived by stakeholders. The mechanisms to realize this function are problem diagnosis and prioritization, needs assessment studies (the needs for knowledge, technologies, resources), and an assessment of institutional gaps. Secondly, *network building* (F2) is defined as the identification and selection of potential partners, facilitating linkages and match making amongst them. Thirdly, *innovation process management* (IPM) (F3) involves creating space for participation where the involved actors, with different institutional backgrounds, negotiate over their roles, tasks, duties; coordinating/facilitating the interaction and learning process to align their activities and create a common vision amongst the partners; evaluating innovations and monitoring the whole innovation process.

3.2.2. Modalities of innovation intermediation: as a core activity via Innovation Platforms (IPs) and as a side activity via an *ad hoc* type of brokerage

The intermediation modality can either be as a core activity or a side activity and each has certain strengths and weaknesses, which have been assessed in the literature (see Adejuwon, 2016; Klerkx, Hall and Leeuwis, 2009).

Several strengths of brokers taking intermediation as their core activity have been identified:

- it prevents neutrality and legitimacy tensions: actors taking intermediation as their core activity have more space to play the role of facilitator with more (perceived) neutrality than those who have a substantive stake in the research, extension or innovation processes, who

may also be providing technical knowledge, or stand to reap benefits from the product created in the innovation process, and;

- it provides more freedom to act as catalysts in the innovation process and bring about institutional change.

Among the weaknesses of brokers taking intermediation as their core activity are:

- difficulties in securing funding: they need some form of continued support from a public funding agency or collective funds, such as farmer levies; which is not easy in most cases, and;
- they may seek to maintain system fragmentation so as to remain relevant in the scheme of things, if the brokers are profit oriented.

The strengths of brokers who intermediate as a side activity include:

- alleviating tensions which may arise from trust issues, for example: brokers who are embedded in the knowledge creation process have the capacity to alleviate tensions which may arise from trust issues in sharing knowledge, and;
- requiring relatively little funding/ resources.

The weaknesses of brokers playing intermediation as their side activity include:

- restricted manoeuvring space to carry out and maintain brokerage roles because of having mixed identities and thus a possible tendency of adhering to their traditional roles;

- functional ambiguity which may arise from the overlapping of traditional functions and brokerage roles: organisations may fall back into their traditional role, for example: researchers facilitating a farmer field school may revert to their role as technical experts;
- difficulty in sustainably embedding the innovation brokerage role in an organisation for which it is not (yet) its core-business, as actors may retain the old mindset and lack the capacity to fulfill this role, for example: extension organisations may adhere to linear transfer-of-technology instead of taking up a facilitation role to connect farmers with different sets of service providers, and;
- neutrality tensions i.e. brokers may be viewed as being partial towards their financiers or the group that they belong to.

As indicated in the introductory section, the intermediaries may opt for various types of interventions, which we refer to as *intermediation mechanisms* to facilitate innovation processes and undertake various intermediation activities, which we label *intermediation functions*. For instance, brokers may connect actors by facilitating innovation platforms (Swaans et al., 2014). But they can also use a problem-based, *ad hoc* intermediation mechanism to connect various actors who were previously disconnected, without establishing new, and relatively permanent, platforms (van Paassen et al, 2014). Innovation platforms (IPs) are widely advocated as powerful innovation intermediation mechanisms, particularly in the context of sub-Saharan Africa, as they can create linkages and facilitate interaction among stakeholders in agricultural innovation processes (Adekunle and Fatunbi, 2014; Davies et al, 2017; Kilelu et al, 2013; Sartas et al, 2018; Swaans et al, 2014). Intermediation processes that use IPs can make important contributions to enhancing the innovation capacity of individual actors as well as strengthening system-level capacities. They contribute to the generation, and scaling of, innovations through

fostering networks, linkages and exchange of knowledge and encouraging negotiation among various stakeholders who, for various reasons, were previously less (or not at all) connected (see Hall et al, 2001; Hermans et al, 2017; Kilelu et al, 2013; Nederlof et al, 2011; Sartas et al, 2018). Members of an IP can take up brokerage roles and this can help to create linkages with different components of an innovation system through distributing intermediation roles among participating members and resolving unexpected tensions that may emerge when different actors interface (Kilelu et al, 2013). Filling institutional gaps is another positive contribution made by IPs that is mentioned in the literature (Davies et al, 2017).

Despite all these positive contributions, IPs are reported to make little contribution in tackling systemic barriers that require higher level interventions (example: institutional innovations that are important in bringing sustainable impact (Cullen et al. 2014; Hounkonnou et al. 2012; Röling et al. 2012; Schut et al. 2016a; van Paassen et al. 2014; Sparrow and Traore, 2017; Davies et al; 2017). They are also time and resource intensive and difficult to sustain in the long-term (Schut et al., 2019). Given these limitations, many authors argue that it is important to think critically before making a decision on whether to initiate an innovation platform or use other intermediation mechanisms (Hermans et al., 2017; Schut et al., 2019). Schut et al., (2019) note that if the innovation platform is not a suitable mechanism for a specific purpose, or when there is an absence of enabling institutional conditions, or when a government views such a platform with suspicion, other problem-solving strategies and mechanisms should be considered.

By distilling insights from intermediation modalities and mechanisms, and intermediation functions, we constructed an analytical framework presented in Figure 3.1, and apply it to compare the effectiveness of different innovation *intermediation approaches* (modalities and mechanisms) in implementing different *intermediation functions*. We conceptualize that IP

brokerage is connected with intermediation as a core activity, while the problem-based, *ad hoc* type of brokerage is connected with intermediation as a side activity.

Figure 3.1: Connections between intermediation approaches (modality and mechanism) and intermediation functions in interactive innovation processes; own elaboration based on the literature

Based on the theoretical framework presented above, we question, firstly, whether these projects take up the intermediation role as their key or side activity (*intermediation modality*); and, secondly, we analyse whether their use of a formal orchestrated innovation platform or a problem-based, *ad hoc* type of brokerage (*intermediation mechanisms*) or use of a combination of modalities and mechanisms (*intermediation approaches*) make a difference in terms of the effective implementation of innovation *intermediation functions*.

3.3. Context, Case Selection and Research Design

3.3.1. Context of the study

The provision of agricultural development support services is traditionally a public-sector activity and there is limited space for non-public organisations such as NGOs, the private sector or civil organisations. However, new actors have entered the scene to provide broader innovation support and finance advisory services over the past few years. NGOs or development projects/ programmes with international donations are playing a role in seeking to boost the production and productivity of smallholder farmers residing in the rural *kebeles* (sub districts) of Ethiopia, following in the spirit of innovation systems (Spielman et al, 2010).

3.3.2 Case selection and research design

A preliminary study was undertaken in 2014 by contacting resource people in Tigray regional state, to identify ongoing projects that were utilising the AIS perspective. Only a few projects had begun to work in-line with the AIS paradigm, and most of them were just starting their interventions during the data collection time, 2015 and 2016. The CASCAPE and the Africa-RISING-Ethiopian Highland projects, both working in the southern zone of the Tigray regional state, were the only projects which were highly active and were attempting to apply the AIS perspective, and thus they were selected as cases for this study.

The Africa-RISING (AR) is a research-for-development project, supported by the United States Agency for International Development (USAID) as part of the U.S. government's Feed the Future initiative. The aim of this project is to contribute to the Feed the Future goals of reducing hunger, poverty and under-nutrition by delivering high quality research outputs through action research and development partnerships (applying the IP as a mechanism) to identify and validate solutions to the problems experienced by smallholder crop-livestock farmers. In

Ethiopia, AR is being implemented in four regions and in eight *kebeles*, of which two are in Tigray region. Farm activities are led by different CGIAR centres, such as ILRI, International Council for Research in Agroforestry (ICRAF), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), International Center for Tropical Agriculture (CIAT), International Center for Agricultural Research in the Dry Areas (ICARDA), and CIP (Hailemariam, et al, 2017). Based on the themes identified, these research centres developed action research protocols.

With the overall goal of improving the livelihood of smallholder farmers operating in different regions and having different farming systems, the Government of the Federal Democratic Republic of Ethiopia has initiated a comprehensive Agricultural Growth Programme (AGP) in 83 *woredas* (districts) in four regional states: Tigray, Amhara, Oromiya and Southern Nations, Nationalities, and Peoples' Region. AGP focuses on agricultural production and commercialization, rural infrastructure development and management. It targets the scaling up of best practices and successful experiences to other *woredas* across the country. CASCAPE was designed to further strengthen the capacity of AGP stakeholders in identifying, documenting and disseminating best practices in agricultural production, thereby improving agricultural production and productivity. CASCAPE embraces AIS: undertaking participatory action research and supporting the development of effective stakeholder and knowledge networks at various levels in order to promote the scaling up of innovations; (see: CASCAPE, 2014). In the Tigray region, CASCAPE operated in the southern zone; in five *woreda* (districts) and 10 representative *kebeles* (sub districts). The project was based at Mekelle University, a public university, and is supported by the regional Tigray Bureau of Agriculture and Rural Development (BoARD) and the Tigray Agricultural Research Institute (TARI). CASCAPE was financially supported by the Dutch Ministry of Foreign Trade and Development Cooperation, through the Royal Dutch Embassy in Ethiopia.

A case study approach was deemed appropriate for this study, which has an evaluative aspect. It compares the differences and similarities in the intermediation processes and functions of the two projects. According to Yin (2004) the case study method is suitable for research that has a descriptive question (what happened) and/or an explanatory question (how or why something happened).

In-depth interviews are a powerful method for generating descriptions and interpretation from the point of view of people (Ritchie et al, 2014). The interviews can be made with a single person and/or with a group (Yin, 2011). In this study, interviews were made with both individuals and groups to generate primary data. Open ended questions were prepared in a way intended to explore innovation intermediation functions and activities. Purposive and snowball sampling was applied to select key informants from the major stakeholders of both projects at different levels, based on their role and level of participation. Whenever possible, the interviews were audio recorded. The audio recorded interviews and discussions were listened to and most were fully transcribed. The rest were partially transcribed focusing on the relevant research themes. Secondary sources, such as minutes of IP meetings, workshops, annual project reports, evaluation reports and diagnostic study documents were used as further sources of information. Non-participant observations in the IP meetings of AR and the workshops of CASCAPE and informal discussions are also used. In line with the theoretical framework described in section 3.2, we labelled/categorized/identified the statements from the interviews with individuals and groups; and qualitatively analysed the information from the secondary data. Table 3.1 shows a summary of data collection methods, stakeholders and number of interviews from each stakeholder type.

Table 3.1 Summary of data collection methods

Organisations contacted	Role of the interviewees	Sampling method	Sample size	Data collection Method
TBOARD	Regional extension process owner (1) AGP project coordinator at regional level (1) <i>Woreda</i> level extension office head (1)	Purposive and snowball	3	In-depth individual interviews
	DA at the <i>kebele</i> level and experts at the <i>woreda</i> level (5)	Snow ball	5	In-depth group interviews
TARI	Part time researchers in CASCAPE (2)	Purposive and snowball	2	In-depth individual interviews
Projects	AR project field coordinators (2) IP members: CIP project coordinator and GRAD project coordinator (2)	Purposive and snowball	4	In-depth individual interviews
	CASCAPE project coordinators (2) and project field assistants (3)	Purposive	5	In-depth individual interviews
Farmers (project beneficiaries)	Innovation team members (3)	Purposive	3	In-depth group interviews
	AR	Purposive	7	In-depth group interviews
	CASCAPE	Purposive	4	In-depth individual interviews
Non-participant observation	In IP meetings of AR project at <i>woreda</i> and <i>kebele</i> levels	NA	NA	In-depth group interviews
	In planning and evaluation workshops of CASCAPE project at <i>woreda</i> and regional levels.	NA	NA	In-depth individual interviews
Total			47	NA

Acronyms: TBOARD= Tigray Bureau of Agriculture and Rural Development; AGP= Agricultural Growth Programme; DAs= Development Agents; TARI=Tigray Agricultural Research Institute; AR=Africa Rising; GRAD= Graduation with Resilience to Achieve Sustainable Development; CIP=International Potato Centre; CASCAPE= Capacity building for scaling up of evidence-based best practices in agricultural production; NA= Not Applicable

3.4. Findings

3.4.1. Project implementation: major activities and events

In this subsection, we describe the process how our case study projects (AR and CASCAPE) were established and implemented. We present a summary of each case study, drawing on quotes from the interviews to substantiate the key points.

The Africa-RISING-Ethiopian Highland project

As shown in Fig.2, The Africa-RISING-Ethiopian Highland project (also called AR) started its activities in 2012, following prior consultation with offices of agriculture at the zonal and *woreda* levels, in which the purpose of the project was explained, and suitable sites selected. Following this, AR identified potential partners with the help of the Office(s) of Agriculture and Rural Development and established a multidisciplinary team including experts from research centres, universities and Offices of Agriculture and Rural Development (E # 1 and A # 1). After building the network, training was provided to the team about the research and development approach of the project, AR's head office in ILRI, Addis Ababa (E # 2 and A # 2), The team then carried out a participatory community analysis (PCA) (E # 3 and A # 3) with the aim of understanding the context in terms of the potentials and challenges for intensifying agricultural production from the perspectives of the farming community.

Some of the major challenges identified during the PCA in relation to crop production were a lack of improved seed, low and declining soil fertility, problems with pests, disease and weeds, the high cost or unavailability of agri-inputs and a lack of crop storage facilities. For livestock, a lack of feed and of improved breeds were the key concerns, along with pests and diseases. Low and seasonally volatile prices for produce, and a lack of information were the major market related problems for both crop and livestock production. An institutional analysis was done to identify the existing and missing actors in the area. The dominance of governmental organisations, such as *kebele* and *woreda* administrations, *kebele* cooperatives and unions combined with the limited number of research and development agencies, NGOs and private organisations was identified as a major issue.

The PCA study helped identify key research themes and led to the drawing up of *kebele* level action plans. In 2013, public meetings were organised in the *kebeles*, where the objectives of

the project were explained (E # 4 and A # 4). In these meetings, farmers who were interested in providing a plot of land and becoming involved in the action research were identified and registered with the help of the Woreda Office of Agriculture and Rural Development (WoARD) and the administrators of the *kebeles*. On farm demonstrations on selected crop varieties (such as: potato, faba bean and wheat) were then undertaken on farmers' fields (E # 5 and A # 5). Mid and end season evaluation events were also organised in order to select the best performing technologies via participatory varietal selection (PVS). A project coordinator was assigned in the same year.

In 2014, an IP facilitation training was organised by the project in Addis Ababa (E # 6 and A # 6), while on farm trials continued with the selected farmers (E # 7 and A # 7), with the main partners also participating in the training. Operational and strategic IPs (further described below), with a general and a technical committee, were established at the *kebele* and *woreda* levels (E # 8 and A # 8). At the *kebele* level, most of the members were farmers, but also included Development Agents (DAs), administrators from cooperatives and other governmental sectors. At the *woreda* level the main players in the IP were governmental education, research and extension organisations (see figure 3.4). A major objective of the IPs was to foster effective community participation in identifying opportunities and in planning and implementing the programme; to enhance learning and to develop a feeling of ownership among the communities. This was to ensure that the technologies being promoted met farmers' needs in order to guarantee their widespread take up. The *kebele* IP members also developed a selection criterion (ownership and type of land to be used for the research interventions, accessibility to a road, irrigation water and willingness) which it used to select the beneficiary farmers.

The major purpose of the strategic IP was to provide strategic direction, advice, support to, and learn from, *kebele* IPs about the best ways to develop improved technologies and practices and the policies that would most improve food and nutritional security and generate incomes for rural communities (Jones et al, 2013). IP members at both levels were supposed to meet three times a year, although according to the members, some meetings didn't take place. In the same year, AR also established commodity-based farmers research groups (FRGs) at the grassroots level, aimed at undertaking participatory action research (PAR) (E # 9 and A # 9). The aim of the PAR was to improve food, nutritional security and incomes through increasing the productivity of crop, livestock and tree enterprises of farmer groups and household members through addressing the priority constraints and opportunities identified in each *kebele* and identified in Africa RISING's thematic areas. The other major activities performed in 2014 were the establishment of seed multiplication and marketing cooperatives (E # 10 and A # 10) and the construction of storage facilities (E # 11 and A # 11). In 2015, a meeting was organised to discuss the scaling-up of the technologies introduced by the project (E # 13 and A # 13), while the action research continued (E # 12 and A # 12). Fig 2 provides a timeline of the major activities of the project from 2012 to 2016.

Figure 3.2: Time line of key events in the innovation process of AR. Keys: #E=event number

Capacity building for scaling up of evidence-based best practices in agricultural production (CASCAPE)

As can be seen from Figure 3.3 CASCAPE was launched in 2011 and began by establishing a management team in Mekelle University (E # 1 and A # 1), the main implementer of the project in the Tigray region. The management team involved a part-time coordinator and assistant coordinator, who are also staff at the university. This team was responsible for the daily management of the project activities and supporting the IT. The IT consisted of experts in agronomy, natural resource management, rural development and extension and agricultural economics. who were employed on a full-time basis, alongside two livestock, extension and rural development experts from Tigray Agricultural Research Institute (TARI), who were engaged on a part-time basis. The management team together with the IT formed the project team.

The established project team undertook participatory rural appraisals (PRAs) in the selected project sites (E # 2 and A # 2). The major objectives of the PRAs were to identify and prioritize agricultural production constraints and to search for possible solutions and interesting research directions in the intervention sites. The constraints identified during the PRAs were mainly input related. Examples related to the arable sector included the high cost, limited access and blanket recommendations for fertilizer use; a limited supply of chemicals such as fungicides/pesticides; limited access to improved varieties, a lack of provision of quality seeds and a mismatch between the demand for and supply of improved crop varieties. Poor institutional development in marketing and infrastructure and inadequate storage facilities were also mentioned. In addition, farmers' limited knowledge and skills related to modern production and the management of crops was also identified as major causes for low productivity.

In 2012, community workshops were organised in each *kebele* to present the PRA results, giving an opportunity to community members to prioritise the constraints to be tackled (E # 3 and A # 3). After these *kebele* level diagnoses, *woreda*/regional level scoping studies were undertaken (E # 4 and A # 4). At the *woreda* level, stakeholders from the *woreda*/zone, such as, the WoARD, those for water, women and youth affairs, administrations, research centres located in the regions, women's associations and other agricultural experts participated. At a regional level, the BoARD, TARI and Mekelle University were involved. The purpose of the community workshops and scoping studies was to create common understanding on the constraints and opportunities identified at all levels, to triangulate the issues investigated in the PRA, to refine the issues identified, screen what was missed, and identify the issues which required attention during the interventions. From a long list of themes identified by the farming communities, the participants in the scoping study produced a short list of innovation themes (E # 5 and A # 5). In the same year best practices were identified from different sources; based on the identified innovation themes (E # 6 and A # 6). As a result of this seed multiplication cooperatives were established in the same year (E # 7 and A # 7). In 2013, the project focused on farm validation trials (E # 8 and A # 8), with emphasis given to pilot-scaling validated best practices (E # 9 and A # 9), together with the continuation of the validation of the best practices (E # 10 and A # 10) in 2014. In 2015, the best practices were scaled up beyond the beneficiary farmers to neighbouring regions (E # 12 and A # 12), along with the pilot-scaling (#E 11 # and # A 11). The finalization of the documentation of best practices in 2015 and handing the project over to stakeholders, particularly the regional BoARD or WoARD (E # 13 and A # 13) included providing training sessions on how to perform the scaling activities (E # 14 and A # 14) and discussions with the major partners on scaling issues (E # 15 and A #15).

Figure 3.3: Timeline of key events in the innovation process of CASCAPE. Keys: #E=event number

3.4.2. The innovation intermediation functions along the trajectory

As we can see from section 3.4.1, some of the activities are more aimed at scaling technologies or best practices, whereas others were about getting the innovation process started or managing the process. This reveals another innovation intermediation function in addition to the three innovation intermediation functions identified in the literature, which is innovation scaling (F4) (see also Figures 3.2 and 3.3). In this sub-section, distilled from the description of the processes, we assess the four innovation intermediation functions along the trajectory and the roles of the different actors involved in intermediating in the projects. This sub-section is integrally linked with Tables 3.2 and 3.3, and also connects back to the timelines.

Africa Rising (AR)

Innovation intermediation functions along the trajectory

AR started its activities by establishing a team (E # 1 and A # 1) for the purpose of understanding the context (opportunities and challenges), identifying knowledge and technology gaps within the farming community and developing a joint plan to tackle the problems identified (F1). The field research site coordinator of AR (we refer to him as the AR coordinator hereafter) explained the need of engaging stakeholders: *“it is crucial to involve local stakeholders and farmers to identify the real problems from their perspectives, to come up with the appropriate solutions, to develop common plans and act jointly during the implementation”* (F1). He added *“The main issue that we planned was to first bring together different stakeholders with different knowledge and skills for a joint action research, and the IP is our tool to implement this action research plan.”* (F2).

The IP members interviewed noted that the IPs are helpful for the continuous articulation and prioritization of the demands of farmers and other stakeholders and for planning and re-planning accordingly (F1), although the result of the diagnosis study was still used as a compass. Problems were identified, and best practices selected at the *kebele* level IPs in which farmers were well represented, giving them better opportunities to contribute to the problem analysis and prioritization. In addition to the IPs, it was reported that the FRGs helped to make the interventions more demand/problem based, as the issues discussed in the FRG meetings were taken up and discussed in the IPs at *kebele* level through their representatives (F1, F2). On-farm experiments and trials were based on the discussions and prioritization from the IP meetings. The *woreda* level IP allowed researchers from different organisations to connect with each other and contribute their expertise to the on-farm action research (F2), while the *kebele* level IPs helped to mobilize the farmers and local resources (F3). The technical committee

members at the *woreda* level participated in *kebele* level IP meetings and the technical committee members at the *kebele* level participated in the *woreda* level IP meetings. In this way, the technical committees served as bridges between the *woreda* and *kebele* level IPs (F2) (see Figure 3.4). According to the IP members, the *woreda* technical committee (WTC) played a crucial role in closely monitoring and evaluating the activities of the project (F3). The extension officer of the *woreda*, who is also a member of the WTC noted that:

“the technical committee participated in the kebele level IP meetings. We identified the weaknesses and strengths of the activities performed together with the kebele level IP members; and brought them to the general IP. Then the general IP would find solutions and guide the decision-making process.”

Figure 3.4: Africa RISING project organisational structure

Keys for Figure 4

Woreda level IP members**WTC= Woreda Technical Committee members (11)**

TARI research institute (2: Livestock researcher & horticulture researcher)
 EIAR research institute (1: Mekoni research centre manager)
 Endamekoni Woreda office of agriculture rural development, the extension officer (1: officer)
 Zonal Agriculture officer (1 officer)
 Maichew Agricultural Training and Vocational Education and Training (ATVET), (1: College dean)
 Mekelle university representative (1)
 International Potato Centre (CIP), (1: Mekelle-Tigray coordinator)
 Africa Rising, (2: Project site coordinator and assistant coordinator)
 GRAD project, (1: coordinator)

Members other than the technical committee (11)

Affairs Offices (social, youth and women) (3)
 Sectors Representatives (health, education, water, land) (3)
 Various project focal persons (HABP, AGP, CASCAPE) (3)
 The woreda and the zone administrator (2)

Kebele level IP members**KTC= Kebele Technical Committee (7)**

Development agents under kebele office of agriculture and rural development (crop, livestock, natural resource management and irrigation) (3)
 Kebele Manager (1)
 Kebele Administrator (1)
 Kebele woman affairs representative (1)
 GRAD representative at kebele level (1)

Members other than the technical committee (19)

Multi-purpose cooperative manager (1)
 Saving and credit cooperatives manager (1)
 Sectors representatives (health, education, water, land) (3)
 Associations representatives (farmers, youth, women) (3)
 Religious Leaders (2)
 Farmers Research Groups (FRGs) Representatives (9)

Field days were organised in the middle and at the end of the growing season to evaluate the varieties in a participatory way, in a process referred to as participatory varietal selection (PVS). PVS was also used as a tool to popularize demonstrated technologies on farmer to farmer basis. Influential people such as administrators at different levels and higher officials from different bureaus, research centres/institutes and universities and non-beneficiary farmers were invited to attend the field days (F2). Selection of most significant changes (MSC) were also used as mechanism of monitoring and evaluation (ME) in the project where the *Woreda* Technical Committee (WTC) evaluated and selected the most successful practices (F3) and nominated them for further scaling out /up (F4). The IPs, as a mechanism for connecting actors, was one of the best practices selected to be scaled out and up.

Following this procedure, different types of technologies and practices were tested/experimented with and introduced in various sub-sectors in agriculture (crop, livestock and Natural Resource Management (NRM). In addition to introducing improved and better performing technologies to farmers, the project facilitated the establishment of seed multiplication and marketing cooperatives (E # 10 and A # 10), as access to quality seed was one of the major problems identified during the diagnosis study. For example, seed and marketing cooperatives were established for faba beans, wheat and potato. In addition, AR and

its partners made efforts to tackle other problems in the value chains of the more vulnerable sub-sectors identified by the project. Examples include: constructing a diffused light store (DLS) to increase the shelf life of potato seed and creating access to markets for farmers involved in seed multiplication (E#11 and A #11).

Several interviewees, representing various stakeholders, reported that most of the introduced technologies were successful. Farmers participating in the project reported their productivity greatly increased because of the improved varieties, new fertilizer application practices, row planting, disease and pest control, close technical support from AR and other partners and their improved knowledge on agronomic practices. According to the respondents from extension services, the production and productivity of some crops doubled. A *woreda* extension officer said that: *“productivity of potato and wheat is doubled (potato 528 quintals per hectare and wheat 80-100 quintals per hectare) and these figures are now taken as a productivity benchmark”*.

The roles of the different members in the intermediation process

The IP members made different contributions to this process. While some actors only participated in meetings during problem identification, prioritization and planning (F1), others participated in connecting actors and organizing meetings (F2), and the implementation of the planned activities (F3), as well the meetings. As shown in Table 3.2, AR and the WoARD played a coordination role: identifying the potential stakeholders, connecting them prior to the PCA and then organizing IP meetings at *woreda* and *kebele* levels during the implementation phase and inviting stakeholders to participate in the meetings (F2) (see also Figure 3.4).

AR played a facilitation role in the training sessions organised at its Head Office (at ILRI) to support local partners and improve their awareness, knowledge and facilitation skills in

interactive innovation processes, mainly through the use of an IP (F3). According to the project coordinator, AR set out to change the dominant research and extension approach in Ethiopia, which is mostly top-down and linear. Consequently, the project gave emphasis to capacity building among stakeholders on how its ‘novel’ approach worked. The AR staff indicated that they tried to do this in three different ways: a) organizing training sessions for major local partners by experts in interactive innovation processes from the Head Office of AR in Addis Ababa, at the start of the project; b) creating the opportunity for actors to learn from each other (through interaction and experiencing) about interactive research and innovation process (mainly in the IPs at the two administrative levels and the FRGs at the local level) (F2); and c) giving leading roles to partners from the government organisations aimed at, not only building capacity, but also enhancing ownership. For instance: the head of WoARD was invited to act as chairman of the IPs, while the representative of the TARI was assigned to coordinate the M&E activities. Another researcher was appointed to lead communication activities, to ensure proper and frequent internal dialogue and document outreach activities and learning events. The actors with such roles were referred to as ‘our champions’ by the AR staff.

According to the AR staff, the aim of the training sessions organised in Addis Ababa was to support local partners and improve their awareness, knowledge and facilitation skills in interactive innovation processes, mainly in the IPs (F3). The local partners participating in AR reported that their awareness and knowledge about the IPs was improved. The coordinator/assistant coordinator of the project took the leading role in organising capacity building activities at the grass roots level, such as training sessions for farmers on agronomic practices.

Researchers from TARI and research centres, TVET and experts from the WoARD were directly involved in the on-farm trials /tests. They provided technical support to farmers either

through their engagement in the on-farm trials or through organising training sessions on agronomic practices (F3). Some members undertook extra networking activities within their own organizations (F2) in order to mobilize extra resources. For instance, the representative of the extension office mobilized experts and DAs for technical support, and to provide improved technologies when required. Similarly, the researchers representing the research centres connected the project with their home organisations in order to pull in resources. They convinced their centre managers to provide resources, such as technologies, improved seeds, or expertise (e.g. a pathologist when there was a disease breakout in the trial fields). Representatives of the research centres reported that it was not difficult to convince their centre managers or institute directors to support the project activities in different ways. As one of the representatives of a research centre explained: *“AR did not only involve experts, but it also engaged the centre managers in important events of the project. So, there was already the feeling of being part of the project’s activities”*

From the interviews with AR staff and other IP members it emerges that, the IP members, particularly the *woreda* level IP members disseminated innovations beyond the project sites and direct beneficiaries. For instance: potato technologies were spread by Graduation with Resilience to Achieve Sustainable Development (GRAD) and the extension offices of the *woredas*; using feed troughs was taken up by research centre representatives; GRAD was planning to take up the IP as a means to connect actors with a stake in project implementation. The GRAD coordinator said that: *“We also use a multi-stakeholder platform; but the way things are done in AR is different. Now we are trying to adapt this approach in our project.”* The existence of IPs at two different administrative levels and the engagement of the stakeholders from the start to the end of the innovation process were mentioned as two major differences in AR’s approach.

As shown in Fig 4, FRGs are the main implementers of the action research at the grassroots level. Together with researchers from different partner organizations, and with a close follow up and support from AR's local staff (coordinator and assistant coordinator), they were responsible for testing the technologies identified and prioritized in the IP meetings. Researchers from CGAIR supported the research activities that were relevant to their respective remits. The FRG representatives participating in IP meetings at both levels served as bridges to farmers engaged in research and the local community at large (F2). FRGs were also responsible for scaling technologies to broader areas (F4). According to the extension officer of a *woreda*, FRGs played a crucial role in scaling out the various technologies and practices, by sharing their experiences with other non-beneficiary farmers through farmer development groups (FDGs) established by the public extension organisation (F4). All the agricultural development activities provided by the public extension system were implemented through these groups. All the farmers in the rural areas of the study areas were members of these groups; which involved 5-6 networks with 5-6 members each. In the *woreda* where the AR operated, there were about 25,000 rural households organised in 1072 FDGs (558 for women and 514 for men). The leaders of the groups were generally 'model farmers'. The members of the FRGs were, by default, members of the FDGs and they brought their experiences to the group. The extension officer said that "the connection between FDGs and FRGs worked well in terms of supporting farmers to share experiences and influence each other's decisions." During the field days, the project coordinator and the Head Office of the WoARD played a major role in connecting people in such events (F2), while the *kebele* level IPs took the lead in organizing the field days (F2). The IP members contributed in different ways to tackling the other problems within the value chains, and also contributed to the action research and in scaling the technologies (F4). In the efforts to tackle seed problems, the *woreda* level Offices of Agriculture and Rural Development established the cooperatives (F2) and the AR supported this through capacity building, the provision of inputs and technical training to the members of the cooperatives (F3). For potato,

for example, the AR gave technical support at field level (in agronomic practices such as spacing, fertilizer application, etc.) and provided them with potato seed. The diffused light store was constructed with the help of GRAD. In addition, GRAD contributed in connecting the seed producers with its beneficiaries to facilitate direct seed marketing with farmers (F2). These seed producers reported that they were selling their potato seed at a fair price. Table 3.2 summarises the activities, intermediation processes and roles of the different actors and the functions of intermediation in the AR project.

Table 3.2. Activities, intermediation processes and functions in AR project

Activities	Actors connected	Actors playing key intermediation role	Purpose and functions of the intermediation
A1: Establishing a multidisciplinary team involving different fields of expertise in agriculture (E# 1)	Research centres, universities and Offices of Agriculture and Rural Development	AR and the Office of Agriculture and Rural Development	Identifying potential partners and linking (F2) and negotiating with the partners (F3) for joint context analysis and demand articulation studies (F1)
A2: Training of the PCA team on the project's research and development approach (E # 2)	The PCA team and the experts in interactive innovation processes in the head office of AR (ILRI) in Addis Ababa	AR	Introducing the partners to the project's research and development approach and increasing their engagement in the innovation process (F3)
A3: Undertaking participatory community analysis (PCA) (E # 3)	The PCA team with farmers	AR and the Office of Agriculture and Rural Development	Understanding the context in terms of the potential and challenges to intensify agricultural production from the perspective of the farming community (F1)
A4: Conducting mass community meetings E # 4)	The project with the farming community	The Office of Agriculture and Rural Development	Explaining the purpose of the project to the farming community and building trust with farmers for joint action of the activities (F3)
A5: Undertaking on-farm action research (E # 5)	Researchers from CGIAR, governmental research centres/institutes, TVET and experts from the Office of Agriculture and Rural Development, AR project coordinators and farmer research groups	AR coordinator/ assistant coordinator and researchers	Linking researchers and experts from different institutions with farmers (F2) to jointly test and validate technologies which can solve the problems of the farming community (F3)
A6: Organising training on IP facilitation for major partners (E #6)	Major local partners with experts in interactive innovation processes in the head office of AR (ILRI)	AR	Linking local partners with experts in interactive innovation processes (F2) to improve awareness, knowledge and facilitation skill of interactive innovation processes among the former, aimed at strengthening their engagement in the innovation process (F3)
A 7: Undertaking on-farm action research (E # 7)	Researchers from CGIAR, governmental research centres/institutes, TVET and experts from the Office of Agriculture and Rural Development, AR project coordinators, farmers research groups	AR coordinator/ assistant coordinator and researchers	Linking researchers and experts from different institutions with farmers (F2) to jointly test and validate technologies which have the potential to solve the problems of the farming community (F3)
A8: Establishing strategic IPs at the <i>woreda</i> level and operational IPs at the <i>kebele</i> level (E # 8)	Several GOs, NGOs and farmers at the <i>woreda</i> level and several local organisations and farmers at the <i>kebele</i> level (see figure 3.4)	AR and the Office of Agriculture and Rural Development	Identifying the most important stakeholders at different levels, mobilizing and creating linkages among them (F2); engaging them in the process of problem identification, prioritization and planning (F1) and enabling them to jointly implement, monitor and evaluate the project activities (F3)

A9: Establishing FRGs and engaging them in tests /experiments of technologies which are identified by the <i>kebele</i> IPs (E # 9)	Farmers with farmers (those with a common interest in the same commodity(ies), farmers with researchers from different organisations	AR and the Office of Agriculture and Rural Development	Articulating and prioritizing the demands of farmers and other stakeholders in an iterative fashion, and planning and re-planning accordingly (F1) Promoting and scaling innovations of the project at <i>woreda</i> level and beyond, and/or creating enabling environment for broader use of innovations in general (F4) Fostering integration among farmers who have similar problems and needs (F2) and engaging the them in learning and sharing knowledge and resources for innovation (F3); involving them in identifying community challenges, and prioritizing aimed at undertaking demand driven research (F1) and the scaling of the innovations to wider groups of farmers by on farmer to farmer basis (F4) Facilitating the establishment of the groups (F2), building their capacity and supporting them technically Tackling seed shortage/quality problems and supporting the broader use of the technological innovations (improved varieties) Connecting the seed producers with other farmers for direct seed marketing (F2) Mobilizing resources to build the storage facility and increase market access for farmers involved in seed multiplication Linking researchers and experts from different institutions with farmers (F2) to jointly test and validate technologies which can solve the problems of the farming community (F3) Discussing the scaling up of the identified and validated best practices from the project (F4)
	Farmers were connected and organised into groups	AR, The Office of Agriculture and Rural Development, GRAD and CIP	
	Farmers were connected and organised into groups	AR, The Office of Agriculture and Rural Development, GRAD and CIP	
A10: Establishment of seed multiplication and marketing cooperatives (E # 10)			
A 11. Construction of a diffused light storage facility (E # 11)	GRAD, CIP, AR, and the Office of Agriculture and Rural Development	AR	
A 12. Undertaking on-farm action research continued (E # 12)	Researchers from CGIAR, governmental research centres/institutes, TVET and experts from the Office of Agriculture and Rural Development, AR project coordinators, farmer research groups Various stakeholders relevant for scaling up/out best practices validated by the project	AR coordinator/ assistant coordinator and researchers	
A.13 Planning of scaling up with partners (E # 113)		AR and the Office of Agriculture and Rural Development	

F1=Context analysis, demand articulation and planning process F2=Network building F3=Innovation process management

Capacity building for scaling up of evidence-based best practices in agricultural production (CASCAPE)

Innovation intermediation functions along the trajectory

The project started its activities by undertaking participatory rural appraisals (PRA) (E # 2 and A # 2), after establishing a project team in Mekelle University (E # 1 and A # 1). The innovation team (IT) members first prepared a plan on their fields of expertise, based on the themes and activities identified during the diagnosis and scoping studies. After discussions with the project coordinator and assistant coordinator on the plans prepared by the IT; *woreda*, regional and national level planning workshops were organised. The majority of the participants of the workshops were from governmental organisations, mainly from research and extension organisations and administration offices at different levels (see Figure 3.5). These workshops continued throughout the project's lifetime, as mechanisms for networking with, and engaging, other relevant stakeholders (F2). Based on the individual and group interviews and the non-participant observations, we came to understand that the major function of the annual planning and reviewing workshops was to obtain feedback on the reports of the validated best practices from the previous year and to get input from the stakeholders to prepare plans for the coming year. This is evidenced by the following quote from one of the IT members of the CASCAPE project:

“We organised workshops and invited stakeholders when we completed our annual activities and wanted to evaluate previous activities, and to plan activities for the coming year. The stakeholders participated by giving suggestions and feedback on the technologies already developed and also made suggestions on the plans for the coming year”.

Besides organizing workshops to engage stakeholders in the planning activities and evaluation of technologies, CASCAPE also participated in already existing networks, such as the regional AGP

technical committee meetings, organised on a quarterly basis (F2). Research centres/institutes, universities, GOs and NGOs and other projects/programmes also participated in these meetings. Another forum in which the project participated was the Agriculture Development Partners Linkage Advisory Councils (ADPLACs) meetings at regional, zonal and *woreda* levels, which were usually organised biannually. The main purpose of CASCAPE's participation in these meetings was to plan and evaluate its activities so that they were aligned with those of the other AGP projects and the government's growth and transformation plans in general (F3).

The major purpose of the project was to assess and identify the best practices (BPs) in agriculture (E # 6 and A # 6), by communicating with potential sources (F2). The starting assumption was that there were already existing BPs that different sources would know about. However, identifying these BPs was not an easy task and turned out to be fraught with problems. The first problem was the contested idea/meaning of BPs, in that a BP in one area might not work so well in another area. The second problem was unclear guidelines as to how to identify BPs. According to the IT members, there were manuals developed by different bodies such as research centres and the BoARD. But, questions were raised about which manuals to use and how to identify the BPs to be validated in CASCAPE. Following prolonged discussions, it was decided to draw on three different resources: research recommendations, model farmers and conventional/traditional practices.

Another purpose of the project was to validate the practices identified from these three categories. CASCAPE had different stages of BP validation, depending on the nature of the innovation: an experiment, if there was little experience with the innovation; an adaptation trial when there was some experience from other areas, but the innovation might need local adaptation; and pre-scaling, when the innovation was nearly ready for scaling out (CASCAPE 2014). Farmers and people from the WoARD mentioned the efforts to adapt the BPs in accordance with the wishes of farmers as a key aspect of the project. However, it seems that there were tensions regarding the project's

experimentation/validation activities. The IT members reported that the major partners (mainly research organisations) were concerned that CASCAPE was focusing on research rather than on development.

That was a lack of clarity over whom should take on the responsibility for scaling the BPs, (E # 11 and A #11), as evidenced by the following quote from a member of CASCAPE's staff : *"our job is to validate best practices from different sources, document them and then hand them over to extension or other actors who want to disseminate that best practice."* Nevertheless, the project was involved in piloting, that is small scale scaling of the best practices, to a relatively large number of farmers, (compared to those who participated in the trials) before broad scaling (E # 9 and A # 9 and E # 12 and A #12). One of the interviewees explained why CASCAPE undertook piloting activities; even though this was not part of its initial plan: *"as there was confusion on how to do the scaling activities, CASCAPE was charged with studying how to do it."* According to CASCAPE project staff, the purpose of piloting was to identify problems in scaling and to assess the comparative advantage of the best practices, based on appropriateness of the agro-ecology, access to market and demand for the best practice. They referred to these issues as 'development pathways'. They also sought to assess the farming systems and socio-economic situations of those farmers who were more likely to adopt the best practices, which they referred to as the 'recommendation domain' (F1). The ultimate aim of this process was to develop 'best fit manuals' for scaling up the BPs.

The main activities during the phasing out year were finalizing the documentation of best practices and handing these over to stakeholders (E # 13 and A # 13). One of the IT members said: *"Up until now we have given three best fit manuals to the Bureau of Agriculture and Rural Development and extension services and have performed capacity building on the use of the manuals; as these organisations will be responsible for the scaling."* In order to provide technical backstopping on scaling, training sessions were provided on how to identify and document best practices, and on

how to perform the scaling activities (#E 14 and # A 14). In addition, discussions were held with the major partners (E # 14 and A #14) to create a conducive environment for the sustainable take up of the validated best practices. Generally, most of the activities during the phasing out year were geared to scaling (F4).

Figure 3.5. CASCAPE project organisational structure

Keys for Figure 5

National workshop participants

National coordination Unit of the Project (NCU)
 Non governmental organizations (NGOs)
 Project coordinators (PCs)
 Tigray Agricultural Research Institute (TARI)
 Tigray Bureau of Agriculture and Rural Development (TBOARD)

Regional workshops participants

Project coordinators (PCs)
 Tigray Agricultural Research Institute (TARI)
 Tigray Bureau of Agriculture and Rural Development (TBOARD)
 Office of Agriculture and Rural Development (OARD)
 Non Governmental Organizations (NGOs)
 Beneficiary Farmers (BF)

Woreda level workshop participants

Office of Agriculture and Rural Development (OARD)
 Research Centres (RC)
 Project Coordinators (PCs)
 Sector Representatives (SR)
 Administrators (A)
 Non governmental organizations (NGOs)
 Beneficiary Farmers (BF)

Kebele level field days participants

Higher officials from regional and national levels (HO)
 Administrators (A)
 Mekelle University (MU)
 Non Governmental Organizations (NGOs)
 Beneficiary Farmers (BF)
 Non Beneficiary Farmers

Field days were organised at *kebele*, *woreda* and regional levels at different times of the year in order to share experiences, promote and scale the technologies (F4) and get feedback from stakeholders. For example: for the crops, the regional level field day was organised once a year, at the flowering stage. Higher level officials (university presidents, bureau heads, research institute directors and centre managers, administration officials), agriculture office heads from zone and *woreda* levels, project/NGO coordinators, beneficiary and non-beneficiary farmers, leaders and members of cooperatives participated in the field days (F2).

Several technologies in crop, livestock and NRM themes were validated, based on the problems identified during the diagnosis study. For example: diseases such as chocolate spot (faba bean) and rust (wheat) were raised as major problems in crop production and productivity in the project sites during the PRA. The project validated varieties that resisted these diseases. Different types of fruits were also introduced and validated (example: papaya). Soil tests were undertaken (since 2013), to replace the blanket fertilizer recommendation practices which had long been standard practice. In addition to introducing farmers with improved and better performing technologies, the project

facilitated the establishment of seed multiplication cooperatives (E # 7 and A # 7), as the availability of quality seeds was one of the major constraints diagnosed during the PRA studies: wheat producing farmers' groups in three different *kebeles* (Hashenge, Menkere, Simiret) involving around 30 farmers per group were established with the aim of making them one of the seed sources. However, the interviewees (the CASCAPE staff) reported that these cooperatives were not yet certified or legalized as seed producers, and that they faced marketing problems. Creating market linkages for beneficiary farmers was another project's activities. The market created for papaya farmers (F2) was mentioned as successful intervention by different interviewees from the WoARD, research centres and institutes and also by the farmers. One of the interviewees from the project said:

"farmers used to sell their papaya produce to traders, with very low price.....they didn't have weighing scales and they used to sell them by containers.....after they became connected with the youth groups, the farmers got access to fair and reliable markets, and to up-to-date market information".

Overall, farmers reported that productivity (particularly among some crops) improved as a result of better knowledge on agronomic practices and close supervision and support of the IT members.

The roles of different members in the intermediation process

The IT members played a key role in assessing and identifying the best agricultural practices by communicating with individuals and organisations that were thought to be sources of the BPs (F2). They also took the lead role in designing experiments and the adaptation trials, working closely with farmers during the implementation (which the IT members stress as one of the successes of the CASCAPE project). The project team organised the annual workshops and invited stakeholders to participate (F2). The coordinators took responsibility in making the higher-level connections, through formal invitations and informal information sharing. The IT members presented their plans

and the other stakeholders participating in the workshops made comments and suggestions for improvement (F3).

At the piloting stage, which the CASCAPE staff also called the pre-scaling stage, farmers took the main responsibility for controlling the activities, with IT members providing technical backstopping and facilitating access to inputs. The IT members collected all the relevant information and developed a best fit manual for each crop. The manuals were then reviewed by other staff of the project at a higher level (the national coordination unit and the Wageningen team) and by people from research institutes and the WoARD, before they were handed over to extension services for broader scaling.

The IT team played a major role in organising the field days (one of the scaling mechanisms) (F4), with the support of WoARD at each level (in identifying and the major stakeholders and organising the events) (F2). During the field days, farmers explained the activities they performed from the start to the end of the trials, and the differences they observed among the trial plots. The main contribution of the project (in which the IT team played the lead role) was the documentation of the best practices validated in the various stages. The BoARD took the main responsibility for scaling the best practices (F4).

The WoARD organised the establishment of the seed producing cooperatives (F2) as this task was outside the project's mandate. The project supported the groups by providing foundation seed to be multiplied and returned later in kind and providing training on how to produce quality seeds. In addition, the project made efforts to get the seed producer cooperatives registered by seed authority, which required both lobbying and negotiation with the regulatory bodies (F3). However, there was no follow up and further effort was needed by the regional BoARD to get these groups registered and certified. The project also established youth groups for unemployed graduates to facilitate

marketing (particularly among papaya producers) (F2), providing this group with seed money and a storage shed in Mekelle University (F3).

The IT members played the central intermediation role throughout the CASCAPE project. They took the lead roles in creating connections with stakeholders, in searching for and selecting best practices; designing the experiments and adaptation trials, leading the monitoring and evaluation process and providing technical support (either through training sessions or direct support in the fields). As such the IT members can be considered as ‘innovation champions’ (in terms of technology, process and networking).

Overall, the different partners who worked with both projects agreed that multi-actor interactive innovation processes were less emphasised in CASCAPE than in AR and that CASCAPE focused more on the technological dimensions of innovation intermediation. For example: capacity building activities in CASCAPE focused on technical agronomic practices and the identification and documentation of best practices. Table 3.3 summaries the activities, intermediation processes and functions in the CASCAPE project (see also Figure 3.5).

Table 3.3. Activities, intermediation processes and functions in CASCAPE project

Activities	Actors connected	Actors playing key intermediation role	Purpose and functions of the intermediation
A1: Establishing project team (E # 1)	Experts in agronomy, natural resource management, rural development and extension, and agricultural economics together with two part-time researchers from the Tigray Agricultural Research Institute (TARI) and Livestock and Extension and Rural Development, were established as the innovation team supported by a part-time coordinator and assistant coordinator, both staffs of the university	Mekelle University	Facilitating the establishment of the project by recruiting experts (the innovation team) and hosting the project in the university (F2)
A2: Undertaking PRA study (E # 2)	Project team with farming community	Innovation team (IT) of the project	To undertake a joint diagnosis study to identify key challenges and opportunities for agriculture in the intervention sites, prioritizing constraints on agricultural production and searching for possible solutions & research directions (F1)
A3: Organizing community workshop (E # 3)	Project team with farming community	IT members	Discussing with farmers to verify the information from the PRA (aligning results), creating common understanding and prioritising themes to work on (aligning needs) (F3)
A4: Organising scoping studies (E #4)	At the <i>woreda</i> level: offices of agriculture and rural development, sectoral representatives, women and youth affairs offices, administration office, research institutes/centres, women's associations. At the regional level: Mekelle University, Bureau of Agriculture and Rural Development, research institutes/centres	Project coordinators and IT members	Identifying potential partners and bring them together (F2) for triangulating the results from the PRA at the grassroots level, getting to know the perspectives/views of other relevant stakeholders, creating common understanding on the constraints, opportunities and needs at all levels (aligning the needs (F3) and developing innovation themes accordingly)
A5: Innovation themes development (E # 5)	At the <i>woreda</i> level: Offices of Agriculture and Rural Development, sectoral representatives, women and youth affairs offices, administration office, research institutes/centres, women's associations. At the regional level: Mekelle University, the Bureau of Agriculture and Rural Development, research institutes/centres	Project coordinators and IT members	Developing innovation themes for intervention, based on the scoping study and preparing action plans based the identified and prioritized themes (F1)
A6: Best practice identification from different sources (E # 6)	Individuals and organisations thought to be sources of BPs by the IT	The IT members	Identifying the potential sources of best practices in agriculture such as research organisations and model farmers and linking with them (F2) to assess their recommendations and identify the best practices to experiment/validate (F3).
A7: Establishment of seed multiplication cooperatives (E #7)	Farmers	Office of Agriculture and Rural Development and the IT members	Connecting farmers in cooperatives (F2) and supporting them through training and input provision such as foundation seed, to tackle the lack of availability of quality improved seeds (F3)

A8: On farm trials and demonstrations (E # 8)	Farmers with researchers and researchers with researchers	IT members	Identifying and connecting with various sources of technologies (F2), and undertaking on farm trials together with farmers to validate best practices from different sources (F3)
A9: Pilot-scaling of validated best practices (E # 9)	Farmers	Office of Agriculture and Rural Development and the IT members	Identifying problems in scaling, assessing comparative advantage and the recommendation of the best practices validated by the project (F1).
A 10: On farm trials and demonstrations (E # 10)	Farmers with researchers and researchers with researchers	IT members	Identifying and connecting with various sources of technologies (F2), and undertaking on farm trials together with farmers to validate best practices from different sources (F3)
A11: Pilot-scaling of validated best practices (E # 11)	Farmers	Office of Agriculture and Rural Development and the IT members	Identifying problems in scaling, assessing comparative advantage and the recommendation of the best practices validated by the project (F1).
A12: Scaling of validated best practices (E # 12)	Project team with stakeholders relevant for scaling	Office of Agriculture and Rural Development and the project team IT members	Scaling of validated best practices outside the beneficiary farmers and also to other neighbouring regions (F4)
A 13: Documentation of best practices and handing over to stakeholders (E #13)	Project team, national coordination unit and the Wageningen team, Office of Agriculture and Rural Development and research / governmental centres/institutes		Facilitating the development, review and documentation of best fit manuals for the best practices of different sub-sectors; to make them ready for scaling (F4)
A14: Scaling training to stakeholders (E #14)	Project team with stakeholders relevant for scaling	Project team	Providing technical backstopping to stakeholders on how to identify and document best practices, and on how to perform the scaling activities; and persuading stakeholders to scale the best practices validated by the project (F4)
A15: Discussions with the major partners on scaling issues (E # 15)	Project team with potential stakeholders who are expected to have vital role in scaling	Project team	Creating conducive environment for sustainable use of the validated best practices (Scaling) (F4).

F1=Context analysis, Demand articulation and planning process F2=Network building F3=Innovation process management

3.4.3. Reflections on the mechanisms of innovation intermediation

Coordinators of these two projects had different opinions on the need for orchestrated IPs to make connections with the relevant actors. The AR coordinator recognized that the IP created some challenges, such as finding a convenient time for all actors to attend meetings and joint actions, some actors, notably farmers, expecting incentives for participation and it being a time-consuming process. Despite these drawbacks he was firmly of the view that the IPs at the two administrative levels enable the project to create close connections with, and among, various stakeholders:

“the different stakeholders that were brought together in the IPs were there before AR came along. There is not much difference in the resources they had before, and their goals are much the same now as they were before. But they did not work together in a coordinated way. AR facilitated this, enabling them to create strong linkages and to tap into each other’s and their joint potential”.

In a similar vein, one of the IP members, representing a research centre involved in AR, who is also part-time researcher in CASCAPE compared the two projects:

“if you see their coverage, the number of farmers benefiting from the projects and the diversity of activities they perform they are incomparable.....CASCAPE is much bigger than AR...but if you look at the feeling of ownership of people involved in both projects, it is different.....people feel more responsible and motivated to be engaged in AR than in CASCAPE. I think this a result of the training programmes, and also the IP approach”

The coordinator of CASCAPE held a different view and emphasised the importance of making use of existing networks. He noted that *“there is no value in using an ad-hoc platform, as it*

doesn't give sustainable solutions for problems. CASCAPE has engaged the relevant stakeholders by using already existing networks."

While the coordinator of the CASCAPE project argued it is possible to engage actors without IPs, the IT members of the CASCAPE project saw things differently:

"CASCAPE is almost a governmental project and the DAs at the kebele level and the experts at the woreda level are supposed to work closely with the project. But, practically, it was not easy to really engage them in our field activities. People might plan together, but when it came to implementation it did not always work."

Another IT member added that: *"When people are in different places there can be space and time constraints, but collaborative work is challenging even for projects within the same university."*

Different reasons were mentioned for the difficulties in working together. The IT team considered that the problem lay in a poor culture of collaboration. However, the work overload of DAs and experts and the absence of a reward mechanism for collaborative work were also noted. One of the IT members said that *"the DAs/experts are going to be evaluated by how they fulfil their other responsibilities."*

3.5. Analysis and Discussion

The question that we aim to address in this study is whether the effective implementation of innovation intermediation functions in agricultural innovation systems depends on the type of intermediation approaches adopted. In this section, we will first present the innovation intermediation functions implemented by the two case studies. We then analyse the similarities

and differences of the intermediation approaches: innovation intermediation as a core activity via orchestrated Innovation Platforms (IPs) as opposed to a side activity via a problem-based, *ad hoc* type of brokerage.

3.5.1. Innovation intermediation functions implemented in AR and CASCAPE

According to the AIS perspective, innovation requires work on changing relationships and institutions at different levels; and the focus should go beyond the interfaces between researchers and the users of the research outputs (Klerkx, van Mierlo and Leeuwis, 2012). Each of our two cases embraced AIS principles in their design and aimed at undertaking participatory action research by building development partnerships and supporting the development of effective stakeholder and knowledge networks at various levels. Both involved in innovation processes and networks, and in terms of finance, they were both donor based. As shown in Tables 3.2 and 3.3, the three types of intermediation functions: context analysis and demand articulation and planning (F1), network building (F2) and innovation process management (F3) were implemented in one way or another at various points of the innovation processes in both projects. In addition, this study explores a fourth intermediation function: innovation scaling (F4), which is defined as a continuous process of expanding networks in order to disseminate innovations (technological, organisational and institutional) among organisations at the same administrative level (horizontal scaling) and organisations at higher administrative levels (vertical scaling). These two processes are often referred to as scaling out and scaling up innovations and include enhancing institutional uptake and/or the embedding of the innovations (Hermans et al, 2017; Sartas et al, 2018; Sartas et al, 2020). While innovation scaling has not been explicitly considered as one of intermediation functions in previous studies., we argue that it is a potential innovation intermediation function.

One of the findings is that the four innovation intermediation functions assume a different importance at different stages of a project. In the AR project, network building (F2) was the most important function (followed by context analysis, demand articulation and planning (F1) and innovation process management (F3) during the entry phase. During the implementation phase, innovation process management (F3) was emphasised, followed by network building (F2) and innovation scaling (F4). In the phasing out year, innovation scaling (F4) became more important followed by network building (F2) and innovation process management (F3) (see figure 3.2). By contrast, in CASCAPE, context analysis, demand articulation and planning (F1) was the most important intermediation activity during the entry phase, followed by network building (F2) and innovation process management (F3). During the implementation period, innovation process management (F3) was emphasised, followed by innovation scaling (F4) and network building (F2). In the phasing out year the focus was on innovation scaling (F4) followed by network building (F2) and innovation process management (F3) (see figure 3.3).

AR primarily played a facilitation role in the process of a diagnostic study aimed at identifying problems and assessing the potentials and opportunities of the area (F1: context analysis, demand articulation and planning). Maintaining the connections created during the diagnosis study, the project continued to identify and connect with potential partners (F2: network building) and facilitate interaction and learning among diverse stakeholders throughout the implementation period. The networking aimed to go beyond initiating the innovation process: it aimed at engaging partners in the innovation process, negotiating and building trust for joint implementation, monitoring and evaluation of the project's activities (F3: innovation process management). Some of the intermediation activities targeted scaling of the technologies identified by the project, beyond its piloting sites and/or creating an enabling environment for broader use of the technologies in general (F4: innovation scaling). Beyond technology/knowledge brokering, AR emphasised other dimensions of innovation

intermediation (organisational/institutional). The IPs at the two administrative levels and the FRGs at the local levels were manifestations of the emphasis on organisational innovations. The intentions to change the top-down-linear research approach and innovation process shows the emphasis the project gave to institutional innovations.

Our findings show the CASCAPE project executed its activities in collaboration with established governmental actors (The Office of Agriculture and Rural Development and research centres/institutes) in the Ethiopian AIS. The networking activities at the initial phase of the project aimed at understanding the context, articulating the needs of the farming community and developing innovation themes accordingly (F1: context analysis, demand articulation and planning); and triangulating different views and aligning the needs of the relevant stakeholders (F3: innovation process management). Identifying the potential sources of best practices in agriculture was one of the purposes of the connections made during the implementation phase of the project (F2: Networking Building). During this phase, the interface was more between researchers of the project (IT members) and farmers. The networking with farmers was mainly for the purpose of knowledge/technology brokering through joint on-farm action research. The networking with the other stakeholders was mainly aimed at receiving feedback on plans and performances of best practices validated (F3: innovation process management). Many of the intermediation activities during the phasing out year of the project were aimed at scaling the validated best practices and creating a conducive environment for sustainable use of the practices (F4: innovation scaling).

3.5.2. Innovation intermediation: as a core activity via orchestrated Innovation Platforms versus as a side activity via problem-based, ad hoc type of brokerage

The findings of this study show that the AR project took intermediation as its core activity and used several intermediation mechanisms to implement various intermediation functions, the IPs

being the major mechanism. The IPs were used to pull different GOs and NGOs and their resources and expertise together (F2: network building). Training sessions aimed at improving awareness and knowledge of the major partners and enhancing their facilitation skills on interactive innovation processes and engaging them better in the innovation process (F3: innovation process management) were among the mechanisms used. Participatory on-farm activities and assigning some of the IP members as innovation champions were among the others.

Taking intermediation as a key task and using IP as a major intermediation mechanism, AR had more freedom to play a facilitation role in the interactive innovation processes and effectively implement the various intermediation functions mentioned above. The IPs at two different administrative levels were central forums that connected actors representing different organisations in AR (F2: network building). They created a space where the partners identified and prioritized problems and proposed solutions together (F1: context analysis, demand articulation and planning), negotiated their roles and tasks; aligned their activities and jointly evaluated and monitored the whole innovation processes (F3: innovation process management). *Kebele* level IPs played a key role in monitoring and evaluation of activities at the local level by FRGs; while the Technical Committees (TC) of the *woreda* IPs evaluated all dimensions of the innovations and selected the most significant changes from the interventions of the project (F3: innovation process management).

This study verified that the use of the IP, as an intermediation mechanism was important for collective innovation intermediation. It helped draw out the capacity and capabilities of individuals and organisations (shared resources, knowledge and expertise). It also gave participants an opportunity to take up brokerage roles, and this helped to create linkages with different components of the innovation system as intermediation roles were distributed among

participating members which helped to resolve unexpected tensions that could emerge between different actors. In short, it created a situation where actors collaborated rather than competed and built a feeling of ownership around the project. In addition, it gave the members the chance to take up brokerage roles individually. Actors such as researchers, extension officers and project coordinators played intermediation roles by mobilizing and pulling in resources, such as experts and technologies from their home organisations; thereby helping connect the project to the broader system (F2: network building). The contribution of IP members, who mostly represented organisations, depended on their profession and position (whether the individual representing a particular organisation was a head office/centre manager/institute direct/expert or ‘just’ a representative in their respective home organisations). There were other actors who were invited and participated when their support was required in the process. Some participated on behalf of special needs groups (example: youth and women’s affairs or associations), mainly during the planning phase (F1: context analysis, demand articulation and planning). Others contributed ideas/knowledge and shared information during the meetings. The same actors also took the innovations back to their organisations (F4: innovation scaling). This clearly shows that the IPs distributed the process of intermediation within AR, which enabled the individuals to create broader linkages with the different components of the AIS. Similar findings have been reported for IPs before (Kilelu et al, 2013).

This study also demonstrated that the IPs create space for the members to learn by doing and/or interacting. This is particularly valuable in contexts where actors are not used to working together and where a hierarchal and top down culture is dominant. In this sense, the IP intermediation mechanism can be said to perform better than the *ad hoc* intermediation mechanism; in that it helps to build the interactive innovation capacity of actors. Besides learning by doing and by interacting, other forms of capacity building activities that enhance knowledge about interactive innovation processes, and the skill to facilitate these processes are

also crucial in this regard. However, whether individuals' learning also creates learning at the organisational level and influences institutions at the system level is another question, which is beyond the scope of this study. In addition, this study shows that the IP as an intermediation mechanism enhances the strong sides of brokers taking intermediation as a core activity: It helps avoid neutrality tension and provides more freedom to act as innovation catalysts.

The CASCAPE project, by contrast, relegated intermediation to a side activity and used problem-based, *ad hoc* intermediation mechanisms to implement its intermediation functions. The mechanisms employed included: training sessions focusing on improving the agronomic practices of farmers, enhancing stakeholders' capacity to identify and document best practices and persuading them to scale the best practices validated by the project (F4: innovation scaling). The other mechanisms were annual planning and review workshops at various administrative levels, although here most of the participants were from governmental organisations. Workshops were established to: network with and engage in relevant stakeholders in the planning of the project and the evaluation of technologies (F2: network building); exchange information in the form of reports and annual plan presentations; obtain feedback on the validated best practice reports of the previous year, and; to get input from stakeholders to improve annual plans of the coming year (F3: innovation process management). Other mechanisms included participatory on-farm activities and field days, which involved the IT members and farmers and participation in already existing forums becoming connected with various GO and NGOs (F2: network building).

Adopting intermediation as a side activity and using problem-based, *ad hoc* intermediation mechanisms, limited CASCAPE's space to act as an innovation catalyst in the innovation process and to perform intermediation functions successfully. The findings of this study show that with limited efforts to create interactive forums and new connections with a wide range of

stakeholders, CASCAPE played a more conventional brokerage role, mainly focusing on knowledge/technology brokerage. Most of the intermediation activities in CASCAPE were performed by the project team. The IT members and the coordinators of the project provided the main links between the project and stakeholders at the *kebele* and *woreda* levels (F2: network building); implemented the on-farm BP validity trials and monitored and evaluated the innovations (together with farmers) (F3: innovation process management). The project coordinator and assistant coordinator undertook the higher-level networking activities (regional and national) by participating in existing forums such as the Agricultural growth programme (AGP) Technical Committee and Agriculture Development Partners Linkage Advisory Councils (ADPLAC) (F2: network building), mainly to align the project's plans with other projects and GOs and to report on progress and evaluate performance (F3: innovation process management). This infers that, in the main, the project contracted coordinators and experts in different fields (the IT members) as technology, process and network champions.

As mentioned earlier, CASCAPE mainly focused on technology/knowledge brokering, which in the context of Ethiopia, is the major role of the GOs who oversaw the project. We observed that the CASCAPE staff (mainly the coordinator) favoured the traditional way of organising things, as opposed to introducing new mechanisms such as the IP. This reflects the presence of functional ambiguity, a tendency to adhere to traditional roles and the traditional way of doing and organising things (culture), retaining the old mindset and a lack of capacity among the organisations in charge of facilitating the intermediation process. These are quite typical weaknesses of brokers taking up brokerage as a side activity, restricting manoeuvring space to carry out and maintain brokerage roles (see Adejuwon, 2016; Klerkx, Hall and Leeuwis, 2009). Overall, this study demonstrates that the problem-based, *ad hoc* intermediation mechanism does not help much in resolving the issues reported in the literature as weaknesses of brokers taking intermediation as a side activity.

This study also reveals different factors that determine the choice or the preference of innovation intermediation approaches (as a core activity via orchestrated IPs or as a side activity via a problem-based *ad hoc* type of brokerage). Organisational culture, knowledge about interactive innovation processes and the facilitation skills of the actors in charge of brokering are some of the factors that influence the choice of innovation intermediation approaches. These factors also determine how much brokering organisations invest in capacity building activities targeting at enhancing knowledge about, and improving facilitation skills for, interactive innovation processes. The findings of this study show that AR gave more emphasis to such kinds of capacity building activities than CASCAPE. CASCAPE focused mainly on technology/knowledge brokering, then capacity building activities with a focus on improving the agronomic practices of farmers, stakeholders' capacity to identify and document best practices and finally, persuading them to scale the best practices validated by the project (F4: innovation scaling). Consequently, the contribution to enhancing knowledge and awareness and facilitation skills for interactive innovation processes was limited. The findings of this study reveal that collaborative work was more challenging in CASCAPE, than in AR because: the major implementers of the former project had limited knowledge of innovation system perspectives and also limited facilitation skill and gave limited priority to interactive learning and capacity building activities.

Another major factor is the relative attachment that brokers have with the government on the one hand and donors on the other. AR had a limited level of attachment with the government and had close links with international donors. The project was linked with CGIAR, an institute that has been increasingly embracing IPs as mechanisms of bringing actors together in the last decade (Schut et al., 2015) in order to operationalize the AIS. CASCAPE was considerably influenced by the government: it was launched on request of the government; and was hosted and implemented by public organisations (mainly Mekelle University, in collaboration with

governmental research and extension organisations). This influence seems to have pushed the project towards a more conventional technology/knowledge brokerage approach (as opposed to one of facilitation) and to opt for an *ad hoc* intermediation mechanism, rather than adopt the more challenging IP mechanism. This divergence between approaches favoured by governments and those favoured by donors has broader ramifications. Mockshell and Birner (2015) report that, in developing countries, there are often divergent worlds of policy discourse; a “domestic world” and a “donor world”, and donors sometimes create their own reality within a state.

3.6. Conclusions

This study reveals that innovation intermediation functions were better carried out through the modality of a core activity, combined with an orchestrated IP mechanism, than as a side activity combined with an *ad hoc* brokerage mechanism. The IP intermediation mechanism enhances the strengths of taking up intermediation modality as a core activity: it provides sufficient manoeuvring space and prevents neutrality tensions. In addition, it creates space to learn by doing/interacting, and contributes to building the interactive innovation capacity of actors by exposing them to different ways of doing things.

The findings of this study show that brokers’ level of attachment with the government or with donors can determine the choice of innovation intermediation modality/mechanism. Broker’s knowledge on interactive innovation processes and their facilitation skills, the emphasis given to investing in capacity building activities and the organisational culture of the actors who are in charge of brokering are other important factors.

Although this study revealed that when the modality of innovation intermediation is that of a core activity, combined with the orchestrated IP mechanism, is more effective than as an *ad*

hoc side activity we question whether this approach can be embedded in a context like Ethiopia, where there is a deep-rooted top-down and linear approach to innovation. Several studies note that the context determines the effectiveness of brokerage approaches, although their own inherent characteristics partially matter (Klerkx, Hall & Leeuwis, 2009; Klerkx et al., 2017; Schut et al., 2019). The divergent characteristics of AIS (example: public based versus privatized extension services, existence or absence of a culture of collaboration, different stages of innovation system development, etc) make a context specific design of intermediation approaches crucial (Klerkx, Hall & Leeuwis, 2009; Adejuwon, 2016). Klerkx et al (2017) note that trying to replicate what works well in one context into a one size fits all approach that can be applied to other contexts is ineffective, as institutional conditions are quite different in different contexts, which create specific histories and path dependencies. According to these authors, translating the approaches to the local context is essential and this can be done via creating space to learn and reflect, and building connections with people with decision making power and influencers who can facilitate institutional change in organisations and innovation systems. Schut et al (2015) underlined that institutional embedding is what determines whether an IP can strengthen systemic capacity to innovate and lead to real paradigm change. This in turn may require structural changes in organisational mandates, incentives, procedures and funding, as well as investments in the exchange of experiences, learning and capacity development.

Chapter 4

Anchoring innovation methodologies
to ‘go-to-scale’; a framework to guide
agricultural Research for Development

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*This chapter is a slightly modified version of the article published as
‘Seifu. M., van Paassen, A., Klerkx., L., and Leeuwis, C. 2020.’
in Agricultural Systems 182 (2020) 102810.*

Abstract

Research for development (R4D) projects increasingly engage in multi-stakeholder innovation platforms (IPs) as an innovation methodology, but there is limited knowledge of how the IP methodology spreads from one context to another. That is, how experimentation with an IP approach in one context leads to it being successfully replicated in other contexts. To inspire development actors to consider the fit of an innovation methodology for a context, following work on anchoring for scaling, we developed a framework for networking-, methodological, and institutional anchoring and applied it to a R4D IP in order to test the value of such an anchoring approach for understanding the scaling of innovation methodologies such as IP. We selected a R4D project with a Farmer Research Group-Innovation Platform in Ethiopia, whose technical output and methodological approach were greatly appreciated by the actors involved. Using the anchoring framework, the executed or non-executed tasks were identified. Besides, the embedding of the methodological experiment the potential up-scaling and out scaling were systematically analyzed. The analysis yielded the strengths and weaknesses of the anchoring work done so far to scale the innovation methodology used and provided concrete suggestions of how to proceed if an innovation project considers ‘going to scale’. We recommend R4D projects to valorize their work and pay more explicit attention to anchoring. With a flexible, multi-pronged anchoring approach and continuous scanning of the progress made in context, more R4D projects and their associated innovation methodologies can ‘go to scale’.

Keywords: Anchoring; out-scaling; up-scaling; Innovation Platform; Farmer Research Group; Agricultural Innovation System

4.1. Introduction

Scientists and donors are increasingly embracing the Agricultural Innovation System (AIS) perspective, underscoring the need for multi-actor learning and coordinated action to create solutions fit and affordable for farmers, value chain actors, and government. One methodology to create multi-stakeholder learning and coordinated change is the Innovation Platform (IP) methodology. Research conducted on the process of IP implementation demonstrates the potential of the interactive IP methodology in developing effective technical, organizational, and institutional innovations at farm level and within value chains (Hounkonnou et al., 2012; Hounkonnou et al., 2018; van Paassen et al., 2014). Furthermore, IPs provide the opportunity for key actors to learn about more interactive problem-solving processes, and they see what type of innovation methodology best fits their context, establishing new roles and relationships for innovation, hence towards building the systemic capacity for innovation. Unfortunately, many IP research projects see the IP methodology as a handy *ad-hoc* means to develop technical solutions for scaling, rather than to investigate the performance of the IP methodology in-context and consider the potential for scaling of the methodology (Schut et al., 2016b; 2018).

This paper is about anchoring the methodological innovation experiment in its institutional context, to fine-tune the design and also to prepare for potential scaling. It concerns the networking to get key implementers of the dominant regime involved in the experiment to test what would work, and simultaneously connect with key authorities who decide on the conduciveness of the context for innovation. Anchoring is a ‘pre-stage’ for scaling. To achieve ‘impact at scale’, the process of ‘scaling’ must become a key concern of scientists, development agencies, governments, and donors (Joly et al., 2015; Wigboldus et al., 2016). The literature distinguishes two components of scaling processes: out-scaling and up-scaling (e.g. Hermans et al., 2017). Out-scaling (horizontal scaling) refers to the large-scale duplication and adaptation

of innovations to benefit more people or larger geographic areas (Aw-Hassan, 2008; Nederlof et al., 2011; Westley et al., 2014; Wigboldus et al., 2016). Up-scaling (vertical scaling) refers to the institutional change so as to provide a conducive environment for the innovation and its duplication, e.g. a change of discourse and work procedures, conducive policies, and incentive structures (resources for implementation, remuneration, career paths) (Nederlof et al., 2011; Westley et al., 2014). Out- and up-scaling mutually influence each other, but their relative importance in the change process depends on the complexity of the innovation, the context, and the actors involved.

To know how to improve the anchoring of a methodological innovation in a context, and to prepare for potential scaling, we studied the literature to develop a framework for anchoring. Inspired by theories on niche-regime interaction, notably literature on strategic niche management (Elzen et al., 2012; Loeber, 2003; Loorbach & Rotmans, 2010; Raven et al., 2008; Schot & Geels, 2008), and innovation processes (Leeuwis, 2004; Kivimaa & Kern, 2016; Klerkx et al., 2009), we developed the ‘anchoring framework’ and selected a well-performing IP project in Ethiopia to test the value of the framework. The aim of this paper was to see whether the framework would enable us to study an anchoring process of an innovation methodological experiment, in such a way that we get insight into the strengths and weaknesses of the anchoring strategy, plausible effects, and steps forward, to ensure a good institutional fit and potential scaling.

In the next sections, we first elaborate our framework for anchoring, the research methodology, and then demonstrate the use by assessing the anchoring activities and strategies of the selected IP project in Ethiopia.

4.2. Theoretical framework

Authors writing about strategic niche management, innovation processes, and anchoring mainly focus on experimental projects as a way to nurture path-breaking innovations (Leeuwis, 2004; Klerkx & Leeuwis, 2008; Klerkx et al., 2009; Loorbach & Rotmans, 2010; Raven et al., 2008; Schot & Geels, 2008; Smith & Raven, 2012). Inspired by Loeber (2003), Elzen et al. (2012) focused on embedding or anchoring as a pre-phase for scaling. From their perspective, anchoring concerns the linking process between niches and regimes: how anchoring activities and strategies employed by niche actors penetrate and influence the socio- technical regime. Anchoring refers to a continuous process of probing new connections between the regime and the niche, until a niche practice is translated into a regime component. Based on work of Geels (2004), Elzen et al. (2012) distinguished three types of anchoring: network-, technological-, and institutional anchoring. They highlight similarities with Geels (2004), who identified three dimensions of innovation: the human actors, the organization, and the socio-technical system with its fixed artifacts, procedures, norms and rules that guide behaviour. Elzen et al. (2012) studied the anchoring of an energy harvesting technology, but as we focus on the anchoring of an innovation methodology, we will not use the term 'technological anchoring' but rather 'methodological anchoring'. A mix of network-, methodological-, and institutional anchoring is required for out-scaling and up-scaling. Institutional anchoring is critical for up-scaling.

To assess the potential success of anchoring and scaling, it is critical to look at (a) the dimensions where the niche and the regime differ, are not aligned, or in conflict (Muilerman et al., 2018); and (b) the benefits, costs, and threats that the niche features pose to the different regime actors (Schut et al., 2018; 2019). The more the regime and niche share similar rules and features, and/or provide benefits to regime actors, the easier the anchoring will be. In our study, the dominant way of supporting agricultural innovation (the regime) was the Transfer-of-

Technology (TOT) orientation, while the novel way (niche) embraced the interactive innovation system model. These innovation approaches have contrasting rules and features regarding their focus, conception of agricultural innovation, perception of knowledge development, intervention and learning methods, and the roles assigned to actors (Schut et al., 2016a).

For our anchoring framework, we identified essential transversal, network-, methodological, and institutional anchoring activities highlighted by the relevant strategic niche management or innovation literature (see Table 4.1).

- Certain so-called transversal activities support all three types of anchoring (dark grey part, Table 4.1), such as preparing a vision document highlighting benefits for the different actors, methodological guidelines, mass communication, and generation of persuasive evidence of ‘proof of concept’ in specific contexts.
- Network anchoring activities concern efforts to find and connect to strategic actors at user, implementation, and decision-making levels (Minh et al., 2014).
- Methodological anchoring activities are efforts made to propose new products or principles for practice, and to support regime actors to learn, try, and adapt the rules for application in their context (Klerkx and Leeuwis, 2008; Nederlof & Pyburn, 2012). This requires brokers, trainers, and/or facilitators with the appropriate knowledge and skills. Training, workshops, experience sharing, and joint experiments can be some strategies.
- The institutional anchoring requires strategic lobbying and negotiation at the level of key regime authorities: the provision of a stimulating vision highlighting benefits to key authorities, backed by evidence about the effectiveness of the proposed novelty, timely advice, and negotiation with key authorities who are able to create new formal rules that provide conducive

policies, incentive structures, and stimulating funding (Hounkonnou et al., 2018; Kivimaa & Kern, 2016; Klerkx et al., 2013; Nederlof et al., 2011; Schut et al., 2016a;). Institutional anchoring also occurs through continued and widespread application of the (adapted) methodological practices, which helps create informal rules, routines, and mind-sets increasingly known, and applied by a growing number of actors.

Though many projects start with networking, anchoring is not linear, but an entwined, flexible process.

Table 4.1: Overview of useful anchoring activities/strategies:

Transversal support Activities: Communication and documentation needed to support all anchoring activities		
<i>T.1. Persuasive vision</i> highlighting relative benefits of the promoted change		
<i>T.2. Technological/methodological guidelines</i> to inform potential partners for trial and implementation		
<i>T.3. Mass communication</i> e.g. leaflets, video's, website about the promoted change at regime, implementation zone, and local user level		
<i>T.4. Generation of supportive evidence</i> , e.g. research reports with transparent, consistent data on the implementation process and impact		
Network Anchoring tasks (N)	Methodological Anchoring tasks, important for operationalization innovation concept in specific context, and out-scaling (M)	Institutional Anchoring tasks, important for up-scaling (I)
At the level of potential users/beneficiaries in niche and beyond		
<i>N.1. Inform potential beneficiaries</i> in and around the intervention area about the proposed change via mass media, presentations, invitation to field days	<i>M.1. Organise training</i> for enabling actors to understand the concept and principles of practice	<i>I.1. Ensure continued practice</i> for institutionalising new beliefs and informal rules of practice
<i>N.2. Identify and mobilise capable persons</i> to represent and organise collaboration with beneficiaries	<i>M.2. Organise practical experimentation</i> enabling actors to practise in context, adapt the methodology where deemed fit, and develop skills	<i>I.2. Create constituency for political support</i> by continued mass communication reinforcing new beliefs and commitments
At the level of potential partners for implementation niche and out-scaling technology or methodology		
<i>N.3. Inform organizations in and around area of intervention</i> about the proposed change via mass media, presentations, invitation to field days, and knowledge sharing events.	<i>M.3. Organise training</i> enabling actors to understand the concept and principles of practice	<i>I.3. Ensure continued practice and monitoring</i> for institutionalising new beliefs and informal rules of practice
<i>N.4. Identify and connect to organizations</i> critical for the implementation	<i>M.4. Organise practical experimentation</i> enabling actors to practise in context, adapt the methodology where deemed fit, and develop skills	<i>I.4. Create constituency for political support in implementing organizations</i> , through continued mass communication reinforcing new beliefs and commitments

<p><i>N.5. Identify and mobilise key officers for implementation who are open and able to drive implementation and persuade colleagues.</i></p> <p><i>N.6. Identify and mobilise key officers with good connections for lobbying at level of regime authorities</i></p>	<p><i>M.5. Organise monitoring, evaluation for learning, and adaptation for involved and potential future implementers about the novelty, to nurture their knowledge, experimental development, and appreciation in context</i></p> <p><i>M.6. Transfer ownership for implementation, mobilization of own resources and finances</i></p>	
At the level of key authorities' incumbent regime able to create new formal rules (up-scaling)		
<p><i>N.7. Inform key authorities of the regime about the proposed change via mass media, invitation to field days</i></p> <p><i>N.8. Identify and connect with key organizations of incumbent regime, with authority to set policies and institutional rules for regulatory framework, incentives and sanctions</i></p> <p><i>N.9. Identify key decision-makers and advisors, who are respected but open for improvement, dare to take political risks, dynamic, and communicative</i></p>		<p><i>I.5. Create events for awareness-raising and dialogue with key actors of the incumbent system, who can set the agenda, build coalitions, and articulate policies and incentive systems (formal institutions)</i></p> <p><i>I.6. Provide a persuasive vision/narrative and research reports on the adapted methodology, highlight benefits for different actors, to convince key actors and support them to persuade required coalition partners</i></p>

Several activities highlighted in Table 4.1 simultaneously or indirectly contribute to different anchoring earmarks, e.g. 'monitoring for learning' simultaneously contributes to methodological anchoring (learning and adapting the methodology for the context) and institutional anchoring (creating a change of beliefs and culture). As a result, the reader might see 'overlapping activities' and question their place in a certain category. It shows the entwinedness. The earmark of the table is however to identify tasks that need to be fulfilled, to accomplish adequate anchoring and identify gaps that might trigger negative backlashes.

The aim of the study was to develop a framework that would enable us to show the critical anchoring activities of an innovation mediation project, in such a way that we get insight in the strengths and weaknesses of their strategy and the plausible effects it has on future scaling. To

attain this objective, we used the framework to study the situation of an IP project in Ethiopia to answer the following research questions:

- What network-, methodological, and institutional anchoring tasks were performed by the IP-based project, at the end of the project phase?
- To what extent can the use of the framework provide insight in the strengths and weaknesses of the anchoring strategy of the project and plausibly explain the achieved level of out- and up-scaling?
- Could use of the framework lead to useful advices for anchoring to attain an experimental fit in context, and a conducive institutional environment for scaling?

4.3. Case selection and Research method

4.3.1. Case selection

The aim of the research was to develop and test a framework for anchoring a Farmer Research Group-Innovation Platform (FRG-IP) methodology used/experimented by projects to achieve 'impact at scale'. Such a framework would enable projects to design strategic anchoring at the start of the project or assess projects on the likelihood for them to achieve 'impact at scale'. To test the framework, it was essential to find an AIS project that performed well, attained short term results (capacity building for interactive learning), and if possible also worked on scaling.

At the beginning of the preliminary study in 2014, resource persons in the southern zone of Tigray regional state were contacted to identify projects operationalizing the AIS perspective in the Ethiopian context, where linear TOT is predominant. When the actual data collection started in 2015, only a few projects had begun to work in-line with the AIS paradigm. The

Africa-RISING-Ethiopian Highland project was the only project with a considerable outcome, applying the FRG-IP approach. This project is one of the three research-for-development projects of the Africa Research in Sustainable Intensification for the Next Generation (Africa RISING) program, which is financed by the United States Agency for International Development (USAID) as part of the U.S. government's Feed the Future (FtF) initiative (ILRI, 2016). Two of the projects are implemented in West Africa, and in East and Southern Africa, and they are led by the International Institute of Tropical Agriculture (IITA). In the Ethiopian highlands, the project is led by the International Livestock Research Institute (ILRI) and is implemented by nine CGIAR (Consultative Group for International Agricultural Research) centers (see Mekonnen and Thorne, 2015 for details). In this article, we use the acronym AR when referring to the specific Africa RISING-Ethiopian Highland project.

The AR project was implemented in four regions and in eight kebeles (wards), among which two kebeles (Tsebet and Embahasti) were in Tigray region (ILRI, 2013). Ethiopia is administratively divided into different regional states that have their own constitutions and considerable sovereignty. Regions are divided into zones, woredas (districts) and kebeles (wards) (Yilmaz & Venugopal, 2008). This research is undertaken in Tigray regional state. The study area (the woreda and the kebeles) is shown in Figure 4.1.

Figure 4.1. Map of the study area: Endamohoni Woreda, Tigray Regional State, Ethiopia

Though the AR project, like many AIS inspired projects, focused on the elaboration and design of their FRG-IP approach and did not (yet) explicitly consider scaling of its innovation approach, we deemed it worthwhile to develop an anchoring framework to assess the likelihood that these projects would ‘achieve impact at scale’ and inspire development actors to proactively work on the fit of a proposed innovation methodology for the larger context and the potential for scaling. This is to overcome the widespread problem that donors finance experimental projects, but with little concern for long-term impact. This research would (a) enable us to test the framework, and (b) assist projects like AR to start critical reflections as to how to strategically engage stakeholders at an early stage and ‘achieve impact at scale’. The

regular agricultural research and extension system in Ethiopia is predominantly TOT-oriented (the regime). So, we consider the FRG-IP of the project, that is based on the AIS perspective, as a niche.

According to the project officers, the main objective of AR was to achieve sustainable agricultural intensification. Aimed at creating a context-specific and demand-driven innovation system, AR started its activities in 2012 by conducting various diagnostic assessments among which a Participatory Community Analysis (PCA) was the main (Ebrahim, 2016). The purpose of the PCA was to identify entry points, constraints, and opportunities, and to assess the potential of different interventions and technologies in addressing priority constraints.

Based on project documents and field research on innovation intermediation processes, AR operationalised the AIS perspective as a FRG-IP. Subsequently, in February 2014, operational and strategic IPs were established at kebele and woreda level, respectively. In the same year, commodity-based FRGs were formed at the grassroots level.

The main objective of the operational IP was to foster effective community participation during opportunity identification, planning, and implementation in order to enhance farmer learning and ownership. The main purpose of the strategic IP was to provide strategic direction, advice, support to operational IPs, but also to learn from them (regarding the farmer and other stakeholder needs), in order to develop technologies, practices and policies (Ellis-Jones et al., 2014).

The FRGs were established to undertake participatory action research. The ultimate aim of the action research was to deliver integrative research outputs for specific area and farmer needs, and improve food, nutritional security, incomes of agricultural households in the Ethiopian

highlands through increased productivity of crop, livestock, and better NRM practices (Eg: tree Lucerne; a multipurpose used as fodder and fertilizer trees). See Section 4.4.1. and Figure 4.2 for details on the members of the IPs and FRGs.

Depending on their roles, some of the IP members at both kebele and woreda levels were selected as members of the technical committees. The technical committees (TCs) served as driving forces and bridges between the woreda- and kebele-level IPs (see Figure 4.2). While the woreda technical committee (WTC) members participated in kebele-level IP meetings, the kebele technical committee (KTC) members participated in the woreda-level IP meetings. The WTC members closely monitored and evaluated the activities of the project and selected the most successful practices (the most significant changes) from the interventions of the project for scaling out/up.

4.3.2. Research design

According to Yin (2004), the case study method is suitable for research with a descriptive and/or explanatory question. This study aimed to explore and assess the networking, methodological, and institutional anchoring processes; thus, a case study was the appropriate method. In-depth interviews were done, as this is a powerful method to generate valuable descriptions and interpretation from the viewpoint of people (Ritchie & Lewis, 2014). According to Yin (2011), interviews can be made with a single person and/or with a group.

Purposive and snowball sampling were applied to select key informants from the project and other stakeholders working as main partners at different administrative levels, based on their role and level of participation in the project activities. We assumed the most active actors would also be most concerned with the sustainability and scaling of the approach. As mentioned earlier, actors in the TC participated/contributed relatively more, though each was not equally

engaged. Members with prominent roles in the project (engagement in the IPs and FRGs) were selected as respondents, regardless of their location. Interviewees included AR project officers, implementing partners from the region (Mekelle, the capital city of the Tigray region), surrounding woredas, Endamehoni woreda and the project sites Embhazti and Tsibet kebeles, and regime actors relevant for scaling (see Table 4.2 and Appendix 4.1 for details). Furthermore, as anchoring of the new way of doing innovation also depends on the appreciation of the farmers, in-depth individual interviews with four FRG members who participated at kebele- and woreda-level IPs, complemented with an in-depth group interview with seven representatives of the most active FRGs, was done.

In-depth individual interviews were made with regime actors relevant for scaling, specifically the head of Tigray Bureau of Agriculture and Rural Development (TBOARD), and the manager of Alamata Research Centre. A change from the TOT to an AIS-oriented innovation approach requires a multifaceted transformation which cannot be done without a conducive institutional environment. Hence, asking those who have the position to enforce institutional changes is important, and this is the reason the higher officials were interviewed in this study.

To collect the primary data, interviews were executed with individuals and groups, depending on the level of involvement and location. Open-ended questions were prepared to explore the executed anchoring activities and applied strategies and analyze perceived anchoring signs (For details refer to Appendix 4.1). Interviews were recorded and transcribed. Secondary sources such as minutes of the IP meetings, reports, reviews, and other project documents were also used. Data collection for this study was made between mid-September 2016 and mid-March 2017 (one year after project completion).

Statements from the interviews and secondary data were coded and analyzed with the defined theoretical framework.

Table 4.2: Summary of the organizations/people contacted, sample size, and membership in the IP structure

Membership in the FRG-IP structure	Organizations/people contacted	N
AR project officers		
Not members of specific FRG-IP	AR project officers in the International Livestock Research Institute (ILRI), in Addis Ababa	4
Members woreda-level IPs	AR project site coordinator and assistant coordinator at Endamehoni woreda	2
Implementing partners		
Members woreda-level IPs	CIP-project coordinator at Mekelle, a researcher representing Tigray Agricultural Research Institute (TARI) at Mekelle, a researcher from Alamata Research Centre, Endamehoni woreda extension office head, Graduation with Resilience to Achieve Sustainable Development (GRAD) project coordinator at the woreda (all members TC)	5
Members kebele-level IPs	Two Development Agents (DAs) from the two project sites (Embhazti and Tsibet kebeles), and four farmers (DAs are members of the TC; farmers are not member TC)	6
Members in FRGs	The project beneficiary farmers from the project kebeles (Embhazti and Tsibet)	7
Regime actors, relevant for scaling		
Not member of the FRG-IP; but well-informed about the project activities, and involved in some events of the project	The manager of Alamata Research Centre	1
Not member of the FRG-IP and not directly involved in the project activities, but informed about the project activities	The Head of TBOARD	1
Total		26

4.4. Findings: Anchoring Strategies and effect

4.4.1. Network Anchoring

In the last decade, CGIAR centres increasingly embraced the AIS approach. Being linked to CGIAR, the AR project envisaged to implement the AIS approach through an FRG-IP approach. AR officers attributed the general low uptake of agricultural technologies to the government TOT approach, disseminating Good Agricultural Practices (GAPs) without consideration of the local biophysical and social-economic circumstances. The aim was therefore to establish a sustainable intensification approach through more participatory research in a predominantly TOT-oriented regime, and, where needed, organize seed-multiplication, improved access to technologies (e.g. improved seed and fertilizer) and marketing.

Interviews with AR project officers indicated that the main network anchoring strategy of the project (the niche) was to engage governmental organizations (from the regime) at different administrative levels as partners for project implementation. The project started consultations with the zonal office of agriculture and the Endamekoni Woreda office of agriculture and rural development to introduce the purpose of the project and discuss on site selection. Together with the woreda office of agriculture and rural development, the potential partners were identified. From the regime, the agricultural research centres working in Tigray (one under the national and two under the regional research mandate), Mekelle university, plus the regional, woreda and kebele agricultural offices were invited to participate in the PCA. As an implementing partner of the AR, already engaged in the AR project sites, the CIP project became part of the PCA.

The partners from the regime and the niche teamed up to organize a PCA at each selected kebele, with about 30-40 farmers. Then kebele- and woreda-level IPs were established, among

which the key actors were selected as technical committee members. Most members of the PCA team became members of the Woreda technical committee, which met regularly to prepare and monitor the execution of all project activities (see Figure 4.2). Next to them, the IPs also included representatives of other organizations, such as Affairs Offices (social, youth, women) and Sector Representatives (health, education, water, land), and woreda and zone administration offices from the regime. Besides the actors from the government, focal persons of projects working in the area also became members of the IPs (e.g. Household Asset Building Program (HABP), Agricultural Growth Project (AGP) and CASCAP). Organizations delegated different employees in the IPs. While some organizations were represented by higher level officials (e.g. Mekoni agricultural research centre, TVET college), others such as TARI and Mekelle University were represented by other employees (see Figure 4.2); the director of the former and college dean of dry land agriculture and natural resources of the latter were only informed about the project approach and specific activities. AR considered the IP as the essential tool to attain concrete collaboration.

Various crop- and theme-based farmer research groups (FRGs) were established, such as the apple, Lucern tree, Oat-Vetch forage, fava-bean, wheat, potato, Participatory Varietal Selection (PVS) and seed multiplication FRG. The number of the farmers participating in each FRG varied from 5 (PVS and seed multiplication) to 29 (wheat). The AR team and other researchers facilitated and supported the FRGs and ensured a close link with the kebele- and woreda-level IPs. To ensure the linkage, FRG representatives participated in kebele IP meetings; to put issues discussed at the FRG on the agenda, representing the farmer community.

Keys for Figure 3

Woreda level IP members**Woreda Technical Committee members (11)**

TARI=Tigray Agricultural Research Institute (2: Livestock researcher & horticulture researcher)
 EIAR =Ethiopian Institute of Agricultural Research (1: Mekoni research centre manager)
 WoARD= Woreda Office of Agriculture and Rural Development (1: Endamehoni woreda extension officer)
 ZAO=Zonal Agriculture officer (1: officer)
 MATVET= Maichew Agricultural Training and Vocational Education and Training (1: College dean)
 MU= Mekelle University (1: representative)
 CIP=International Potato Centre (1: Mekelle-Tigray coordinator)
 AR=Africa Rising (2: Project site coordinator and assistant coordinator)
 GRAD= Graduation with Resilience to Achieve Sustainable Development project (1: coordinator)

Members other than the technical committee (12)

Affairs Offices (3: social, youth and women)
 Sectors Representatives (4: health, education, water, land)
 Projects' focal persons: (3: Household asset building Program (HABP), Agricultural Growth Project (AGP) and Capacity Building for Scaling Up Evidence Based Best Practices in Agricultural Production in Ethiopia (CASCAP))
 Administrators (2: the woreda and the zone administrator)

Kebele level IP members**Kebele Technical Committee (7)**

DAs= Development Agents under kebele office of agriculture and rural development (3: crop, livestock, natural resource management and irrigation)
 GRAD= Graduation with Resilience to Achieve Sustainable Development project (1 project representative at kebele level)
 Kebele Manager (1)
 Kebele Administrator (1)
 Kebele woman affairs representative (1)

Members other than the technical committee (20)

Multi-purpose cooperative (1: Manager)
 Saving and credit cooperatives (1: Manager)
 Sectors representatives (4: health, education, water, land)
 Associations representatives (3: farmers, youth, women)
 Religious Leaders (2)
 FRGs= Farmers Research Groups (9: representatives)

Figure 4.2. Networking for implementation, across different administrative levels adapted from Ellis-Jones et al. (2014:13).

The reasons for involving all these actors, as expressed by AR officers, were many. The prime reason was to gather stakeholders with different knowledge and skills for joint action research at the project sites. The second was to increase the feeling of ownership. Finally, the engagement of these actors was assumed to lead to diffusion and adoption of the created technical and organizational innovations in the various home organizations and beyond. Yasabu (2015), one of the project officers, explained that the project intentionally engaged various actors right from the start, to promote ownership and thus strengthen the sustainability and uptake of the introduced technologies, management practices, and institutional systems.

The next network activity of the AR project was communication, to create discussion and where possible support for the sustainable intensification and FRG-IP approach. Radio broadcasts and leaflets were prepared, and at different phases of the FRG research, field days were organized to inform and critically discuss technical as well as organizational innovations with other farmers communities and key actors of organizations at kebele level, woreda level, and beyond. At this point, the project made sure they included higher level officials, as illustrated by the quote of a research centre representative: 'AR does not only involve researchers, but it also engages research centre managers in important events of the project; so, there is a feeling of being part of the project activities.' Interviews and field day reports showed that issues raised during these events mainly concerned the introduction and local adaptation of farm technologies, rather than the value of the interactive FRG and IP approach. However, as many actors involved highly appreciated the FRG-IP approach, the word was spread. The IP members, particularly those from research and extension organizations, reported that they share the Most Significant Change (MSC) stories about the FRG-IP in various government meetings, especially at the Agricultural Development Partners Linkage Advisory Council (ADPLAC) meetings. A woreda-level extension officer said, 'In different government meetings we participate in, we promote the approach as a best practice that has to be taken up.' As most of

the IP members work in regular research and extension organizations, we can consider them hybrid actors (part of the niche and the regime) promoting innovation.

4.4.2. Methodological Anchoring

The Innovation Platform guideline for AR partners in Ethiopia (Lema & Cullen, 2014) and the manual for innovation platform facilitators at the AR research sites were developed by the AR team in Addis Ababa (Lema, 2014). Training on the research and development approach of the project (AIS concept and the IP methodology, PCA tools, facilitation as well as interactive monitoring and evaluation methods (e.g. MSC approach) was provided to the partners in the PCA team, before undertaking the diagnostic study. The training on IP facilitation was organized in Addis Ababa, to cater to the AR project site team and major partners (Lema et al., 2014; Ebrahim, 2016; ILRI, 2016). In this way, the AR team members (AR coordinators and CIP Tigray coordinator) were prepared for their role as AR facilitators.

To build capacity and ownership, leading roles were given to the actors from the regime. Accordingly, the head of WoARD was invited to act as chairperson of the IPs, while the representative of TARI would coordinate the M&E activities. Another researcher was appointed as communication champion, to ensure proper and frequent internal dialogue, and to document outreach activities and learning events.

Apart from the training, methodological anchoring was mainly executed through practical experimentation. The experimentation aimed to serve the capacity building (Yasabu, 2015), and test whether the FRG-IP methodology would fit the local context. A project officer in Addis Ababa noted, ‘We aim to validate not only the technologies, but also the interactive research and innovation approach.’ The majority of the IP members agreed that the IPs served as a forum for learning about AIS and IP methodology and how to operationalize this in concrete planning,

collaborative action, monitoring, and evaluation. They reported that, for them, IP meetings provided opportunities to learn how to do things differently, how to organize and facilitate an interactive process. One of the IP members, delegate of a research centre, noted, 'When you work with AR, you learn a different way to collaborate with partners in research.' Government officers appreciated the approach. A researcher underscored, 'It is crucial to involve farmers and other local stakeholders to identify the real problems from their perspectives, to come up with the appropriate solution, to develop joint plans and collaborate for implementation.'

The individual interviews with the kebele-level IP members and the group interviews with FRG members revealed farmers' appreciation of the FRG-IP structure. Farmer IP members noted, 'AR is mainly special because of the approach that highly engaged farmers for the identification of problems, the planning and implementation trials, monitoring and evaluation.' IPs enhanced farmer-to-farmer-learning, created mutual understanding, and provided opportunities to learn how to tackle collective problems in a cooperative way. FRGs reported that the research groups enabled them to strengthen relationships and develop habits of consultation and collaboration. Many farmers highlighted benefits such as access to information on improved technologies, strict follow-up and technical support, higher productivity, and improved income and livelihoods.

Despite the learning and positive appreciation, only few of the IP members were interested in applying the IP methodology in their respective organization. The local coordinator of GRAD noted, 'We also try to use multi-stakeholder platforms, but in a different way. Now we are trying to adapt AR's approach in our project.' The head of extension at WoARD was also enthusiastic: 'We developed a demand-based project proposal for an international water management project and the proposal is accepted.' Based on the AR experience, they planned to implement the project through multi-stakeholder IPs. Beside these positive reactions, most

respondents forwarded constraints as to why they were not able or less interested to implement the IP methodology, while some even did not grasp the issue and noted that ‘there was quite some adoption of new agricultural technologies’. The first constraint mentioned was lack of knowledge and limited facilitation skills. An extension officer explained they could not propose an IP approach, as they lacked enough colleagues with the required knowledge and appropriate facilitation skills. The second constraint mentioned was lack of resources (particularly financial resources). The extension officer at woreda level said, ‘Even if we want to apply the same approach as in AR in our extension office, we don’t have the required resources. We are supposed to cover large areas with limited human and financial resources.’ He added, ‘The key is in the government’s hand: it is about lack of commitment.’ His colleagues agreed there was some investment done in public extension and research, but the higher-level authorities were not committed to financing interactive innovations processes. The third constraint underscored was the absence of evaluation and rewarding mechanisms that encourage applying similar approaches. The extension officer and the DAs stressed that they were evaluated and ranked on, for example, the number of farmers that applied the promoted fertilizer and seed varieties, rather than the execution of a problem-based interactive innovation process, and the provision of demand-based services. It takes some effort to undertake a participatory approach, while there was no incentive or reward to do so.

4.4.3. Institutional Anchoring

The project focused mainly on the development and out-scaling of agricultural intensification practices. Nevertheless, interviews with the AR team interviews showed the expectation that the IPs would be sustained after the end of the first phase. The summary of AR R4D in Endamehoni Site, Tigray region (2012-2016, February), compiled by the site coordinator, noted the project expected some partners would adopt the participatory research and extension

approach, notably the IP methodology (Ebrahim, 2016). The AR site coordinator explained, 'We want to show that the approach we apply is successful. We engage them in all activities and we also provide training, so we expect that if they know the benefit, they will make efforts to make it sustainable,' Similarly, the national coordinator noted, 'We are working with them, starting from farmers, to the local level officers, researchers and extension, in the hope that they appreciate the approach.' In a way, it was assumed that the concrete evidence at the local level would spread the word and convince the relevant policy-makers. Additionally, the IP members shared the methodology and success stories of the project in different meetings organized by GOs and in other established networks. Some regime actors got to know and appreciated the methodology. A woreda extension officer noted, 'The government policy advocates participation of different parts of the community, but in most cases the practice is far from that.' However, there was no systematic activity to use mass media or lobby at regional level to convince key actors who decide about government research and extension approaches, distribute R&D funds, and elaborate officer evaluation and promotion criteria. National-level review and planning meetings were organised by the project on an annual basis, where federal level partners of the project from MOA and EIAR and other projects, and local project coordinators and woreda level partners participated. However, they mainly discussed technological innovations, and there was no explicit knowledge sharing and reflection on the FRG-IP methodology. Higher-level government officers on their turn claimed that adopting innovative approaches and adapting the policy and work arrangements wouldn't be difficult, but they underscored the need for evidence that shows the new approach works and brings better results than the actual government approach. The Head of TBOARD stated, 'Research and development partnership is very important for us, to accelerate our development. ADPLAC is one platform in which we use to facilitate such partnerships. He added, 'Scaling innovative partnership approaches wouldn't be a problem, if it is proved to be useful and efficient. On his

part, the Alamata research centre manager said, ‘Starting from the first Growth and Transformation Plan (GTP I) in 2010, the government is giving more and more attention to participatory and adaptation-based research that can satisfy the needs of farmers.’ He added, ‘I don’t think there is a problem from the government to learn and take up best practices in this regard.’

Though the explicit lobbying at the higher level may have been limited, the practical work itself induced change in attitudes and practices at the more local level. Implementing IPs not only ensured some methodological anchoring but also influenced informal behaviour of IP members. They somehow got used to ‘new’ innovation procedures (e.g. joint planning, implementation, and monitoring and evaluation). Different members testified that the IPs changed the usual top-down compartmental work culture into a more collaborative one. They now worked collaboratively, which stimulated each to invest more time, effort, and resources on the AR project, and thus created a feeling of ownership. A woreda extension officer said, ‘It is like creating one strong team for a common goal. We plan together, and implement together, which was not common practice before.’ Several interviewees appreciated that IPs stimulated continuous demand articulation by farmers and other stakeholders, useful for planning and re-planning. FRGs were also reported to be useful, as most problems were first discussed in the FRGs meetings before farmer representatives would take them to the Kebele IP. Government Development agents (DAs) noted that: ‘It is a new thing, to make farmers responsible for their own development. Something introduced by AR.’ Hence, several parts of the FRG and IP approach were highly appreciated by the actors, but unfortunately, as described in section 4.4.2., most respondents do not propose the approach outside the AR project and forwarded constraints such as lack of knowledgeable colleagues, lack of resources, and a lack of a conducive incentive system. Table 4.3 gives a systemic overview of the anchoring activities/strategies.

Table 4.3: Overview of anchoring activities/strategies in the study area

Communication and documentation needed to support anchoring activities, important for both out- and up-scaling			
<p>+<i>T.1. Create persuasive vision</i>: those involved have positive story they tell in meetings, but this issue is not systematically prepared</p> <p>+ <i>T.2. Develop methodological guidelines</i>: Guidelines and manuals for establishing and facilitating innovation platforms for AR partners were developed by the AR team in Addis Ababa</p> <p>+<i>T.3. Ensure mass communication</i>: Radio broadcasts, leaflets and field days were more focussed on technical aspects than <i>FRG-IP approach</i>.</p> <p>- <i>T.4. Generate supportive evidence</i>: No systemic data collection is done to provide policy makers with required evidence.</p>			
Network Anchoring Activities	Methodological Activities	Anchoring	Institutional Anchoring Activities
At the level of potential users/beneficiaries in niche and beyond			
<p>+<i>N.1. Inform potential beneficiaries</i>: Mass communication via radio and leaflets. Inviting beneficiary and non- beneficiary farmers to participate in field days</p> <p>+ <i>N.2. Identify and mobilize capable persons</i>: Identifying and involving core actors for Kebele IPs and technical committee; and farmers for commodity based FRGs</p>	<p>- <i>M.1. Organize training</i>: not performed for actors involved at local level</p> <p>+ <i>M.2. Organize practical experimentation for learning and adaptation to real-life context</i>: FRG and IP members learned through practice</p>		<p>-<i>I.1. Ensure continued and widespread practice for institutionalising new beliefs and informal rules of practice</i>: Stimulating continued practice of interactive demand-articulation and trials of solutions in restricted intervention area</p> <p>-<i>I.2. Create committed constituency for political support</i>: networking and mass communication mainly on technical aspects such as adoption of farm technologies</p>
At the level of potential partners for implementation niche and out-scaling the 'novel' methodology			
<p>+ <i>N.3. Inform organizations in and around area of intervention</i>: Identifying and inviting higher officials such as woreda and zone level administrator, research center managers in experience sharing events, workshops/meetings, and field days; Informing higher officials, when they are not engaged themselves (e.g. TARI director and college dean of dry land agriculture and natural resources of the Mekelle university)</p> <p>+<i>N.4. Identify and connect to organizations key for implementation</i>: Identifying potential partners (universities, research institutions, and regional and zonal bureaux of agriculture)</p>	<p>+/-<i>M.3 Organize training</i>: AR head office at Addis Ababa organized (a) training for core partners in the PCA team on AIS concepts and FRG-IP methodology, PCA tools, facilitation and interactive monitoring and evaluation methods (e.g. the Most Significant Change approach). (b) IP facilitation training for the core partners identified earlier (agricultural research institute, woreda level extension offices), and the AR team at the project site (trainings are limited to core actors)</p> <p>+ <i>M.4. Organize practical experimentation for learning and adaptation in real-life context</i>: Technical committee prepares most meeting and is highly involved in experiential learning, other IP members to a lesser extent</p>		<p>+/- <i>I.3.: Ensure continued and widespread practice for institutionalising new beliefs and informal rules of practice</i>: practice of less rigid interactive research, collaborative mobilization of resources in restricted in intervention area</p> <p>+/-<i>I.4. Create committed constituency for political support in implementing organizations and beyond</i>: identifying zonal and woreda administrators and government officers and involving them in IP and in mass communication events such as field days, with issues focused mainly on technical aspects, such as adoption of farm technologies</p>

<p>+N.5. Identify and mobilize key officers for implementation: directors and experts from research centers, a university, ATVET and WoARD are selected for PCA/Technical committee, other relevant officers join woreda IP</p> <p><u>-N.6. Identify and mobilize key officers with good connections for informing and lobbying at the level of regime authorities.</u> Identification of actors and connections created were focusing on successful implementation, than lobbying for changes at a regime level</p>	<p>+ M.5. Organize monitoring for explicit learning & adaptation: Applying MSC as means for participatory monitoring, dialogue and learning about IP approach</p> <p>+ M.6. Transfer ownership: Inviting regime actors to take on some responsibilities; to develop new skills of doing things and mobilizing human and physical resources among IP partners</p>	
At the level of key authorities in incumbent regime able to create new formal rules (up-scaling)		
<p>+/- N7. Inform key authorities of the regime: Inviting higher officials such as directors of research institutes, extension offices and research center managers to workshops/meetings, experience sharing events and field days</p> <p><u>-N.8. Identify and connect with key organizations of the incumbent regime</u></p> <p><u>-N9. Identify key decision-makers and advisors in organizations</u></p>		<p>+/- I.5. Early Lobbying and creation of events to convince key actors of the incumbent system: Presenting successful project experiences at some government planning and exchange meetings and other national network meetings</p> <p><u>-I.6. Provide a persuasive vision/narrative and research reports promptly to key decision-makers and advisors in organizations:</u></p>

Bold and + =Activities executed well; *Italic and +/-* = Activities not executed well; Underlined and - = Activities Not executed

4.5. Analysis and discussion

The aim of this paper was to develop an anchoring framework that would inspire and support projects that experiment with innovation methodologies, to reflect upon, design, and assess anchoring of the experiment to ensure a good fit and potential for scaling. The question was whether the framework provided insights in the strengths and weaknesses of a strategy and plausible effects it has on future scaling. We used the framework to analyze the anchoring activities executed by an FRG-IP project in Ethiopia, highly appreciated by the involved actors. We asked ourselves: what anchoring activities are done, and what does this imply for the (a) grounding and adapting of the innovation methodology in the real-life context, (b) the potential

for up-scaling to improve sustainability, and (c) the potential for out-scaling (mainstreaming)? Our analysis gives the following results.

4.5.1. Anchoring of the innovation methodology in local real-life context

The R4D approach, envisaged by AR, differed considerably from the dominant agricultural TOT regime in Ethiopia. To try the fit and value of the FRG-IP in the local Ethiopian context, AR needed to inform and motivate stakeholders to join the experiment; hence, they started with the first networking and methodological anchoring. They identified and mobilized high-level officers in agricultural research institutes and the woreda and kebele extension offices (N4+N5 anchoring activity, Table 4.3). These persons had the technical expertise and/or the local authority to contribute resources to the experiment. At the same time, they were the core actors of the agricultural TOT regime at woreda and kebele level: they could influence the research and development procedures, resource attribution and practices in their respective offices. They were open, but also somewhat unsure about applying the new innovation approach. At first instance all methodological anchoring activities were geared towards these core actors: they received training on the AIS concepts and FRG-IP methodology (M3), and were appointed to critical roles in the multidisciplinary PCA teams and the Technical committee (M4+M5+M6). The head of WoARD acted as chairperson of the IPs, while the representative of the Tigray Agricultural Research Institute (TARI), coordinated the M&E activities. In sum, AR field coordinators assigned them critical roles in the planning, execution and M&E of the new approach, for operationalising and adapting the approach to the local context, where needed. In this way, these core actors acquired theoretical and experiential knowledge, were active in the monitoring and reflection about what the possible fit of the methodology, or parts of it were in the local context (M5). In a way, they also had the ownership to decide whether and how to implement the demand driven, interactive innovation approach in the local context, what skills

should be developed, and what resources needed to be mobilized (M6). However, the transfer of ownership was limited, as it was done within the realm of the project, providing substantial resources and incentives for a limited time and number of actors, directly involved. For a more sustainable ‘grounding’ of the FRG-IP idea in context, a dialogue could have been started with the relevant authorities to see what resources and incentives could be sustainably allocated to such a FRG-IP idea, to assess and adapt the methodological format most apt to be sustained (I5).

The second focus of the AR networking concerned selection of the farmer communities and respected farmer leaders (‘model’ farmers) who led FRG discussions and experimentation (N2). Similarly, AR officers identified additional actors at kebele and woreda level, whose guidance and support would help the execution of a farmer-driven innovation approach (N4). These actors were invited to participate in the IPs, next to the technical committee members who were the prime movers of the IP approach (M3). Neither the FRG nor the additional IP members received any specific training, but learned through practice. In this way, they operationalized the FRG ideas as fit within their biophysical, farm, and community context.

4.5.2. Networking & methodological anchoring for out-scaling

Out-scaling of small technical and methodological changes require mainly networking and methodological anchoring: to make more people informed about the benefits and the required practices, to see to what extent it would fit their biophysical, socio-cultural and economic situation. However, out-scaling of more complex technological or methodological innovations requires systemic change. In these cases, institutional anchoring and up-scaling is needed to create the required organisational and institutional context for local actors to even consider uptake.

The AR case shows that the change from a TOT innovation approach to the FRG-IP approach was a complex one. The differences in innovation methodology and related organisational and institutional were considerable. AR invested in networking. With their partners, they organized farmer field days at several stages of the experiments, printed leaflets, and organized radio broadcasts to network, disseminate, and discuss the work and results among participating and non-participating farmers and relevant organisations at kebele (N1), woreda, and zonal level (N3). These events focused primarily on demonstrating developed agricultural technologies, but as participants were enthusiastic about the approach, they also mentioned this aspect. IP members identified the IP methodology as 'the MSC story' and also shared this story with colleagues in their organisation (N3) and sometimes at higher-level planning and network meetings (N7).

Through informal networking, a substantial number of officers at kebele, woreda, and regional level were informed about the positive FRG-IP experience. AR documents and interviews revealed the implicit assumption or hope that the 'successful implementation' would lead to uptake, but they somewhat overlooked the need for more intense exposure (M3+ M4) and the force of the constraining institutional context.

4.5.3 Networking and institutional anchoring for up-scaling

As noted above, the sustainability and mainstreaming of a methodological innovation depend on the creation of conducive conditions. This means a dialogue has to be started with key authorities at regional and/or national levels about the benefits of a locally developed innovation methodology, the institutional environment needed to sustain and mainstream the methodology, and the actual possibilities of key authorities to do so. Persuasive narratives and positive

evaluations give the benefits, but key authorities have to see to what extent they can mobilize institutional support.

In the case of the AR project, the focus was on the local FRG-IP methodology to provide local-fit technologies, rather than to explicitly propose the Ethiopian authorities to sustain and mainstream the developed FRG-IP methodology. They did not work on a persuasive vision, independent scientific research, or a strategic plan to mobilize brokers (N.6 & 7) or identify critical authorities (N7 & 8) in order to start a dialogue (I.5 & 6) whether and how they could adapt the government incentive and reward system.

Informal institutionalisation of interactive R4D practices (I2 & I4) happened but was mainly limited to the project period and intervention zone.

4.5.4. Assessment of anchoring activities done and potential for scaling

AR did a thorough job to ground the FRG-IP methodology in the local context. The regime actors involved appreciated the methodology. The logic and features of the FRG-IP niche, however, differed considerably from those of the TOT regime; out-scaling of the niche experiment was problematic due to the limited institutional anchoring and up-scaling. Networking for and actual dialogue and lobby with key authorities were the main missing activities (dark grey in Figure 4.3). Besides this, broader networking, training and mobilisation of key implementing partners for the experiments-in-context and capacity building could have supported some out-scaling. Figure 4.3, shows five missing activities (in dark grey shades) negatively influenced the performance of several other anchoring tasks. The entwined negative dynamics led to a situation in which the potential for scaling of the FRG-IP, if desired, became limited. Results showed that at the end of the project, there were some farmers, IP members, and technical committee members who appreciated the collaborative FRG-IP methodology, and

a few dynamic technical committee members dared to propose the AIS approach in upcoming research, but most IP members deemed it difficult to pursue the new innovation approach outside the AR realm, as they lacked knowledgeable colleagues, resources, and rewards to substantially invest in the ‘hard work’.

Figure 4.3: Missing anchoring activities and strategies across different types of anchoring and administrative levels in Tigray region, and effects

The AR project focused on the development and out-scaling of technological innovations rather than the FRG-IP approach, but simultaneously assumed or hoped that the methodology would be taken up and spread. Our analysis shows that AR succeeded in the grounding of the experiment in the local real-life context but did not start a dialogue with regime authorities to make the fit of the experiment with the institutional context. Our framework showed the importance of institutional anchoring, notably strategic networking (N6, N8 & N9), coupled with dialogue and mobilisation of key regime actors (I5 & I6), for institutional grounding of the experiment and potential up-scaling. The framework also showed what network- (N4 & N5) and methodological anchoring activities (M3 & M4) were needed for out-scaling, but the AR case study revealed this was not enough. It showed that out-scaling of radical, complex changes in the innovation methodology highly depends on institutional anchoring, ensuring conducive environments (up-scaling). These insights may be very useful for AR and future innovation methodological experiments, to develop an interactive innovation methodology fit for the context and with potential for up- and out-scaling.

With this framework, we want to inspire R4D projects that experiment with methodological innovations, to proactively and systematically consider the anchoring in order to make the best fit between the innovation methodology and its context, and to work on scaling the successful experiment. So far, many R4D projects, introducing participatory and interactive innovation methodologies for agriculture in developing countries, lack attention for the institutional embedding (Hermans et al., 2017; Minh et al., 2014; Nederlof et al., 2011; Schut et al., 2016b; Wigboldus & Leeuwis, 2013; Wigboldus et al., 2016). Their prime focus is to apply a participatory methodology to find technological sound solutions for farmers.

Looking at these experiments from a niche management perspective, Schot & Geels (2008) note that niche experiments often fail, due to a focus on single loop learning (*'How to apply a methodology'*) and limited involvement of regime actors (Schot & Geels, 2008). Pro-active

involvement of regime actors in the methodological experiments, coupled with a dialogue with regime authorities on the vision, would create double loop learning (*'What type of methodology would be fit and acceptable in the context?'*), and bricolage of the logic and practice to make it acceptable for regime actors who are able to provide resources and institutional embedding (Schot & Geels, 2008; Smit, 2007; Wigboldus & Leeuwis, 2013).

Idealism helps to design more effective innovation methodologies and binds people in a niche experiment, but to embed it in the wider institutional context, pragmatic actors are needed who can make compromises and help to translate niche ideas into new forms more amendable for regime actors (Smith, 2007). Our research findings show the pertinence of the transversal support activities (T1, T2, T3 & T4) and strategic networking (N4, 5, 6, 8 & 9), to be followed by methodological anchoring (M3 & 4), while simultaneously working on institutional anchoring (I3 & 4), to ensure the right fit with the real-life local situation and the institutional context. In other words, methodological anchoring is about 1st order learning, while institutional anchoring concerns 2nd order learning. Together they allow for good grounding and ensure a potential for scaling. To attain the best fit, an iterative process of dialogue and probing is needed. We therefore recommend a flexible, multipronged approach, continuously scanning the progress made and anchoring tasks yet unfulfilled, in order to ensure proper embedding, as a pre-phase for going to scale.

Ultimately, successful anchoring depends on the mobilisation of key actors in a certain context (Kivimaa & Kern, 2016; Muilerman et al., 2018; Wigboldus et al., 2016). So-called champions navigate the process and can overcome constraints (Klerkx et al., 2013). Champions may have different qualities: knowledgeable on the methodology and/or anchoring processes, open-minded, dynamic and with good connections, or having power resources (such as rule making authority, financial resources). These qualities enable them to ensure the networking, craft and flexibly adapt

the vision, the methodological- and institutional anchoring strategies to make them fit and effective for the context.

4.6. Conclusion

At this moment, there are many R4D projects, experimenting with more interactive innovation methodologies to find sound technical solutions for farmers. This concerns a wealth of investment, but unfortunately the innovations and outcomes of the projects seldom 'go to scale'. To stimulate the uptake of successful innovation experiments, we want to inspire practitioners to pay more attention to the anchoring of these niche experiments. We developed an anchoring framework, highlighting relevant networking, methodological and institutional anchoring activities, and tested the value for assessment and strategic advice to a R4D project in Ethiopia. The use of the framework (identifying the tasks executed or non-executed), coupled with an analysis of the embedding of the methodological experiment, potential up-scaling and out-scaling, provided interesting insights. It showed the strengths and weaknesses of the anchoring work, which led to concrete suggestions on how to proceed if an innovation project considers 'going to scale'. We recommend R4D projects to valorize their work and pay more explicit attention to anchoring. With a flexible, multipronged approach, continuously scanning the strengths and weaknesses for better anchoring, we are sure more R4D projects can fit the innovation methodology in the context and be able to 'go to scale'.

Appendix 4.1: Summary of organizations/people contacted, themes explored and interview types

Organizations/People contacted	Themes explored	Interviewee and Interview types
AR project	<p>Comparison and contrast of the project and the public research and extension, keeping in mind the features identified from the literature (regime/niche comparison)</p> <p>Activities performed/strategies used to find and connect to strategic actors from different administrative levels and create connections (network anchoring)</p> <p>Activities performed/strategies used to teach regime actors about the FRG-IP approach of the project, support to try it and adapt to their context</p> <p>Lobbying and negotiation activities performed, and strategies used to stimulate key regime authorities, advise provided to help them create vision of the proposed novelty, negotiations to create conducive policies ((such as incentive mechanisms and changing evaluation criteria and stimulating funding) in the governmental organizations engaged in the project, mainly in research and extension organizations</p> <p>Perception in relation to changes on the partners engaged in the project, on their awareness and understanding about innovation system thinking and FRG-IP approach</p> <p>Perception on the positive influence of the project so far (e.g. if there are actors from the regime promoting or using the approach because of the experience they got from the project)</p> <p>Efforts made to out scale or up scale the FRG-IP approach</p>	<p>In-depth Individual interviews with AR project officers in the ILRI</p> <p>In-depth group interview with the site coordinator and an assistant coordinator of the AR project</p>
AR project partners	<p>Comparison and contrasting of the project with the public research and extension (regime/niche comparison)</p> <p>New knowledge and skill acquired from engaging in the project, the willingness and/or ability and confident to apply what they learn, and challenges faced</p> <p>Perceived changes, in relation to research and extension approach policy and incentive mechanisms and/evaluation criteria or cultural/practice changes</p> <p>Types of capacity building supports received; particularly in relation to increasing awareness and knowledge on the innovation system thinking, and the FRG-IP approach</p> <p>Perception on the approach of the project (if they appreciate and promote the approach of the project or tried to use it in their respective organizations, and why/why not)</p> <p>Efforts made to out scale or up scale the FRG-IP approach.</p>	<p>Individual in-depth interview with a researcher from Alamata research center</p> <p>In-depth group interview with the worda Endamehoni extension officer, Development Agents (DAs) and GRAD coordinator at Endamehoni worda</p> <p>In-depth group interview with CIP coordinator and TARI representative, both based at Mekelle</p>
AR project beneficiary farmers (FRG-IP members)	<p>Comparison of the project with the public research and extension system regarding the services they get and also regarding their engagement and participation in the decision making, experimentation, or trial; and their perception towards the approach of the project compared to the public approach</p>	<p>In-depth individual interview with FRG members also members of the kebele IPs</p> <p>In-depth group interview with representatives of the most active FRGs (but not members of the IPs)</p>
TBOARD; and Alamata Research Centre	<p>Willingness of the government to take up/ adapt the approach of the project or similar innovative approach, and the challenges and opportunities (institutional anchoring)</p>	<p>In depth individual interview with Head of TBOARD; and Alamata Research Centre manager, separately</p>

Chapter 5

A State-Initiated Multi-Stakeholder Platform as an Instrument to Build Agricultural Innovation System Capacity: A Case Study from Ethiopia

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*The chapter has been accepted for publication by the journal
Innovation and Development as:*

Seifu. M., van Paassen, A., Klerkx., L., and Leeuwis, C. 2021. A State-Initiated Multi-Stakeholder Platform as an Instrument to Build Agricultural Innovation System Capacity: A Case Study from Ethiopia” Innovation and Development (in press)

Abstract

Many Sub-Sahara African (SSA) countries still adhere to the linear Transfer-of-Technology approach and their agricultural innovation systems (AIS) lack the structural capacities to support smallholder-inclusive innovation. Multi-stakeholder Innovation Platforms (IPs) have been proposed as systemic instruments to improve the functioning and building the structural capacities of the Innovation System (IS). This article studies the role of state-initiated IPs, multilevel Agriculture Development Partners Linkage Advisory Councils (ADPLACs) in tackling the systemic problems of the AIS in Tigray, Ethiopia. After studying policy documents, in-depth interviews were conducted with various participants of ADPLACs at different administrative levels. The results show that the contribution of ADPLAC in building the structural capacities is limited; due the absence of some important enabling factors and presence of several intertwined constraints. The missing enabling factors are: proportional representation of all stakeholders, neutral and capable brokers, and institutional arrangements conducive for interactive planning such as participatory monitoring & evaluation and incentive mechanisms for government officers to invest in participatory processes. The obstacles include (1) the government-led hierarchical structure of the councils, (2) a culture of top-down planning and agenda setting, (3) limited understanding of IS principles and (4) lack of funding of the facilitation of interactive multi-stakeholder processes. The major finding of this study is that the interlocked nature of the systemic problems constrained the functioning of the platform. Building local innovation capacity requires more than one systemic instrument such as an IP. Combinations of IP-facilitating and other systemic instruments are needed to overcome the lock-in and build local innovation capacity.

Keywords: Innovations, Innovation Platform, Capacity Building, Obstacles, Constraints, Enablers

5.1. Introduction

In many SSA countries, the linear Transfer-of-Technology (TOT) innovation paradigm still predominates (Smink et al. 2015; Schut et al. 2016; 2019). The TOT model is often criticized for its top-down, supply driven and technological approach, in which the smallholder context is not considered (Klerkx et al. 2012). Conversely, the IS perspective underscores the importance of interactions and learning to improve individual and collective capacity to innovate, and develop the institutional and infrastructural preconditions for inclusive, sustainable development (Lundvall et al. 2002; Hounkonnou et al. 2012).

There is a need to promote an IS approach, in which stakeholders and experts exchange knowledge and concerns, learn and reflect upon possible pathways for development. This creates a space where the stakeholders jointly select and implement those suited for the circumstances and able to address societal challenges such as inequality, poverty and climate change (Altenburg 2009; Hekkert et al. 2020). Interactive, or inclusive, innovation approaches are more likely to provide solutions that are technically sound, match the aspirations and resources of farmers, and align with the institutional context (Schut et al. 2019).

IS in developing countries, including the sub-Saharan countries, is often considered to be ‘immature’ or ‘catching up’ (Albuquerque 1999; Chaminade et al. 2009; Rapini et al. 2009). Actors, such as universities and research, financial, educational and intermediate organizations exist but have relatively low competences and lack the linkages and institutional bridging capacity to engage in demand driven innovation approaches (Arocena & Sutz 2000; Altenburg 2009; Rapini et al. 2009; Nelson 2010; Chaminade and Padilla-Perez 2017). Policy makers therefore have an interest in systemic instruments, which focus on change of the process and direction of a whole innovation system, rather than a part (Smits & Kuhlman, 2004). They tend to promote innovation platforms (IPs) or Public-Private-Partnerships (PPPs) as systemic instruments, enhancing multi-

stakeholder dialogue, learning and experimentation, to establish the critical innovation functions and build the structural capacities at innovation system level (Smits & Kuhlmann 2004; Turner et al. 2016). Assumption is that through their functioning, IPs and PPPs build capacities the orchestration of customized policy mixes (Triomphe & Rajalahti 2013).

Different authors have confirmed the potential of IPs to provide space for stakeholders from different backgrounds to identify, prioritize, and address issues of mutual concern (Mur and Nederlof 2012; Schut et al. 2011). Yet, they are also reported to have made a limited contribution to structural change (van Paassen et al. 2014).

In this study we therefore explore the impact of state-facilitated IP, ADPLAC in Ethiopia, on enhancing more interactive forms of agricultural innovation for farmer development and bringing structural change in the dominant top-down AIS, by enforcing change from within. We assume that state-driven IPs are well-embedded, and therewith have a good potential to induce regime actors to create the required conducive innovation policies, incentives and regulations.

5.2. Theoretical framework

Various theoretical concepts have been used to study innovation systems, their core functions and shortcomings (Minh et al. 2010; Minh et al. 2014; van Paassen et al. 2014; Wigboldus et al. 2016; Wieczorek & Hekkert 2012). The focus of this paper is exploring the impact of a state-facilitated platform in transforming the national AIS, by enforcing change from within. So, we operationalize the theoretical framework of Wieczorek & Hekkert (2012) for the agricultural sector in a developing country context. Wieczorek and Hekkert (2012) argued that the performance of an IS depends on its structural elements. They distinguished four types of structural elements and eight related systemic problems which affect IS capacities (see Table 4.1). The structural elements are: the actors, their interactions, the institutions and the infrastructure. The actors include different

types of individuals and organizations in the IS (e.g. Government, NGOs, civil society). Interactions are the dynamic relationships among actors, which range from individual contacts to dense networks (Turner et al. 2016; Wieczorek and Hekkert 2012). Institutions are the sets of rules that exist to reduce uncertainty in human interaction (North 1990). We distinguish formal and informal institutions where formal institutions are policies, rules and regulations, etc.; and informal institutions cover culture, routines and established practices in an AIS. Infrastructure includes physical (e.g. technologies); knowledge (e.g. research, development and advisory services), and financial infrastructures (e.g. grant programmes) (Turner et al. 2016; Wieczorek and Hekkert 2012). For details on the systemic problems see Wieczorek and Hekkert (2012).

Table 5.1: Systemic capacity and possible goals of systemic instruments

Structural elements that determine IS capacity	Type of systemic Problem	Aims of systemic instrument
Actors	Presence	Stimulate and organize the participation of various actors
	Capabilities	Create space to develop the capabilities of actors
Interactions	Presence	Stimulate the occurrence of interactions
	Intensity/quality	Prevent overly strong and overly weak linkages
Institutions	Presence?	Secure presence of (formal and informal) institutions
	Capacity/Quality	Prevent overly weak or overly strict institutions
Infrastructure	Presence	Stimulate physical, financial and knowledge infrastructure
	Capacity/Quality	Ensure the adequate quality of the infrastructure

From Wieczorek and Hekkert (2012)

In a developing country with a dominant TOT, the capacity of an IP to strengthen the IS depends on various enabling and constraining factors (Schut et al. 2016). The **first** enabling factor is the representation of the “right” stakeholders in the IP. It is essential to get actors on board who have a real stake, are knowledgeable, or have authority to enforce the required technical, organizational or institutional changes (van Paassen et al. 2014). The **second** enabling factor is facilitation by

neutral and capable brokers, with skills and knowledge to bring the relevant actors together, foster learning, coordinated action, monitoring and evaluation (Nederlof et al. 2011; Swaans et al. 2014). The **third** enabling factors are institutional arrangements that encourage platform facilitators and members to put their newly acquired competencies into practice (Schut et al. 2015). Among the constraints, identified by the literature, are limited understanding by IP members and facilitators of the IS principles, the facilitation of interactive multi-stakeholder processes, or how to address structural power inequalities (Cullen et al. 2014; Adejuwon 2016; Schut et al. 2015). When R&D organizations adhere to the linear Transfer-of-Technology approach, there are limited resources for collaborative approaches (Kristjanson et al. 2009). Actors' motivations might be hampered by ambiguous objectives, absence of monitoring & evaluation, or inappropriate incentive mechanisms and mandates (Nederlof et al. 2011; Schut et al. 2016; 2019). Cullen et al. (2014) and Schut et al. (2019) also note that regime actors may feel threatened by the collaborative IP approach and be reluctant to create a conducive institutional environment.

Keeping these elements in mind, we posed the following research questions:

- To what extent can an embedded IP such as ADPLAC, contribute to AIS capacity building?
- What are the enabling and constraining factors for such an IP in a predominant TOT context?

5.3. Case Selection and Research Design

5.3.1. Case selection

The Ethiopian People's Revolutionary Democracy Front (EPRDF) government that took power in 1991 demonstrated a high commitment to agricultural development, food security, and a political support base among farmers (Berhanu and Poulton 2014). As a result, most of the key actors for agricultural innovation, such as research, education and extension facilities, farmer cooperatives

and unions, traders, input- and service suppliers are present. The Ethiopian Science, Technology and Innovation (STI) policy is predominantly TOT centered (FDRE 2012). However, the agricultural policy of the country ‘Agricultural Development-Led Industrialization’ (ADLI), implicitly recognizes the need for a more dynamic, inclusive IS (Spielman et al. 2010; Woodhill et al. 2011; Berhanu and Poulton 2014). In 2008, the government established the Agricultural Development Partners Linkage Advisory Councils (ADPLACs) to enhance collaborative agricultural innovation (Ludi et al. 2013; Kebebe et al. 2015). This article explores the contributions of the councils in Tigray regional state in tackling the systemic AIS problems; and the structural conditions influencing its enactment.

5.3.2. Research Design

We opted for a case study method, as it is suitable for research with a descriptive question and/or an explanatory question (Yin 2004). First, secondary sources such as guidelines, minutes of ADPLAC meetings, diagnostic studies and reports from governmental sources and NGOs were studied. Especially, a guideline developed by the Ministry of Agriculture and Natural Resources (MoANR, 2010) was used to explore the history, the design (organizational structure and membership) and intended contributions of the ADPLACs. Secondly, in-depth interviews were performed to generate descriptions and interpretations from people’s point of view (Lewis 2003; Ritchie 2003). In ADPLAC, most of the participants represented a particular organization. So, the interviewees came from different levels of the Tigray Bureau of Agriculture and Rural Development (TBOARD), Tigray Agricultural Research Institute (TARI) and research centers, from NGO projects and farmers.

Purposive and snowball sampling was applied to select representatives participating at different levels of ADPLAC. The Ministry of Agriculture (MOA), specifically the extension department is

responsible for leading and organizing ADPLAC at the national/federal level. Hence, the national Extension director was selected purposively to get an overview of the challenges and opportunities and policy related issues at national level, even though the study focuses in Tigray. At the regional level TBOARD and TARI are responsible for leading and organizing ADPLAC. So, the bureau head and the institute director were selected purposively. Agricultural Growth Program (AGP) is the financer of the ADPLAC meetings, and thus coordinators of the program at different administrative levels (who also participate in organizing the meetings), were selected purposively. The other interviewees were suggested by TBOARD head, TBOARD Extension head, Zone and Woreda Level Agriculture office heads. and TARI Director. The suggestion was made based on their role in organizing the ADPLAC meetings at regional, zonal and woreda levels, and based on experience of participation in the meetings. Farmers were selected by Development Agents (DAs) in the respective Kebeles, based on their experience of participation in the ADPLAC meetings.

While individual interviews were used in most cases, group interviews were also executed when seemed most useful. Interviewees who have something in common and can form a unit together were interviewed together. Examples: representatives who work for the same bureau/institute (with the same or different roles) and have similar roles in organizing the ADPLAC meetings or are part of an innovation platform of another project, and representatives of different projects who are part of an innovation platform of another project. In total 27 people were interviewed, 18 individually and 9 in groups. For details on the profile of interviewees and interview types executed see Appendix 5.1.

In the interviews, we always started by asking the interviewees general questions such as: main mandate of the organization they represent, the services it provides to the public and their opinion on the role of multi-stakeholder approach. Then to explore the understanding and the intended goals, we asked respondents (especially facilitators) about the historical evolution, the purpose and

the problems intended to be tackled by ADPLAC. Building on the secondary information, especially the ADPLACs guideline, and our analytical framework, we also asked the interviewees about the actual organizational structure, membership, and roles of actors. To explore the actual implementation of ADPLAC, questions related to decision making procedures and the process of agenda setting, planning, execution, monitoring and evaluation, and feedback in ADPLAC were asked. To inquire in to the actual contributions of ADPLAC, interviewees were asked about the roles the ADPLAC is playing in (1) creating linkage between the research, extension, farmers and beyond; and improving research and extension services (making them demand based that can tackle grassroot level problems); (2) building the capacity of actors; (3) inducing institutional change (changing old and/or introducing new culture and practices, and policies to tackle regulations related issues); and (4) resource mobilization such as funding for innovation to tackle resource/materials problems. Interviewees who have experience of participation in other platforms such as local groups or networks were asked to compare their experience in ADPLAC with their past or present experiences. The issues for comparison were: purpose/objective, the approach and engagement of farmers, membership, procedure/process and contributions (in achieving its purpose of establishment and, specifically in tackling systemic problems such as actors' capacity, interaction, institution and infrastructural problems). The questions asked to the farmers focused on: activities performed by ADPLAC; the roles played by the farmers in the meetings; the contribution of ADPLAC for setting agendas from farmers' perspective and for solving farmers problems; and the limitations of the councils in solving the problems of farmers. We also sought to assess the limitations of ADPLAC in implementation and the perceived enabling and constraining factors for ADPLACs to achieve their aims.

5.3.3 Analysis Method

Most interviews were recorded and fully transcribed. Interviews and information from secondary data were coded, in line with the theoretical framework that frames the relationships among the

structural elements that determine IS capacity, the related type of systemic problem, and the aims of systemic instrument in tackling the problems (refer to table 5.1); and the potential enabling and constraining factors for IP functioning. The iterative coding and structuring enabled the identification of intended and actual contributions of ADPLAC councils in tackling systemic problems, and the obstacles to function as instruments for systemic change. Finally, causal tree diagrams were drawn to get an overview of the core factors, restraining the councils from functioning (see figure 5.4).

5.4. Findings

In this section, we first present the history, the design and the intended contributions of the ADPLACs. Then we look at the actual practice and explore the contribution of ADPALCs in tackling the systemic problems of the AIS.

5.4.1. ADPLAC's intended contribution to systemic capacity building

The efforts to create more linkages and interaction among innovation actors, (mainly research and extension) go back to 1986, when the government launched the Peasant Agriculture Development Program (PADEP). They formed Research Extension Liaison Committees (RELCs) at national and zonal levels. These committees did not function well and were dissolved with the change of government in 1991. However, the concerns about poor linkages resurfaced and in 1999 the new EPRDF government initiated the Research Extension Farmers Advisory Council (REFAC) at national, regional and zonal levels. These councils struggled with a variety of systemic problems and did not function as hoped for. The weaknesses of both councils, as reported by MoANR (2015), are summarized in Table 5.2.

Table 5.2: Reported weaknesses of RELC and REFAC

Issues identified as weaknesses	Linkage efforts	
	RELC (1986-1991)	REFAC (2000-2008)
Actors' capacity	Lack of steering capacity of the facilitators	
Interaction	Insufficient representation and participation of farmers Ad-hoc and non-institutionalized nature of meetings	Domination of government organizations and their officials with limited representation of farmers Ad-hoc and non-institutionalized nature of meetings
Institutions	Ambiguity or absence of clear working guidelines Absence of monitoring and evaluation mechanisms Lack of incentive mechanisms Lack of positive perceptions among stakeholders; and lack of real accountability	Ambiguity or absence of clear working guidelines Lack of sustained follow-up (monitoring) of linkage related activities
Infrastructure	Serious lack of funding and human resources	Serious shortage of funding

Source: MoANR (2015)

Conscious of these failings, the Federal/National Ministry (MoANR) launched a new multi-stakeholder platform in 2008, named Agriculture and Development Partners Linkage Advisory Council (ADPLAC). The council was established *'to create a situation where all stakeholders make their contributions to the success of agricultural development in an integrated and harmonized way'* (MoANR 2010, 66). The specific objectives mentioned were: to create a conducive environment for collaboration among agricultural development actors and build their capacity to ensure demand-led technology generation; integration and alignment of activities; efficient resource utilization; and participatory monitoring and evaluation (*ibid*, 67).

Figure 5.1: Organisational structure of ADPLACs in design

As shown in figure 5.1, the ADPLAC councils were supposed to have a hierarchical structure, from national, regional, zonal, Woreda down to Kebele level. The State Agriculture Deputy Minister, regional bureau of agriculture heads, zonal administrator/agriculture office heads, Woreda office of agriculture & rural development heads, and Kebele administrators presumed to chair the meetings. While research institutions were supposed to co-chair; extension offices were expected to act as the secretary. Higher level councils were expected to provide capacity building activities for the lower level councils and evaluate their performances. Agendas and feedback reports were supposed to come from the local level.

Council membership and representation varied between levels. The aim was to achieve participation of all relevant actors at each administrative level, including government organizations, NGOs, private companies, civil organizations and farmers' representatives. The

federal/national, regional and zonal level councils were supposed to meet twice a year; and the Woreda and Kebele levels every 3 months. Government would allocate funding for council meetings at all levels. If this was insufficient, the council was supposed to search for extra funds from projects and other sources.

5.4.2 The actual contribution of ADPLAC to systemic capacity building

Actors' capacities

Figure 5.2: Organisational structure of ADPLACs in practice

As shown in figure 5.2, the councils were established at the four higher levels, but not at Kebele level, due to limited funding. The core members were from Governmental Organisations (hereafter called GOs) which include: TBOARD, TARI, research centres, administration bodies, higher learning institutions, and Agricultural Training and Vocational Education and Training (ATVET)

colleges. Nonetheless, representatives of NGOs such as donor-based projects, Civil Organizations (COs) such as multipurpose cooperatives and unions, women/youth/farmers' associations, Private Sectors (PS), and Farmers (F) were also invited (see figure 5.3).

Bureaus/offices of agriculture and rural development took responsibility for the coordination and facilitation, while research institutes co-chaired meetings. People appointed as focal persons of the AGP in the bureau/offices of agriculture at various administrative levels were assigned to support the organization of the meetings and monitor progress.

Many respondents of various organizations agreed that the councils did stimulate the participation of actors, directly or indirectly involved in agricultural development (see Figure 5.3). GO interviewees mentioned that capacity building mainly happened through the joint identification of main bottlenecks in agricultural production and marketing. The articulation and prioritization of problems enabled them to develop common visions on what to achieve, and how to align their activities with the government's growth and transformation plan. A few respondents noted an improved efficiency in the use of resources (e.g. fertilizer, improved seeds and other technologies). A national level officer remarked:

'ADPLAC creates collaborative efforts. It brings together the resources and time of different stakeholders. This avoids duplication of efforts and leads to more efficient utilization of available resources.'

Other respondents had the feeling that the councils themselves did not build capacities, but rather identified gaps in knowledge and competences of the different actors and advised them how to acquire the necessary expertise. One interviewee noted:

'ADPLAC might not have made a direct contribution in building the capacity of actors, but it identified capacity gaps at the grass roots level and then linked them with actors responsible for capacity building activities; such as ATVETS, universities, and others.'

Figure 5.3. Schematic representation of members of councils: (Circle size indicates the representation and participation of actors)

Respondents reported various limitations and obstacles for the councils to achieve their goals. The main limitation was the dominance of government in the composition and focus of the council, and a relative absence of private actors and NGOs. Furthermore, some key government actors, expertise, and resources lacked at some levels. A government officer remarked:

'In our hierarchic organizational culture, it is essential to work and collaborate according to your mandate and position. It is therefore sometimes difficult to engage a government organization from another level'.

This means that at times a critical capacity was missing to solve an identified innovation problem at a certain level. Lack of clear development perspectives and capacities in ADPLAC were other obstacles reported.

Limited farmer representation and participation was the other reported limitation of the ADPLAC. This was a persistent problem that predecessors such as RELC and REFAC also struggled with (see Table 5.2). Many government officers claimed that the farmer representation had improved, especially at Woreda levels, but did not capture diversity at local level. Ordinary farmers were not invited. Farmers who participated had positions as Kebele administrators or union or cooperative leaders, or at least ‘model farmers’, farmers who are assumed to mobilize and guide other farmers. One of the AGP coordinator, in one of the Woredas explained:

‘The types of farmers who participated in the meetings were model farmers.....those who use new technologies and increase their productivity. We aim to create farmers similar to them.’

Consequently, ADPLAC did not tap into the diversity of farmer capacities at the local level.

The last limitation mentioned was the absence of ADPLAC capacity building activities. Although lower level councils were supposed to be trained by the upper level councils (see section 5.4.1 and Figure 5.1), all interviewees confirmed that there was no training of any kind (see figure 5.2). An appointed meeting organizer-cum-facilitator noted:

‘‘We haven’t received any type of training about ADPLAC, regarding how it should function and be managed or facilitated. We just read the guide line by ourselves.’

Training was said to be lacking because policy documents did not include concrete plans on how to organize the capacity building. Furthermore, some respondents noted that most council members did not know the innovation principles behind ADPLAC, which limited their attention and learning.

Interactions

In the opinion of the respondents, the councils did stimulate interaction between GOs, NGOs, Coops, private companies and farmers. The regional and Woreda level councils met twice a year. In the first meeting, actors identified and prioritized the major bottlenecks for agricultural production and marketing, discussed solutions, and allocated responsibilities for people to act. Actors accepted responsibilities that were in line with their mandates. In the second meeting, actors reported whether and how they executed the assigned tasks, so that council members could evaluate, comment or raise questions.

In the mind of most respondents, the function of ADPLAC was sharing information on how to align each one's activities with the agricultural growth and transformation plan. Apart from this, the interviewees from the agricultural researcher centers/institute appreciated the opportunity to present their research proposals in the planning meeting, and subsequently share results at the evaluation meeting. Some respondents from the Office of Agriculture and Rural Development noted some instances in which the council enabled them to identify a useful market link. In one example a connection was created between malt barley farmers and the Raya Beer Factory. In sum, the councils stimulated some knowledge sharing and coordinated development actions.

Despite the highlighted contributions, respondents also mentioned many limitations and obstacles of ADPLAC functioning. Interactions were not perceived to be very intense. Most councils met biannually, while the Woreda level was supposed to meet every three months. Zonal meetings were sometimes cancelled.

Furthermore, councils could have been used as a forum to discuss collaboration and required conducive policies, but as an AGP focal person noted:

‘Policy issues related to interactive innovation processes were hardly discussed.’

Many respondents agreed that interactions were limited to planning and outcome reporting of input services such as improved seeds/varieties, fertilizers and pesticides, but lacked initiatives for coordinated action and monitoring, as the following quote illustrates.

Although actors agreed to take their assignments and promised to play their role in solving a particular problem during the meeting, there was no ongoing follow up and feedback. In many cases the stakeholders may have gone to the next evaluation or planning forum, without any interactions in the meantime.

Interviewees reproached the MoANR top, as they did not provide additional funding required for intensive collaboration. Another woreda level AGP coordinator described the following situation:

Councils only function in the AGP project areas, and yet few meetings are organized because of a lack of budget. For example, in 2015 there was no budget from AGP, as the program was in a transition time to the next phase. That year, we only had one meeting.

Council meetings occurred less frequently than intended but were also not very inclusive. Government officers outnumbered other participating actors, steered and tended to dominate the discussions. DAs, for example, felt that researchers and administrators were dominant. In such an environment, there was little discussion and particularly farmers felt uncomfortable in expressing themselves. Participating farmers noted they:

“just attended” or felt they only had the responsibility “to put certain Kebele level problems on the

agenda”.

Reasons for the unbalanced discussions were several. First, facilitators lacked the expertise to properly steer the meetings. Second, the unbalanced representation discouraged NGOs, private actors and, especially, farmers to really engage. Third, the council agendas were more or less set by national development targets. This limited broader discussions, developing an open inventory of key problems, and thus, the real engagement of many actors. Overall, ADPLAC was not able to tackle the main constraints that RELC and REFAC had run into earlier: weak interactions and linkages.

Institutions

In the perspective of most government officers, the councils enabled actors to get used to interactive problem solving and articulating problems and solutions. A research official remarked: *‘considering the poor cooperation and lack of integration we have; the councils are somehow helping to improve the culture of collaboration.’*

Apart from this, the council meetings brought a new culture in which researchers were expected to present research proposals and get feedback on the research outputs. However, the envisaged bottom-up communication and planning was limited. A few officers of Agriculture and Rural Development offices noted, concerns expressed by Kebele committees were discussed and considered. An AGP focal person explained:

‘Some of the Kebele committee members participated in the council meetings at Woreda level, so the issues for discussion also came from the grass roots.’

ADPLAC introduced a routine of knowledge sharing to identify and prioritize (mostly technical) problems in line with the national development targets; allocate tasks to those actors able to

contribute to the solution and appreciate the activity reports. Yet, this is not exactly what the theory of inclusive innovation envisions. Interviewees noted there was no critical exchange of concerns, nor balanced sharing of perspectives for joint identification of core problems and desirable solutions. Several respondents underscored the predominance of top-down planning and agenda setting. A government officer described the situation thus:

‘depending on the season, there are always agendas prioritized by the governments at each level (national, regional or Woreda); such as soil and water conservation, irrigation, harvesting. Then based on those agendas, there was open discussion in the ADPLACs.’

However, most participants displayed a meek attitude and low engagement for the proposed planning and research agenda. Some researchers complained that:

‘they would have appreciated some critical discussion to improve their research questions and enhance the quality and relevance of their research. It would also create engagement and motivation to collaborate on a trial or new development activity.’

ADPLAC remained primarily a planning instrument. Some actors received some tasks, while the others diligently waited for the upcoming activity reports, rather than truly engaging themselves in collaborative trials, monitoring and execution.

So, what were the causal factors for the limited changes in the practice of planning and development? First, most of the interviewees ascribed the persistence of top-down planning, limited discussion, and shallow engagement routines, to the general lack of knowledge about inclusive innovation. Actors were not aware what active listening and the serious consideration of

all stakeholder knowledge and concerns would imply. Secondly, respondents mentioned the ingrained hierarchical culture. Facilitators, as well as ordinary council members, were accustomed to focus on concerns of higher level authorities, rather than to forward their own. Many respondents agreed they did not take the ADLAC responsibilities seriously, as there were few incentives. Some GO interviewees also noted their boss did not value, acknowledge and reward council- related activities as much as other assigned duties, hence their active engagement did not provide better career opportunities. Furthermore, though originally envisioned, there were no monitoring and evaluation mechanisms put in place to ensure accountability. A high official noted:

'there is no such thing as a responsibility without accountability.....(yet) there is no mechanism in place to make people accountable for their actions, so people are only focused on the tasks that are going to be evaluated by their bosses.'

Thirdly, there was a lack of resources allocated for training and the proper execution of the councils' envisaged tasks. Facilitators were not trained and did not know how to steer communication patterns in a more inclusive direction. And last, but not least, the authority and numeric predominance of government actors in the council, out-crowded and discouraged the participation and interest of other council members.

Infrastructure

Regarding the infrastructure, the councils did contribute to some resource mobilization and a more coordinated and efficient use of human and material resources. Some respondents from the GOs reported that ADPLAC helped to mobilize the resources and expertise of some actors present at the meetings, although this was mostly related to physical resources such as fertilizer, improved seeds and other agricultural technologies. There is no evidence that council leaders actively sought

to mobilize additional financial resources for training and the execution of ADPLAC activities. As mentioned above, respondents attributed the limited investment in innovation infrastructure to the low awareness and interest of various members in the platforms designed to enhance interactive innovation. According to the interviewees, awareness raising to improve the platforms' functioning was not an issue for discussion, nor a concrete agenda point.

Table 5.3. Summary of intended and actual contributions, limitations, and obstacles of ADPLAC in tackling systemic problems

Systemic Problems	Intended contribution	Actual contributions	Limitations	Constraining factors (obstacles)
Actor related	Identify and bring together actors who play roles in promoting agricultural development Building actors' capacity in: facilitation and communication effective service delivery Building strong linkages among GOs, NGOs, Private companies and other stakeholders and create a conducive environment where all make their contributions to agricultural development Enhancing a new culture of working. Examples: Shifting the research agenda towards a farmers' frame of reference to increase the rate of adoption of technologies by farmers	Stimulate and organize the participation of various actors in one forum Create opportunities where stakeholders interact for joint planning and evaluation Help members get used to new practices: Examples: Joint problem identification and prioritization of bottlenecks of agricultural production and marketing,	Disproportional representation of actors (e.g. learning institutions, private companies and an excessive presence of GOs) Limited role in building the capacity of the actors involved Interaction limited to planning and evaluation; no coordinated enactment of development Discussions dominated by GOs Top down agenda setting predominated Limited coordinated/integrated action Limited engagement of actors in research and innovation agenda setting	Hierarchical organizational structure of the councils Absence of people (including the facilitators) who were knowledgeable about interactive innovation processes, and who were able to build the capacity of stakeholders Lack of funding, limiting the intensity of interactions Disproportional representation of actors as a result of the hierarchical organizational structure of the councils Lack of knowledge and experience, and facilitation skill to steer interactive processes Majority of the members were from organizations with a culture of top down planning and accountability Absence of evaluation mechanisms and incentive to initiate this as career move depends on direct assessment by one's boss Lack of knowledge of facilitators and members on interactive innovation processes Limited practical support and emphasis given by the government to supporting linkage /collaborative activities
Infrastructure related	Stimulating integrated/coordinated action, and establishing a participatory monitoring and evaluation system Mobilization of resources	Joint planning and evaluation Researchers sharing their research proposals and outputs with stakeholders Small contribution in mobilizing the available physical and human resources, mainly within the GOs. (e.g. improved seeds, fertilizer, expertise)	No efforts to mobilize financial resources to run council activities and/or secure innovation funds No efforts to mobilize or strengthen or to create access to knowledge infrastructure	Limited knowledge on how interactive innovations work and what they require

5.5. Analysis and Discussion

How the performance of the state facilitated platform was inhibited by systemic problems

Figure 5.4. Causal tree diagram of interwoven systemic problems

The study shows that the contribution of ADPLAC in building the structural capacities is limited due to absence of some enabling factors and presence of several entwined constraints. The first missing enabling factor is proportional representation of all stakeholders. This is essential to enforce the required technical, organizational or institutional changes (van Paassen et al. 2014). The second missing enabling factor is neutral and capable brokers, which is important to bring the relevant actors together, foster learning, coordinated action, monitoring and evaluation (Nederlof et al. 2011; Swaans et al. 2014). The third missing enabling factor is institutional arrangements that encourage platform facilitators and members to put their newly acquired competencies into practice (Schut et al. 2015).

An absence of formal mechanisms, such as monitoring and evaluation, career incentives, and accountability assurance limited the engagement of actors. Although the platforms were

assumed to discuss policy measures needed, these issues were rarely raised in the meetings. Previous studies also report actors' motivations might be hampered by absence of monitoring & evaluation, or inappropriate incentive mechanisms and mandates (Nederlof et al. 2011; Schut et al. 2016; 2019).

The following are the entwined constraints that put the platforms in a vicious circle, which blocked their functioning as a systemic instrument (see figure 5.4).

1. The platforms were structured and chaired along governmental administrative lines, which automatically led to the predominance of GOs in meetings and decision-making.
2. The government actors, facilitators included, had inadequate knowledge on IS and interactive innovation processes. This hampered interactivity at the platforms, and the capacity development of the actors involved. These findings contrast with other research on project-based IP initiatives, where delicate facilitation led to a substantive increase in mutual learning and capacity building (Ayele et al. 2012; Schut et al. 2016; Lamers et al. 2017; Mulema et al. 2017; Sell et al. 2018). Understanding of IS principles and skillful facilitation are crucial for success (Cullen et al. 2014; Schut et al. 2015; Adejuwon 2016). Capacity building of facilitators and IP members is particularly noted as important, when individuals and organizations are not used to collaborating (Nederlof et al. 2011; Mur and Nederlof 2012).
3. The dominance of state actors in meetings discouraged non-state actors such as NGOs, private companies and farmers from participating. Consequently, the platforms did not improve the interactions and relationships or broaden or diversify the innovation networks. Other research has shown that unbalanced representation and engagement of stakeholders tends to constrain the success of IPs (Cullen et al. 2014; Adejuwon 2016; Schut et al. 2016). A diversity of perspectives, ideas and experiences are crucial for an IP's success.

4. The dominant institutional logic of GOs remained linear and hierarchical, and its top-down planning and agenda-setting practices prevailed within ADPLAC. The importance placed in meeting national policy targets remained critical for IP facilitators (Cullen et al. 2014). This explains the limited contribution of the platforms in changing the culture. Other research confirms that it is difficult for IPs to change a predominant top-down planning culture (Sherwood et al. 2012; van Paassen et al. 2014; Schut et al. 2015). According to a recent study in Ethiopia institutional context favoring the status quo is one of the key issues that need to be considered when building and evaluating effective multilevel IPs to achieve inclusive value chain innovations (Lema et al. 2021).

5. A lack of funding earmarked for the IP training and functioning was one of the major obstacles. Other research also reports that within other contexts where the TOT innovation logic predominates, there is usually little funding earmarked for training and execution of collaborative approaches (Kristjanson et al. 2009). Our findings show there were no efforts made by the platform members to influence the usual fund allocation and training programs of the government. As they had little knowledge as to what collaborative problem solving was about, they did not actively tackle the infrastructural problems.

Generally, we can conclude that the platforms' functioning was constrained by the very systemic problems they were supposed to tackle. This is known as a lock-in situation (Patana et al. 2013; Kieft et al. 2015). Systemic lock-in takes place when interdependent systemic problems sustain each other through one or more closed feedback cycles (Wesseling and Vooren 2017). This means, the framework of Wiczorek and Hekkert (2012) was useful to study the functioning and structural properties of the government facilitated innovation platform ADPLAC, but this study also shows the limitation. The identification of specific

functional and systemic problems in a locality is of limited value as it is almost impossible to tackle the identified problems at this level. As Turner et al. (2016) noted, innovation systems have path-dependencies that reflect a certain institutional logic, which is historically and socially constructed and continuously recreated. It is difficult to achieve a radical change in such a logic. To identify measures to overcome this lock-in, the deeper pattern of feedback mechanisms between systematic problems needs to be detected in order that the root cause(s) can be tackled at regime level. In our case, the root causes seem to be the top-down/hierarchical planning culture, combined with the limited knowledge of IS principles. This combination inhibited government officers from demanding and allocating training and funding so that the inclusive platforms could properly function. If they were more knowledgeable and open to applying the AIS principles, the involved GOs could have insisted on training and funding to make the IPs work in order to interact more intensely with a wider network of actors and jointly engage in demand-led problem solving.

We seriously doubt whether, as suggested by Smits & Kuhlmann (2004), one systemic instrument, such as an IP, can orchestrate the articulation of new inclusive innovation routines and induce the development of conducive policy measures. Various studies have shown that non-governmental, project-based IPs were not able to change the well-established linear innovation approach (Cullen et al. 2014; van Paassen et al. 2014; Schut et al. 2016; Lamers et al. 2017). Our study demonstrates that this is also the case for a government-facilitated platform at state level. Government actors may have better links with regime actors, to demand conducive policies, but they also share the deep-rooted logic and culture of top-down planning, inhibiting any real change. As highlighted by Turner et al. (2016), overcoming these interlocked blocking mechanisms requires facilitative measures that are backed up with transformative ambitions and actions at higher levels. Policy makers need to support the transformation of the

TOT innovation approach towards farmer inclusive, interactive approach, through providing adequate resources, conducive M&E systems, career incentives, etc.

In a context where the state plays a key and dominant role, it is questionable whether governments are willing and able to support a more farmer inclusive, interactive development approach; as they may feel that this threatens their mandate, oversight and control over the development process. In the case of Ethiopia, the government was deeply committed to agricultural development and created ADPLAC to improve interaction but shied away from devolving discretionary power and resources to local government and other authorities, and also did not establish bottom-up accountability mechanisms. The Ethiopian state and ruling party structure are deeply intertwined, and apart from agricultural growth, they have a deep interest in retaining political control. To ensure their political support base, they require loyalty from government officers and use extension advice and input cooperatives as instruments of patronage (Berhanu and Poulton 2014). The hierarchic culture is such that despite the rhetoric and half-hearted actions for decentralization and participatory development, local officers tend to obey 'orders from above' and give a high priority to meeting national policy targets (Cullen et al. 2014). As a result, top-down government plans dominated the ADPLAC meetings, crowding out market-based and civil society actors who did not have an equal voice or decision-making power (Spielman et al. 2010; Cullen et al. 2014). Though the nature of the central state and local authorities differ amongst Sub-Saharan countries, central governments are broadly resistant to local democratization and the decentralization of powers (Ribot 2003). There is fear of losing political control, becoming dependent on the whimsical preferences and actions of local authorities and not being able to achieve the national development targets (*ibid*).

There is a clear tension between normative theories of inclusive sustainable development, and

how theory-driven interventions work out in practice (Ribot 2003). IPs expose and influence power structures. *Ex-ante* appraisal of historic pathways of political-economic development, may show the contours of what types of intermediation and democratization may be acceptable in a governance context. Awareness and consideration of regime actor concerns is essential when designing systemic instruments for IS transformation.

5.6. Conclusion

The purpose of this article was to explore the role of a state-facilitated multi-stakeholder platform as a systemic instrument to build the capacity for inclusive agricultural IS in Tigray, Ethiopia. Multi-stakeholder IPs are often proposed as systemic instruments to build the structural capacities of the Innovation Systems (IS): skillful actors, broad linkages and interaction, innovation conducive institutions and infrastructure. Non-governmental, project-based IPs often have limited impact, as they are not well-embedded. Our study of a state-initiated IP (which is relatively well embedded) also revealed a limited impact. This is due the absence of some important enabling factors such as proportional representation of all stakeholders, neutral and capable brokers and institutional arrangements conducive for interactive planning such as participatory monitoring & evaluation and incentive mechanisms for government officers to invest in participatory processes. It is also due to the presence of several intertwined obstacles such as the government-led hierarchical structure of the councils, a culture of top-down planning and agenda setting, limited understanding of IS principles and lack of funding of the facilitation of interactive multi-stakeholder processes.

Overall, the systemic problems that the IP was supposed to tackle were interlocked and greatly constrained the functioning of the platform. This shows that one systemic instrument, such as an IP, is not enough to build local innovation capacity and create conducive policy and

institutions. Strategic combinations of IP-facilitating- and complementary systemic instruments are needed to overcome a lock-in and build the capacity for inclusive development.

This paper focuses on structural analysis. To explore the systemic problems in a better depth, future studies can use a coupled functional–structural analysis. This will pave the way to comprehensive evaluation of performance of an IS; and help facilitate the design of a systemic instrument that can address the problems in an integrated manner.

Appendix 5.1: Profile of interviewees and interview types

Interviewees interviewed in groups	Reason for interviewing in group	Interviewees interviewed individually
TBOARD, Extension Head Extension expert at regional level Regional level AGP focal person in TBOARD TARI Director and researcher TARI Socioeconomic Director manager and researcher A researcher from TARI CIP project coordinator and researcher in TARI	All of them work for the same bureau, but with different roles; and they have similar roles in organizing the ADPLAC meetings Both work for the same institute and have similar roles in organizing the ADPLAC meetings Both are part of an innovation platform of AR project. They were interviewed about AR's IP and ADPLAC at the same time.	Federal/national Extension Director TBOARD head Southern zonal AGP focal person Endamekoni Woreda Extension Office Head Endamokeoni Woreda level AGP focal person Ofla woreda Extension office vise head Ofla woreda AGP coordinator Alamata woreda AGP coordinator DAs in Endamekoni, Ofla and Alamata Woredas Alamata Research center manager and researcher Farmers participating in ADPLAC
AR project coordinator GRAD project coordinator	Both are part of an innovation platform of AR project. They were interviewed about AR's IP and ADPLAC at the same time.	

Acronyms: TBOARD= Tigray Bureau of Agriculture and Rural Development; TARI=Tigray Agricultural Research Institute; AGP= Agricultural Growth Programme; DAs= Development Agents; GRAD= Graduation with Resilience to Achieve Sustainable Development; CIP=International Potato Centre; AR=Africa Rising.

Chapter 6

General discussion and conclusions

6.1. Introduction

It is increasingly recognised that it is not useful to promote a certain, normative, form of innovation intermediation, but to find out which intermediation approach is most appropriate to any given context and best able to build capacity within the dominant agricultural innovation system for encouraging more demand-driven and/or farmer-inclusive development (Brinkerhoff & Brinkerhoff 2015; Schut et al 2019). This thesis has explored the performance and institutionalisation of various types of intermediation approaches initiated by different types of actors (NGO projects and the government) in the agricultural sector, in the southern zone of Tigray regional state, Ethiopia. It aims to provide answers to the following four overarching research questions, derived from the specific objectives presented in the introduction chapter (section 1.1.).

1. How have the research and extension system and related policies and discourses in Ethiopia evolved over time, and how do these developments relate to the evolution of the innovation paradigms in the broader literature?
2. What type(s) of agricultural innovation intermediation approaches perform better in terms of providing the essential innovation functions in a government-led development context, such as exists in Ethiopia?
3. To what extent, and how can, successful intermediation approaches be institutionalized within such a context and to what extent can the anchoring framework provide useful guidance on how to create an experimental fit-with-context and a conducive institutional environment for scaling?
4. To what extent, and under what conditions, can state-initiated innovation platforms IPs be effective in tackling the systemic problems of the top-down agricultural research and

extension regime and realise a transformation of the system towards interactive innovation?

Three cases with different ties to the government are studied in this thesis. The cases are: Africa Research in Sustainable Intensification for the Next Generation (Africa-RISING-Ethiopian Highland), a project which was independent of the government; Capacity Building for Scaling up of Evidence-based Best Practices in Agricultural Production (CASCAPE), a project that was highly integrated with governmental organisations; and Agriculture Development Partners Linkage Advisory Councils (ADPLAC), a platform, which is part and parcel of the government system, which tried to implement a more interactive approach. In this concluding chapter, I bring together the findings from the different chapters of the thesis and discuss the cross-cutting issues and the overall theoretical and policy implications. Section 6.2 provides a brief summary of the main findings that answer the research questions presented above. In section 6.3, I distil the cross-cutting issues and link them to broader debates, reflecting on the literature on agricultural innovation systems, approaches to innovation intermediation and institutional embedding and scaling. Subsequently, in sections 6.4 and 6.5, I reflect on the theoretical and practical policy implications of this study, respectively. Section 6.6. discusses recent political changes and their implication for the agricultural innovation system. Issues for further research and concluding remarks are indicated in sections 6.7 and 6.8, respectively.

6.2. The main findings of the thesis

6.2.1. The evolution of thinking and practice of the national agricultural innovation system in Ethiopia

To analyse the link between the developments in discourse and practice and the evolution of innovation paradigms in the broader literature, I conducted a historical review of the Ethiopian

extension system (chapter 2). I traced three successive agricultural extension regimes in Ethiopia that covered the past eight decades and investigated the linkages with the paradigm shifts in the broader literature: from the Transfer of Technology (TOT) to Participatory Technology Development (PTD) and then to Agricultural Innovation Systems (AIS). I identified the major features that characterize these innovation paradigms (chapter 2) to enable me to analyse the historical periods and show the linkages with the paradigm shifts in the literature. For more details on these features see chapter two.

Over the past eight decades Ethiopia has gone through radical ideological shifts, from feudalism to Marxism to a more liberalised market system. In these three eras, several aspects of PTD and AIS paradigms were practiced, even before the AIS paradigm was developed in the literature. For instance: public agricultural innovation support services' focus on institutional and market issues predated the AIS paradigm in the literature. Similarly, non-state actors, with different approaches to innovation, played roles in all the three periods. However, the TOT paradigm on research, extension and innovation has remained dominant and hegemonic across the three periods. This continued predominance across the three periods, despite their ideological differences can be explained by political history. The parties that have ruled the country for the last five decades have a strong socialist ideology, which espouses a concern for the needs of the poor but also has a tendency for centralising power and seeking political hegemony. Thus, the successive regimes prioritised command-based top-down principles in order to retain political control. In chapter two, I conclude that despite the uptake of insights from the broader innovation literature by successive regimes, innovation practice was predominantly shaped by political power dynamics.

6.2.2. The performance of innovation intermediation approaches, the importance of implementing intermediation functions in-context

Having explained the dominance of the linear TOT model in the government agricultural research and extension system (chapter 2), the thesis research focused on the performance of various project-based innovation intermediation approaches in Ethiopia in chapter 3.

This chapter presents a comparison of two donor-funded agricultural innovation projects in Ethiopia, Tigray regional state: the Africa Research in Sustainable Intensification for the Next Generation (Africa-RISING-Ethiopian Highland-AR) project and the Capacity Building for Scaling up of Evidence-based Best Practices in Agricultural Production (CASCAPE) project. I first characterise and assess the intermediation approaches followed by the two projects and then compare the performance of these intermediation approaches in terms of how they provided the space for interactive innovation processes and effectively fulfilled a number of innovation intermediation functions: context analysis, demand articulation and planning; network building; innovation process management (IPM), and; innovation scaling.

The findings revealed that AR adopted innovation intermediation as its core activity, using an orchestrated IP as a brokerage mechanism. In contrast, CASCAPE used innovation intermediation as a side activity, adopting a more *ad-hoc* type of brokerage. This study shows that the modality of a core activity, combined with an orchestrated IP mechanism, was more effective in fulfilling innovation intermediation functions than a side activity combined with *ad hoc* brokerage. Taking intermediation as a core activity, AR is in a relatively independent position, having more freedom to act as innovation catalysts. In the literature, independence of brokers has been described in various ways, such as: neutrality and legitimacy (see chapter 3). I prefer to use the word independence, because this study has shown there is no absolute neutrality in intermediation, rather there is relative independence. This is also one of the

strengths of taking intermediation as a core activity, which some literature has referred to it as preventing neutrality tensions. This study also shows the IP intermediation mechanism enhances such strong sides of taking up intermediation as a core activity. In addition, the IP intermediation mechanism creates space to learn by doing/interacting and contributes to building the interactive innovation capacity of actors by exposing them to different ways of doing things. Overall, the AR's approach allowed more space for interactive innovation processes and was more effective in terms of implementing the required innovation intermediation functions. The CASCAPE project, by contrast, adopted intermediation as a side activity and used problem-based, *ad hoc* intermediation mechanisms, which limited its capacity to act as an innovation catalyst in the innovation process or to successfully perform the required intermediation functions. With limited activities in terms of creating new connections with a wide range of stakeholders, the project mainly focused on knowledge brokerage and related capacity building activities (such as improving the agronomic practices of farmers). As a result, the contribution of the CASCAPE brokerage mechanism to enhancing knowledge and facilitation skills for interactive innovation processes was limited.

The results of this study also show that success (the effective implementation of the intermediation functions) cannot be merely attributed to the intermediation approach. The capacity and position of the leading brokers (in terms of their attachment/detachment with the government or donors, which affect its relative independence) also contributes to successful intermediation. The AR project was situated outside the government, as it was donor-financed and recruited its own staff with good facilitation knowledge and skills to lead the intermediation process. CASCAPE was also a donor-financed project but was implemented by government organisations. Launched at the government's request and hosted and implemented by public organisations, the project was closely integrated within the government structure. Staff members did not receive thorough training in facilitation, hence the capacity, time and space to

act as a catalyst in the innovation process, enhance interaction and to fulfil the intermediation functions, was limited.

6.2.3. Institutionalisation of project-based innovation intermediation approaches

After setting the scene in terms of the dominant innovation paradigm in Ethiopia in chapter 2 and assessing the effectiveness of two project-based intermediation approaches in this context, chapter 3 focused on different ways of creating systemic change (in this case a transformation of the national AIS), either by anchoring a niche project for up- and out-scaling (chapter 4), or by using a government-driven innovation platform as a systemic tool to transform the regime (chapter 5). The overarching aim was to better understand what is needed to attain wider and long-term impact (transformation) of the Ethiopian agricultural innovation regime.

Anchoring project-based innovation intermediation approaches

Chapter four focused on the possibility for outsiders to drive change through an innovation project (a niche). From the comparison between the AR and CASCAPE project in chapter 3, AR emerged as more promising in this respect at the local level: AR attained high levels of interaction between actors and effectively implemented the different innovation intermediation functions. The success of AR at the local level inspired me to take this project as a case (niche) study to study its potential for creating sustainable change in the dominant innovation system of Ethiopia. I used the multiple level perspective (MLP) on transition processes within socio-technical systems (Geels, 2005; Geels and Schot, 2007) and the concept of anchoring (Elzen et al. 2012), which both elaborate niche-regime dynamics. A regime refers to a community of interactive groups with a recognized combination of stable rules that coordinate actions, whereas a niche refers to a micro-level system from which radical changes can emerge. In a niche, new, yet unstable, rules are developed by a small network of dedicated actors in protected

places (Geels, 2005). Anchoring involves creating links between niches and regimes. Here, anchoring activities and strategies employed by niche actors to penetrate and influence the socio- technical regime, through the translation of a niche practice into a component of the regime play an important role (Elzen et al. 2012). Following these authors, anchoring was conceptualized as a pre-phase for scaling.

I developed an anchoring framework from the strategic niche management and innovation literature, which identified essential transversal, network, methodological, and institutional anchoring activities for out- and up-scaling. This framework was used to assess the anchoring activities of AR, and the potential for the up/out scaling of their farmer research group cum innovation platform (FRG-IP) experiment.

I identified three critical anchoring levels: potential users/beneficiaries; potential actors for niche implementation and the out-scaling of the ‘novel’ methodology; and key authorities in the incumbent regime with the capacity to create conducive institutional environments (up-scaling).

The study showed that although the AR project undertook several anchoring activities (network, methodological and institutional) at different levels in Tigray and beyond, several anchoring activities, crucial for the creation of a conducive institutional environment and to enable scaling, were overlooked. For example, higher level networking and institutional anchoring was limited, which inhibited the prospects for scaling. From this study, I conclude that there was no comprehensive or cross-level anchoring process. The missing anchoring activities created entwined negative dynamics, which limited the potential for the scaling of the FRG-IP. A flexible, multipronged approach, continuously scanning the progress made (the strengths,

weaknesses and anchoring tasks yet unfulfilled) would have helped to develop an interactive innovation methodology that fit the context and had potential for up and out scaling

This anchoring framework enabled me to identify the relevant anchoring activities of the AR project that were both undertaken and omitted, and to assess how they interrelated and affected the scaling process. The framework provided insights into the requirements for aligning the experiment with its context, thereby creating a socially acceptable innovation, as well as a more conducive institutional environment, which together would have ensured scaling. The study also showed that anchoring and scaling became a challenge as the regime (a top-down TOT) and the niche (FRG-IP) had quite divergent features. Projects should give serious consideration to the type of methodology they employ if they wish to ‘go to scale’ and ensure sustainable innovation.

State-driven innovation platforms (IPs) as an instrument for transforming the incumbent regime

Having analysed the potential of outsider-driven innovation projects to create systemic change in an innovation regime, my research then focused on the potential of an internal state-driven innovation effort to create the desired systemic change. Chapter 5 assessed the effort of the Ethiopian government to enhance demand-driven coordinated development in agriculture through multilevel multi-stakeholder platforms, called the Agriculture Development Partners Linkage Advisory Councils (ADPLACs). In this chapter, I aimed to better understand the process of system transformation through change from within, raising the question of whether a state initiated and facilitated platform could serve as systemic instrument, tackling critical problems within the national agricultural innovation system.

Systemic instruments are tools which focus on a change in the process and direction of a whole innovation system, rather than a part (Smits & Kuhlman, 2004). Innovation platforms (IPs) are viewed as systemic instruments, enhancing multi-stakeholder dialogue, learning and experimentation, in order to establish the critical innovation functions and build the structural capacities within the innovation system. Wieczorek and Hekkert (2012) argued that the performance of an innovation system (IS) depends on its structural elements: actors, interactions, institutions and infrastructure. They distinguished eight systemic problems that can affect IS capacities and highlighted possible ways in which systemic instruments can tackle such systemic problems (related with each structural element). I drew on the theoretical framework of Wieczorek & Hekkert (2012) applying it to Ethiopia's agricultural sector. Other literature (such as Schut et al 2016), helped me to identify the enabling and constraining factors that influence an IP's capacity to strengthen the IS. This framework enabled me to analyse the potential of a state-facilitated platform to bring structural change in the dominantly top-down AIS, by enforcing change from within, and to investigate the influencing factors.

The findings of this study showed that the state facilitated platforms at different administrative levels helped to: stimulate the participation of various actors (directly or indirectly involved in agricultural development); overcome an absence of interaction and create opportunities for joint planning and evaluation; stimulate some knowledge sharing and coordinated development actions, and; made some contribution in mobilising available physical human and resources. However, its contribution to tackling the systemic problems and building structural capacities was limited. This was due the absence of some important enabling factors such as the proportional representation of all stakeholders and the absence of neutral and capable brokers and of institutional arrangements conducive for interactive planning (such as participatory monitoring & evaluation and incentive mechanisms for government officers to invest their efforts in participatory processes). It was also due to the presence of several intertwined

obstacles, which included the government-led hierarchical structure of the councils, a culture of top-down planning and agenda setting, limited understanding of the principles of IS and a lack of funding to facilitate interactive multi-stakeholder processes. Overall, the systemic problems that the IP was supposed to tackle were interlocked and greatly constrained the functioning of the platform.

From this study, I concluded that the systemic problems that the IP was supposed to tackle were interlocked and inhibited the functioning of the platform, and its potential to drive a multidimensional process of interactions that could create lasting changes. This shows that one systemic instrument, such as an IP, is not sufficient to build local innovation capacity and induce subsequent changes in policy and institutions' *modus operandi*. Strategic combinations of IP facilitating, and complementary systemic instruments are needed to overcome a lock-in and build capacity for inclusive development.

6.3 Discussion of the cross-cutting issues and conclusions

6.3.1 Introduction

The overall aim of my thesis is to understand and explain how and why different options for enhancing interactions within agricultural innovation could work within the Ethiopian context. The institutional embedding of a successful niche experiment in a specific context is also emphasised in this thesis. This thesis adds to the debate on the types of interaction that best fit the context and encourage more innovation and a scaling of the innovation mechanism.

This thesis started by providing an overview of the background which is dominantly linear, and TOT based. The study then presented three different ways of innovation intermediation that had been experimented with in this context. The first case was AR, a project which was independent

of the government. It took innovation intermediation as its key activity, initiated and facilitated FRGs-IPs and pulled-in different governmental and non-governmental sectors in an attempt to do things differently. The CASCAPE project, the second case, was highly integrated with governmental and public organisations. It was launched at the request of the government, hosted by a public organisation (mainly Mekelle University) and implemented by public organisations (mainly, again, Mekelle University, in collaboration with other governmental research and extension organisations). Despite its integration with the government, the project had its own approach. It tried to achieve interactive innovation via more flexible, problem-based, *ad-hoc* ways of bringing actors together (as opposed to having permanent platforms to engage stakeholders). The third case was ADPLAC, a state-initiated and facilitated multi-stakeholder project. It was part and parcel of the governmental system in which the state itself tried to develop a more interactive approach.

The findings of the thesis touch upon several cross-cutting issues that contribute to theoretical debates about the performance of these various innovation intermediation approaches in relation to a) and the embedding processes needed to make them fit the institutional context, and b) the generic literature on AIS. In the remainder of this section I reflect on the major emerging issues.

6.3.2. Changing ideologies and rhetoric, but unchanging practices

Chapter 2 clearly showed there have been continued ideological shifts in Ethiopia. The country has evolved from a feudal system with a landlord-based economy, via a command-led communist military regime, towards a democratic republic with considerable space for market liberalization. In recent years the advisory discourse has changed towards one of pro-participation and decentralization. However, the TOT paradigm has remained dominant and

hegemonic over research, extension and innovation practices. The findings in chapter 5 confirmed the persistence of the TOT culture, despite the changes in ideologies, policies and rhetoric reported in chapter 2. In ADPLAC (the state-facilitated multi-stakeholder platform), the actions for decentralisation and participatory development were only superficially embedded in the policy and guidelines, while in practice, the dominant institutional logic of GOs remained linear and hierarchical and top-down planning and agenda setting practices prevailed. Although front line government actors such as extension and research officers have better links with politicians and policy makers and could demand changes to, say, create conducive policies, they also share the deep-rooted logic and culture of top-down planning, which has inhibited real change.

The findings in chapter 5 show that several entwined constraints combined to create a vicious circle and blocked ADPLAC's functioning as a systemic instrument. The intertwined obstacles such as the government-led hierarchical structure of the councils, a culture of top-down planning and agenda setting, a limited understanding of IS principles and a lack of funding to facilitate interactive multi-stakeholder processes, show the persistency of 'TOT logic'. The continuity of this logic (see chapters 2 and 5) is deeply anchored in the specific historical and institutional conditions of the Ethiopian AIS. The findings can be explained through what various authors describe as path dependencies in which, while changes may occur, they generally do so in an incremental way (Geels, 2005; Hekkert et al 2007; Woolthuis et al 2005). Changes happen, but usually along certain trajectories that are strongly influenced by the already existing rules, social relationships, commitments, sunk investments and the vested interests of existing organisations (Geels, 2005). Previous research on AIS has shown that innovation systems display path-dependencies (Nettle et al., 2013; Minh et al., 2014; Schut et al., 2015) and reflect a certain institutional logic, defined as "the socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules by which individuals

produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality” (Thornton and Ocasio, 1990, 804).

The TOT logic has continued, despite rhetorical changes, and shows the contradiction between policy and practice that I highlighted in the historical chapter, a phenomenon that De Roo (2020) also identified in Ethiopia. The author noted that at the policy level there was increasing attention for the involvement of citizens in local planning and needs-based extension services and explicit mechanisms such as the development groups, model farmers, and farmer training centres were put in place to enable decentralised planning. But the approval of annual plans and budgets and targeting still took place at the regional level. This clearly shows the contradiction that exists between participatory planning and top-down targeting in Ethiopia. The tension between discourse and practice may be attributed to a political and organisational culture with a strongly ingrained belief in the benefits of central control and planning, but it could also be related to the presence of contradictory elements within the regime’s ideology. For instance: the ideology of the EPRDF regime, ‘revolutionary/developmental democracy’ considers both democracy and development as indispensable. Although some economic liberalisation reforms have been introduced, the government, as a developmental state, has continued to assume a strong role in almost all development interventions. The vanguard role of the ruling party has remained intact as the party’s fundamental principles are still anchored in its Marxist-Leninist past. This has given rise to a form of democratic centralism that is characterised by an emphasis on the ruling party’s leading role in socio-economic and political processes which leads to an ongoing blurring of the structures of the ruling party and the state (Berhanu 2012). All this indicates that there is a contradiction between democratisation, and central and top down planning.

The question is, then, whether, and to what extent, the other projects (CASCAPE and AR, which both attempted to apply the AIS paradigm) were able to change practices and disrupt continuities? The findings in chapter 3 show CASCAPE managed to follow participatory principles at the local level, but at a higher level centralized planning still predominated. This may not be necessarily caused by their adherence to the government's ideology, but as a project that is highly integrated with the government, the plans had to align with the government's development goals. By contrast, AR as a project outside the government, working solely at the local level, managed to function more independently and practice a bottom-up approach. However, given both projects are donor-based, it would be hard to see their approaches being taken up by regime actors after their funding ends. So, the potential of changing the innovation practices in a permanent way is very limited.

6.3.3. The performance of niche level intermediation experiments in-context: factors influencing successful intermediation

This study considers the projects (selected as cases for this study) promoting the AIS paradigm, that used different intermediation mechanisms as niches and the national research and extension system, which is predominantly a TOT oriented as a regime. The findings of chapter 3 clearly show that AR performed better than CASCAPE in providing the envisaged interactive innovation and effectively fulfilling innovation intermediation functions.

One of the main factors for AR performing better in implementing the intermediation functions was its relatively independent position, which provided it with more freedom to act as an innovation catalyst. This relative independence was related to its intermediation approach (taking intermediation as a core activity that was combined with the IP intermediation mechanism to build networks among the actors). From the beginning, AR planned to play a

facilitation role and the IP mechanism effectively helped in this. Moreover, the relative detachment from government made it possible to enact a 'pure' AIS logic of bottom-up multi-stakeholder learning and innovation and to stimulate and support more interactive dynamics and mutual learning among actors, including those government officers who appreciated the process and its impact. AR, however, was not free from donor influence. The AR project decision to adopt the AIS approach was influenced by its close links to CGIAR centres, which led it to explicitly try the FRG-IP approach. This confirms findings by other authors, who have noted that brokers and brokering are never neutral or independent and always exercise a certain degree of influence, although the degree of steering should be acceptable for those actors amongst whom the broker is positioned (Klerkx et al. 2009; Laschewski et al., 2002).

Being hosted and facilitated by actors from governmental organisations, CASCAPE was less independent and worked with and around government planning and work procedures, which led it to take intermediation as a side activity and apply *ad-hoc* intermediation mechanisms. This constrained successful innovation intermediation, limiting the manoeuvring space and opportunities to think and act 'out of the box'. The actors had a tendency to adhere to traditional roles and ways of doing things and retained the old mindset instead of thinking and trying to do things differently. This shows the presence of functional ambiguity, one of the weaknesses of taking intermediation as a side activity. The *ad-hoc* intermediation mainly concerned knowledge brokerage and did not venture into other brokerage roles that might disrupt and change governmental planning procedures. In line with this, the findings in chapter 5 also clearly show an absence of independent, full-time all-round brokers, which also inhibited the functioning of the state facilitated platform (ADPLAC).

The results of both chapters 3 and 5 show successful intermediation cannot be merely attributed to the adopted intermediation approach. AR was more successful because it allocated sufficient

finances for interactive innovation processes and assigned capable brokers (facilitators) with better knowledge, facilitation skills and experience, who were able to engage partners and enable them to practice and learn about the new approach. CASCAPE was less successful as its main implementers had limited knowledge about the innovation system perspective and limited facilitation skills. In addition, the project did not put much emphasis on AIS capacity building (chapter 3). For ADPLAC (the state facilitated platform), the absence of capable brokers and appropriate institutional arrangements, a lack of funding to run the activities of the platform and capacity building in collaborative problem-solving approaches, and the lack of the government's commitment to solve these problems were among the factors that inhibited its success (chapter 5).

Overall, the findings of chapters 3 and 5 clearly show that the different intermediation approaches faced similar obstacles that limited the success of their intermediation approaches. Apart from the intermediation modalities adopted, the limiting factors for both ADPLAC and CASCAPE were mainly linked to their embeddedness in the top-down government structure and culture. This indicates that when niche experiments are too embedded in a regime without 'independent', knowledgeable and skillful brokers taking intermediation as a key activity and without sufficient finance for capacity building, this will limit the chances of successful innovation intermediation.

From these findings, it can be diagnosed that most of the issues that limit successful innovation intermediation are basically related to the context (presented in chapter 2). This is in line with others' arguments about the importance of context (Minh et al., 2010; Minh et al., 2014; Schut et al., 2019). However, it is worth asking why one specific intermediation approach performed better than the others within the same TOT dominated context. Looking at the factors that contributed to the relatively successful innovation intermediation in AR (chapter 3), it can be

inferred that it is important to work on the issues that hinder the creation of an interactive space for actors and the implementation of intermediation functions. The AR project created a situation where its approach worked well. It started independently (outside of government structures) but involved regime actors and created a feeling of ownership among them. It also invested in building the capacity of potential local implementing partners and beneficiaries in the niche and beyond and provided its facilitators with appropriate knowledge, skills and experience. This implies that there is a chance that different institutional logics (the AIS logic AND the TOT logic) can co-exist at the local level, provided that the niche actors do not push for higher level policy changes. Overall AR was more independent: there was some distance between the project and the government officers and it was easier to enact a different logic. But its sustainability is still questionable. CASCAPE's work was also based on participatory principles at the local level and sought to explore practices and technologies that would be useful for farmers. At the higher level, however, centralised planning continued to predominate. As a project that was highly integrated with the government, its plans had to align with the government's development goals. This shows that different institutional logics can co-exist, at different levels within the same organisation. Recently, hybridity, the integrated or (electively) decoupled management of diverging institutional logics by an organisation has attracted quite some research interest (Heeks et al 2020; Savarese et al 2020). AR created an organisation with a different institutional logic, alongside the government. Though they enticed government officers to embrace this new logic, this did not lead to the logic being integrated within governmental circles. CASCAPE opted for a hybrid approach: it implemented needs-based interactive innovation logics at the local level, while adhering to the more top-down planning logic at the higher level. However, the hierarchical planning logic of the context, the government system, was too strong to allow the sustainable integration of this needs-driven, interactive innovation logic after the project came to an end.

6.3.4. Contradictions between context and imported models and thinking

As noted earlier, the findings in chapter 3 indicated that the niche level experimentation of the FRG-IP approach by AR was successful in terms of providing the desired interactive innovation and effectively fulfilling various innovation intermediation functions. However, despite the short term positive impact (for instance: changes in the informal institutions of interactive R4D practices at local level), the findings in chapter 4 show the out/ up scaling of the innovation approaches was a challenge. This is due to the difference in the logic and features of the FRG-IP niche and the regime. Similarly, the findings in chapter 5 show that the systemic problems that the ADPLAC was supposed to tackle were interlocked and greatly constrained the functioning of the platform. Due to this, the logic of TOT continued to predominate in ADPLAC, because of the tension between the context, which favoured the *status quo* (the regime) and a platform that intended to challenge the *status quo* by changing the entwined rules and practices of the regime. Overall the findings in chapters 4 and 5 clearly revealed the contradiction between the context (the national extension TOT approach) and the innovation approaches built on imported AIS thinking.

This raises the question of whether we can simply export the IP models of intervention and the way of thinking behind them (the AIS) into a context such as Ethiopia, where the TOT paradigm predominates? Klerkx *et al.* (2017) argue that newly introduced approaches/practices need to be adapted to the context with the actors involved, through creating space for learning and reflection, and building connections with people who are in the position of facilitating institutional change in organisations and innovation systems. I argue that this embedding or anchoring process should be an integral part of the design of an intervention. This may help those involved to make timely decisions about the introduced novel approach/practice. Such a preliminary anchoring analysis may indicate: 1) whether, and how, the introduced novel

approach/practice is appreciated and fits the context, and what type of support will be needed (example: capacity building); 2) whether the policy and institutional context will allow and support the practice, and/ or what institutional embedding activities are needed (for example: having a dialogue with policy makers) to create the required conducive environment and 3) whether the practice does not only not fit, but converges significantly from, and even threatens, the logic of the context, in which case experimentation should not be recommended.

I argue that only innovation practices that fit a context can be sustained and bring broader/sustainable impact. By the same token, something that can't be sustained cannot be claimed to be fit in a context. At the niche level (which is in a protected space) with good financing and capable facilitators (with knowledge on innovation system thinking and practice and skills in facilitating interactive innovation processes), any experiment can work. The problem, as explained earlier, is to scale successful novel approaches and to use them to achieve broader impact and sustainable change. Continuous experimenting with an approach at pilot level, without any intention or plan to scale, even when positive results are found, is a waste of time and resources.

6.4 Theoretical synthesis: The centrality of anchoring

This thesis draws on a range of theoretical concepts. In this section, I will integrate the concepts at a theoretical level. The first concept used is *innovation intermediation approaches*, ways of implementing intermediation functions (activities performed in innovation facilitation processes) which can be done through different models of intermediation (i.e. as a key or side activity) and using different intermediation mechanisms (i.e. via IPs or *ad-hoc* type brokerage). The second concept used is *intermediation mechanisms*, such as IPs, which can be seen as systemic instruments to tackle systemic problems. The third concept used is *anchoring*, which

is a pre-phase of scaling. Anchoring involves the institutional embedding of a successful niche experiment, carried out in a specific context. This leads to the fourth set of theoretical concepts: *niches and regimes*. A regime is a community of interactive groups with a recognized combination of stable rules that coordinate actions, whereas a niche refers to a micro-level system where new, yet unstable, rules are developed by a small network of dedicated actors in protected places (Geels, 2005).

When bringing the analysis and findings from the various chapters together (see Table 6.1) we can see that these concepts are complementary. The Table also shows the central role of the concept of anchoring, which integrates the other three concepts (see Table 6.1 and Figure 6.1).

How are these concepts linked? Firstly, AIS promotes intermediation to create multi-stakeholder innovation (for example: technical innovation). However, enhancing intermediation in an innovation system (actors, and their practices, rules and procedures, that create innovation in a certain system in a particular manner) also requires innovation. In other words, creating interactive multi-stakeholder processes within a system requires innovation of the innovation system itself. According to Wieczorek & Hekkert (2012), the functioning of an innovation system depends on the presence and quality of the structural elements (actors, interactions, institutions and infrastructure). Thus, to innovate across the whole system requires tackling the systemic problems, which can be related with any (or all) of the structural elements. Systemic instruments are tools that enhance the presence and quality of the structural elements and therefore the functioning of the innovation system as a whole. Intermediation mechanisms, such as IPs, can act as a systemic tool, but so can AIS methodological capacity building, policy changes etc. Anchoring activities aim to improve the functioning (of the structural elements of) of an innovation system in a context-sensitive manner. Anchoring theory mainly focuses on network, methodological and institutional anchoring and does generally not pay explicit attention to infrastructure, seeing this element as part of the institutional context. Conducive

infrastructure and institutions are needed, which can be endorsed by policy dialogue and change. If done properly, anchoring allows the intermediation approach, emerging from niche experimentation, to hook into and influence the actors, practices, institutions and infrastructure of a dominant innovation regime in such a way that the innovation or intermediation approach is up- and out-scaled.

Table 6.1: Linkages between theoretical concepts, focused on: intermediation for anchoring a new innovation approach and solving systemic problems in an innovation system

Levels	Innovation intermediation functions utilised in innovation processes	Anchoring activities	Systemic problems tackled by systemic instruments such as IPs
High level regime actors (institutional decision makers)	Network building Innovation up scaling	Identifying key decision-makers and advisors who are respected and open for change, dare to take political risks, are dynamic and communicative and connect (through strategic brokering) with key organisations and authorities of the incumbent regime, key decision-makers and advisors, informing them about the proposed change (e.g. the feasibility and merits of the approach). This can be done via the mass media, invitations to field days and being engaged in the processes of devising policies and institutional rules for regulatory framework, incentives and sanctions.	Lobbying efforts to convince higher level policy makers to take up the approach and to create a conducive environment. Making efforts to create a persuasive vision and providing supportive evidence. Creating events for awareness-raising and dialogue with key actors in the incumbent system, in order to set an agenda, build coalitions and articulate policies and incentive systems (through formal institutions). Providing a persuasive vision/narrative and research reports on the adopted methodology, that highlight the benefits for different actors, and can convince key actors and support them to persuade the required coalition partners.
Potential implementing partners	Network building Innovation process management	Strategic selection of actors who can play a brokerage role with regime level authorities. Inform organizations in and around the area of intervention about the proposed change, via mass media, presentations, invitations to field days and knowledge sharing events. Identify and connect with organizations critical for the implementation. Identify and mobilise key officers for implementation who are open and able to drive implementation and persuade their colleagues to cooperate. Identify and mobilise key officers with good connections for lobbying regime authorities.	Capacity development activities: making people appreciate the new approach and giving them the skills to implement it. Creating opportunities for practicing the new approach. Making efforts to create a constituency to politically support the approach.
User/beneficiaries in niche and beyond	Context analysis and demand articulation Innovation process management Innovation out scaling	Capacity building activities for important actors working at lower levels, such as development agents and farmers. Equipping people with sufficient insights and confident to implement the approach	In formal institutional problems: culture, routines and established practices. Actors' capacity gaps.

Keys: network anchoring (light blue), methodological anchoring (brown), institutional anchoring (ochre)

To experiment with, and anchor, a more interactive intermediation and innovation approach in an innovation regime, different types of intermediation functions and anchoring can be employed at different levels, as demonstrated in Table 6.1 and Figure 6.1. At the local level a certain intermediation mechanism is proposed and tried with the stakeholders in the field and potential implementers. The intermediation activities at this level focus on capacity building (learning by doing) and help actors learn how to apply the approach. Anchoring at this level focuses on methodological and institutional aspects and a bit of networking. The systemic problems which need to be resolved here may include: informal institutional problems (changing established routines and culture by creating opportunities for actors to practice the new approach) and capacity gaps. At the higher regime level of institutional decision makers, intermediation more involves networking, dialogue and negotiation with the regime actors, while, anchoring is more focused on networking and institutional aspects and less on methodological ones. Here, the systemic problems to be tackled might include formal institutional-infrastructure problems, such as incentives, finance for meeting infrastructure requirements and career development policies. As with the intermediation functions, some specific types of anchoring activities are more important than the others and the sequence in which the systemic problems need tackling might be different.

The analysis so far shows the close relationship between anchoring and intermediation. On the one hand there is a need to anchor intermediation mechanisms, on the other hand, intermediation is needed to support the anchoring of intermediation mechanisms (see Figure 6. 1). This implies that the embedding processes that take place via integrated intermediation and anchoring activities, performed at different regime levels, and the efforts to change the institutional rules within the regime, to create a conducive situation for scaling are very important. Without coordinated efforts at different levels, it may be possible to have a well-functioning intermediation mechanism at the local level, which will seldom ‘go to scale’. This in turn indicates the need to have intermediation mechanisms at different levels, to ensure anchoring across levels and to facilitate scaling.

Figure 6.1: Intermediation and anchoring activities at niche/region levels required to tackle systemic problems

The main question posed at the beginning of this research was: How to embed ‘novel’ intermediation approaches (at the niche level) within a context and to create sustainable change in the dominant innovation system (the regime). I have analysed how different innovation approaches or mediation mechanisms do, or do not, go to scale. The main conclusion of this thesis is the importance of paying attention to anchoring and embedding activities as part of the design of intermediation approaches in order to facilitate scaling up/out, attaining broader impact and sustainable change. Out scaling here refers to the large-scale duplication and adaptation of innovations so as to benefit more people and larger geographic areas (Aw-Hassan, 2008; Nederlof et al., 2011; Westley et al., 2014; Wigboldus et al., 2016). Up-scaling refers to the institutional change required to provide a conducive environment for the innovation and its duplication, i.e. a change of discourse and work procedures, policies and incentive structures (resources for implementation, remuneration, career paths) (Nederlof et al., 2011; Westley et al., 2014). This analysis indicates that an anchoring analysis helps to address sustainability issues. Overall, I argue that anchoring is a useful way of facilitating up and out scaling.

6.5. Reflections on the policy and practical implications of this study

Adequate understanding of the context of an AIS is central for appraising the performance and structural embedding of innovation intermediation approaches (Schut et al 2019). In a context where an authoritarian one-party governance system predominates, a mechanism that harmonizes participatory aspirations with the demands and structures of a traditionally supply-driven extension system, is critically important for embedding demand-driven approaches (Minh et al. 2014). It has also been suggested that assessing an existing system's root problems and capacities and then gradually and systematically introducing institutional innovations may be a more effective way of embedding more participatory extension approaches than aiming to complete overhaul a system, which may result in the creation of a 'parallel universe' (Minh et al.2010). This study suggests that an anchoring approach, looking for a mechanism appreciated and fits the context, introduced through experimentation and in dialogue with key regime actors so as to systematically tackle existing systemic problems, may help to find the most appropriate mediation mechanism within an authoritarian one-party context.

There are obvious reasons for the domination of the Ethiopian state in service delivery: the government is greatly influenced by ideological legacies, the private sector is profit oriented, and the majority of farmers cannot afford to pay for extension and advisory services. In such circumstances, the characteristics of the state (e.g. its top down approach) are also likely to be reflected in the research and extension system. In line with the anchoring perspective, Minh et al (2014) call for a "strategy of harmonization" in an authoritarian context, in order to embed an innovation approach based on the AIS logic. According to these authors, the first steps in the process of harmonization are the identification of strategic actors who are in a good position to take responsibility for aligning the different institutional logics and to provide support to these actors. From the government's side, the extension wing can take the lead here. Playing these types

of roles requires different knowledge, skills and attitudes on the part of extension professionals and agents at different levels. This, in turn, requires investment in capacity building and institutional changes at the policy level (e.g. changes in incentive mechanisms and evaluation criteria) which are needed to create a conducive environment for the extension service to change its *modus operandi*. Further systematic assessment of the existing institutional structure and the broader functioning of the AIS within the country are required to generate more specific recommendations, which could be an area for future study. *Ex-ante* appraisal of historic pathways of economic and political development may help delineate the types of intermediation that will be acceptable (Schut et al 2018).

According to Adejuwon, (2016), the lack of linkages among actors within AIS inhibits the development and diffusion of appropriate innovations in Sub-Saharan African (SSA). As such linkages are rarely self-organised, intermediation is essential (Leeuwis, 2004). However, as the characteristics of innovation systems differ between countries, the modalities and mechanisms of intermediation need to be tailored to the specific contexts. This thesis shows how a project, which takes intermediation as a key activity, using IPs as intermediation mechanisms, and with better financing and capable facilitators, may perform well at niche level, even within a strongly hierarchal and top down culture. However, the regime's hierarchical system proved too immutable for this successful niche to be scaled out/up. To create broader and sustainable impact, more explicit attention needs to be paid to anchoring. A flexible, multi-pronged anchoring approach and continuous scanning of the progress made in context, would enable more R4D projects and their associated innovation methodologies to 'go to scale' (Seifu et al. 2020).

The anchoring framework (which shows the anchoring activities that are performed and omitted) also helps to identify how a somewhat isolated effort of the state to enact an interactive innovation approach was constrained by the interlocked nature of systemic problems within Ethiopia, where

the linear innovation approach and hierarchal and top down culture dominate. This was helpful in identifying the missing anchoring activities which created a backlash, due to the interlocked nature of the systemic problems. Systemic instruments, tools, which tackle systemic problems and focus on changing the process and redirecting the whole innovation system, rather than parts of it, are crucial for sustainable change (Smits & Kuhlman, 2004). IPs have been proposed as an important systemic instrument for improving the functioning, and building the structural capacities, of the innovation system (ibid). However, this thesis shows that one systemic instrument by itself is not sufficient: combinations of mediation mechanisms such as IPs and other types of instruments such as policy change, incentive structures, etc. are needed to overcome the lock-in and build a more interactive innovation capacity and policy instruments (that go beyond actively stimulating and supporting interactive innovation) are needed to reinvigorate the innovation structure, a transition that scholars have called ‘structural system innovation’ (Howells and Edler, 2011; Turner et al. 2016).

6.6. Recent political changes and their implications for agricultural innovation system

The field work of this study was undertaken before the ‘reforms’ within the EPRDF in 2018 and more importantly before the war in Tigray, the region where the study was conducted, started. The historical chapter of this thesis does not cover changes since the ‘reform’. However, these developments cannot be overlooked, as they have implications for embedding the main theme of the thesis. So, in this section I reflect on the recent political economic changes and these (might) affect the Ethiopian AIS.

Ethiopia was swept by anti-government protests from 2016 to 2018, mainly sparked by anger over the expansion of the boundaries of the capital, Addis Ababa, into territory that is part of the Oromia Region. The protests and growing inter-ethnic tensions pushed the EPRDF to make internal party reforms, which led to Hailemariam Desalegn’s resignation as Prime Minister and Chairperson of

the Party (Breuning and Ishiyama, 2021). He was replaced by Abiy Ahmed Ali who was appointed as the new Chairperson of the EPRDF and Prime Minister in April 2018. Once in power, Abiy embarked on a number of changes that were admired by both domestic supporters and the international community and considered to be important reforms (Breuning and Ishiyama 2021). Releasing political prisoners, removing bans on opposition parties, easing restrictions on internet use, and pushing for vast economic reforms for the Ethiopian economy through “Unleashing the potential of the private sector” and “Reforming state-owned-enterprises” were among the reform agendas for which he was praised (Breuning and Ishiyama, 2021; Constantine, 2020). Abiy shifted from a developmental to a neo-liberal and free market paradigm, announcing the opening up of the state-owned telecommunications, energy and transport sectors (including the state-owned airline) to foreign investors and allowing for full privatisation in areas such as the railways, sugar production, industrial parks, manufacturing and hotels (Faleg, 2019). Some commentators considered that such economic reforms would open-up “Ethiopia’s path to prosperity” (Paul, 2019).

In foreign relations, Abiy normalized the country’s diplomatic relations with Eritrea, with which Ethiopia had fought a protracted border war almost 20 years earlier, which created great hope for the future of the country (Breuning and Ishiyama, 2021). This move distinguished Prime Minister Abiy as a peacemaker and reformer and led to him winning the 2019 Nobel Peace Prize (Pilling, 2021).

Under Abiy Ahmed and the new Prosperity Party (a pan-national party formed after dismantling the EPRDF) power and decision making were completely centralized, showing the continuity of the authoritarian mode of governance that had been part of the country’s legacy for decades (Dibaba, 2021). After these ‘reforms’ a number of incidents have undermined the autonomy of the regional states. The war in Tigray which led to the removal of the democratically elected regional

government is one of the major manifestations of this. Mentioning the war in Tigray as an indicator, Constantine (2020) argued that although the new leadership has proven its commitment to market-oriented reform and economic liberalism, it has also proven itself equally reluctant to let go of power. Given past trends and recent developments, one might well conclude that continuity is more likely than change. For instance, centralization is likely to be even further tightened, and the top down planning culture will be reinstated. Furthermore, evidence shows that the narrative in Ethiopia is changing, and this change is ‘backward’ rather than ‘forward’ looking. The pro-centralised and unitary system narrative of the current regime is a prime example of this that can be mentioned here. This narrative contradicts the fundamental pillars of the existing constitution, such as ethnic federalism and providing decentralised power to regional states (Allo, 2020; Constantine, 2020). This indicates that there may well be a return to a unitary and centralised system.

However, the liberalisation policy the government has introduced or promised to introduce might well bring beneficial changes to the agricultural sector, encouraging and opening up space for private companies, NGOs and civic organisations to engage in and contribute more. But, this will come with its own risks. It is uncertain how land and other agricultural policies (including extension policies) will be affected by the combination of promised neoliberal reforms and the pro-centralisation narrative and how this will affect smallholder farmers in Ethiopia’s rural areas, who make up close to 85 % of the population. At this point in time, it is far from clear how the federal government’s reforms will affect the Ethiopian AIS.

The situation is even more uncertain in my research area, Tigray regional state. Two months after regional elections in September 2020 in Tigray, an unprecedented military confrontation broke out between Tigray and Ethiopia, partnered with troops from neighbouring Eritrea which makes the future of the region very unpredictable. The war, a result of tensions between the federal

government and the leadership of the Tigray region, has resulted in a humanitarian crisis and fears of regional instability (Gavin, 2021). It has been argued that the war is rooted in two radically contrasting and seemingly irreconcilable visions about the future direction of Ethiopia (Allo, 2020; Abai, 2021). Although there has been no constitutional change so far, Prime Minister Abiy Ahmed has been advocating a centralised and unitary state in which the centre determines the political, economic, and cultural policies of the periphery (Allo, 2020; Abai, 2021; Constantine 2020). Meanwhile, the Tigray People's Liberation Front (TPLF, the leading party in Tigray) support a multinational federal policy in which political authority is constitutionally divided between the central government and autonomous regional governments which would be responsible for determining policies that affect their political, economic, and cultural futures (*ibid.*). Overall, with the restoration of the elected government of Tigray and the war between Tigray regional forces and Ethiopian and Eritrean forces still ongoing, the future of the region (and the country as a whole) is far from clear and it remains to be seen how rhetoric and practices from the federal level will influence Tigray's future.

The current situation of the agricultural sector in Tigray is very disturbing. According to a report by the interim administration of Tigray, a body that was assigned by the federal government to administer Tigray after the capital city Mekelle was captured by the federal forces, the sector is so damaged that it cannot be repaired in a near future. Farm produce, home appliances, and farming equipment have been ransacked during the conflict. All agriculture and rural development offices, vehicles and motorbikes, veterinary clinics and farmer training centres in almost all areas were looted by Eritrean soldiers and Amhara ethnic militia across the region. In addition, much livestock was looted, and irrigation infrastructure was damaged in many areas. In such circumstances it is difficult to provide meaningful agricultural support to farmers. Over 95% of Tigray's population is in need of humanitarian assistance and over 95% of Tigray's farmers cannot afford to buy

agricultural inputs such as fertilizers, seed, pesticides, for the next growing season (TGHAT, 2021).

6.7 Outlook for further research

- One of the topics studied in this thesis is appropriateness of different types of intermediation mechanisms in a context. The study shows an IP based intermediation mechanism performs better compared to *ad hoc* brokerage, in terms of creating interactive innovations and effectively implementing intermediation functions. However successful embedding such an approach and achieving out and up scaling can be challenging, particularly when there are substantial differences between the niche and regime. This thesis argues such an approach cannot be sustained if it does not fit with the context. This indicates the importance of the careful selection of an intermediation mechanism that does fit the context. This raises the question as to which should take priority: successful experimentation or sustainable and broader impact? Should we always go for the highly interactive approach or should we think more about the long-term perspective? In relation to this, investigating whether a less ambitious intermediation mechanism would be easier to integrate within an authoritative context and therefore be more likely to have a system wide impact that would last longer could be an area for future research.
- One of the conclusions of this study is that building local innovation capacity requires more than one systemic instrument, such as an IP. So, analyzing the different combinations of systemic instruments (such as incentive structures) needed to overcome lock-ins and to strengthen innovation systems in developing countries is another promising future research area.
- The scope of this thesis was broad, in that it focused on the overall innovation system of the agricultural sector. The broad and complex nature of the concept of AIS created challenges

during the data collection, processing and analysis. So, for future in-depth investigation, I recommend studies with a narrower scope, focusing more on specific commodity or value chains.

- To the best of my knowledge, there are few insights (although, see: Minh *et al.*, 2010; 2014) into the extent that various brokerage arrangements work in countries with a similar context as Ethiopia (i.e. a hierarchal organisation with a dominant top-down culture). Hence, I advocate comparative studies elsewhere, to learn lessons from other countries.
- This study shows that IP, as an intermediation mechanism functions well at the local level but embedding it in a context such as Ethiopia's is difficult. As a result, IP often remains as 'islands of success', and seldom 'goes to scale'. These findings trigger questions that require further research, such as: Why do donors promote and insist on such kinds of intermediation mechanisms, which have limited broader and sustainable impact? And, why do governments invite (or tolerate) interventions that diverge from their own ways of working, but then show no commitment or willingness to scale the successful innovation intermediation mechanisms introduced? In a broader sense, *who* determines *what* model of development in the country? Nowadays more research is being done on the negotiation of logics during the formulation and implementation of development projects and partnership arrangements (Nelson and Tallontire, 2014). The inclusion of national governments is not always ensured, even though it is critical for ensuring that development projects and partnerships are aligned with national development goals and structural capacity building. This has led various authors to recommend multi-level alliances for dialogue, rule-setting and accountability (see Heeks *et al.* 2020; Nelson and Tallontire, 2014; Vurro *et al.* 2010). Future research into the potential of such alliances and their influence on development interventions is needed, to explore more needs-based development collaboration.

- This PhD thesis provides an anchoring framework that is valuable to assess the likelihood of niche-based novelties achieving ‘impact at scale’. To the best of my knowledge, this is the first study that attempts to investigate the anchoring of a successful intermediation mechanism and its potential for scaling and I recommend further in-depth research on this topic. Such work could, for example, focus on the effectiveness of the anchoring strategies of research and development projects, which have already worked on scaling their innovation methodologies. In terms of research methodology, I suggest a type of action research that would allow researchers to follow all the important events in a timeline. This action research would allow a critical evaluation of the anchoring framework and whether it is useful to assess the local fit (and adaption) and potential for scaling (in dialogue with policy makers) of any type of innovation mechanism opted for.

6.8. Concluding remarks

Due to the lasting legacy of the socialist background and the origin of the parties that have ruled the country for the last five decades, there is a continued preference for command-based hierarchal and top-down approaches such as TOT in Ethiopia. The main question posed at the beginning of this research was: *how do different intermediation approaches actually work in a specific context and to what extent and how can successful intermediation approaches be institutionalized.*

This study showed that with adequate funding, key skills, independently positioned leading brokers, projects using an orchestrated IP mechanism may perform better compared to projects using *ad-hoc* brokerage, in terms of creating interactive innovation processes and thereby effectively implementing intermediation functions (such as: context analysis, demand articulation and planning; network building; innovation process management; and innovation scaling) at the niche level. However, successful embedding, and thereby scaling is challenging. This is due to the

contrasting logic between the regime (the TOT logic) and the niche (the AIS logic). With large contrasts, the potential of outsider-driven innovation projects to create systemic change in a dominant innovation regime is limited, and successful experiments remain an island of success. To inspire development actors to consider the fit and embedding of an innovation methodology in a context, I developed a framework for networking-, methodological, and institutional anchoring. The use of the framework showed the relevance of anchoring considerations right at the start of an innovation project. It also demonstrated the need for strategic networking with key regime actors to engage in a dialogue for institutional grounding of the innovation experiment. Anchoring of a niche is an essential pre-phase for scaling. This study also demonstrated that a state-facilitated platform, that was used as a systemic instrument to create systemic change in the regime, had limited impact. The systemic problems that the platform was supposed to tackle were interlocked and greatly constrained its functioning.

Overall the findings of this study lead to the following three major conclusions:

- Careful selection of an intermediation mechanism that somehow fits the context is important, as it is easier to anchor and be sustained for broader impact.
- Changing dominant innovation systems from the outside (e.g. via NGO, project-based platforms) requires explicit attention for anchoring in the design of intermediation approaches. This enables the development of an interactive innovation methodology that fits the context, with a potential for up and out scaling, attaining broader impact and sustainable change.
- Changing innovation systems from within (e.g. via state facilitated platforms) requires innovation capacity building. This demands strategic combinations of intermediation mechanisms such as IPs and other types of instruments (such as policy change, incentive structures) to overcome lock-ins, build a more interactive innovation capacity, and to reinvigorate the innovation structure.

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Summary

The lack of linkages among actors within agricultural innovation systems (AIS) inhibits the development and diffusion of appropriate innovations in Sub-Saharan African (SSA). As such linkages are not usually self-organised, furthering the need for intermediation. As the characteristics of innovation systems are different in different countries, the modalities and mechanisms of intermediation need to be tailored to specific contexts. Much literature exists on the communication dynamics of various intermediation approaches. However, we know little about *how different approaches actually work in specific contexts and to what extent (and how) successful intermediation approaches can be institutionalized*. This dissertation aims to fill this knowledge gap by investigating the performance and institutionalisation of various types of intermediation approaches initiated by different types of actors (projects and the government) in the agricultural sector, in the southern zone of Tigray regional state, Ethiopia. The background to, and outline of, this thesis are provided in *chapter one*.

Chapter 2 provides a historical literature review. It traces the link between the discourse and practice of three successive agricultural extension regimes in Ethiopia over the past eight decades and the innovation paradigm shifts in the scientific literature: from the transfer of technology (TOT), to participatory technology development (PTD) and then to agricultural innovation systems (AIS). The study finds that Ethiopia has gone through radical ideological shifts, from feudalism to Marxism to a more liberalised market system in this time. In these three eras, several aspects of PTD and AIS paradigms were practiced, even before the AIS paradigm was developed in the scientific literature. However, the TOT paradigm has remained dominant and hegemonic throughout the three periods in Ethiopia, despite the ideological differences among the regimes. The continued predominance of the TOT paradigm can be explained by political history. The parties that have ruled the country for the last five decades had strong links with socialist ideology,

and while they espoused a concern for the needs of the poor were also known for seeking to control power and maintain political domination. The successive regimes, thus, prioritised a command-based top-down principle to retain political control. The chapter concludes that innovation practices were predominantly determined by these political power dynamics.

Having explained the context (the dominance of the TOT paradigm) in the government agricultural research and extension system (chapter 2), in *chapter 3*, the study zooms in on the performance of various project-based innovation intermediation approaches. Chapter 3 presents a comparison of two donor-funded agricultural innovation projects in Tigray regional state: the Africa Research in Sustainable Intensification for the Next Generation (Africa-RISING-Ethiopian Highland-AR) project and the Capacity Building for Scaling up of Evidence-Based Best Practices in Agricultural Production (CASCAPE) project. The study first characterises and assesses the intermediation approaches that the two projects adopted. It then compares the performance of the intermediation approaches in terms of how they provided space for interactive innovation processes and were effective in fulfilling the following innovation intermediation functions: context analysis, demand articulation and planning, network brokering, innovation process management, and innovation scaling. This study finds that AR took innovation intermediation as its core activity, using an orchestrated innovation platform (IP) as a brokerage mechanism. In contrast, CASCAPE took innovation intermediation as a side activity, using a more flexible, *ad-hoc* type of brokerage. This study shows that the innovation intermediation functions were more effectively carried out through the modality of a core activity, combined with an orchestrated IP mechanism, than as a side activity combined with *ad-hoc* brokerage. AR's approach seemed to perform better in providing the space for interactive innovation processes and creating space to learn by doing/interacting, thus contributing to building the interactive innovation capacity of actors by exposing them to different ways of doing things. CASCAPE's activities aimed at creating new connections with a wider range

of stakeholders were limited and mainly focused on knowledge brokerage and capacity building (for example: on improving the agronomic practices of farmers). Consequently, CASCAPE's brokerage mechanism made a limited contribution to enhancing collaborative learning and facilitation skills for interactive innovation processes. This study shows that with adequate funding, key skills, independently positioned leading brokers and making intermediation combined with an orchestrated IP mechanism, a core activity can lead projects to perform well. At the end of the chapter the question is posed as to whether this AR approach can be embedded or anchored in a context such as Ethiopia, where a hierarchal and top-down culture dominates.

Building on the findings in chapter 3, showing that AR attained high levels of interaction between actors and effectively implemented the different innovation intermediation functions, I took AR as a case (niche) study in *chapter 4* to study its potential for creating sustainable change in the dominant innovation system of Ethiopia (regime). Chapter 4 develops and tests a framework to analyse the anchoring of the FRG-IP innovation intermediation approach of the AR. The study first identifies the network, methodological, and institutional anchoring tasks performed by the FRG-IP-based AR project. It then analyses the extent to which the framework provides (a) insights into how to attain an experimental fit-with-context and a conducive institutional environment for scaling, or (b) an explanation of the achieved level of out- and up-scaling.

The study shows that the AR project performed several anchoring activities well (*networking, methodological and institutional*), but also missed some critical ones (for example: *higher level networking and institutional anchoring*). The missing anchoring activities created self-reinforcing negative dynamics, which limited the potential for scaling the FRG-IP approach. The study suggests that in order to develop an interactive innovation methodology that would have fitted the context, with potential for up- and out-scaling, a flexible, multipronged approach that continuously scanned the progress made (strengths, weaknesses and anchoring tasks yet unfulfilled) would have

been required. This chapter also shows how the anchoring framework I developed is useful in identifying the relevant anchoring activities performed, those missing and how they interrelate and affect the scaling process. It also provides insights into what is needed to create an experiment that fits with its context and a more conducive institutional environment that could ensure scaling.

Having analysed the potential of outsider-driven innovation projects to create systemic change in an innovation regime in chapter 4, the last empirical study (*chapter 5*), focuses on the potential of internal state-driven multilevel multi-stakeholder platforms, called Agriculture Development Partners Linkage Advisory Councils (ADPLACs). It explores the performance of the ADPLACs in tackling systemic problems (related to structural elements, such as actors, interactions, institutions and infrastructure) and thereby structurally transforming the dominant top-down innovation regime towards a more interactive innovation approach. The study shows that the ADPLACs at different administrative levels helped to stimulate the participation of various actors (directly or indirectly involved in agricultural development), overcame an absence of interaction, created opportunities for joint planning and evaluation, stimulated some knowledge sharing and coordinated development actions and mobilised some physical human and resources. However, it made a limited contribution to tackling systemic problems and thus building the needed structural capacities. This was due to the absence of some important enabling factors, such as the proportional representation of all stakeholders, the availability of neutral and capable brokers and institutional arrangements conducive for interactive planning (such as participatory monitoring & evaluation and incentives for government officers to invest in participatory processes). It was also due to the presence of several intertwined obstacles, such as the government-led hierarchical structure of the councils, a culture of top-down planning and agenda-setting, limited understanding of IS principles and a lack of funding for the facilitation of interactive multi-stakeholder processes. Overall, the systemic problems that the IP was supposed to tackle were interlocked and greatly constrained its functioning. The chapter concludes that building local innovation capacity, and

thereby inducing conducive policy and institutions, requires more than the establishment of a platform. It needs strategic combinations of systemic instruments that can overcome a lock-in and build the capacity for inclusive development.

Chapter 6 synthesises the findings from the previous chapters to answer the main question posed in the introduction. The thesis started with an overview of the context. It described how the TOT logic continued to dominate in Ethiopia despite rhetorical changes, showing the contradiction between espoused policies and practice. The study argues that projects with quite different innovation logics can co-exist at the local level: either by organisational hybridity (as was the case with CASCAPE which implemented needs-based interactive innovation logics at local level while adhering to the more top-down planning logic at higher level within the government) or by creating a new organisation, outside the government, with a different institutional logic (AR). This suggests that niche level projects may be able to change practices locally, but their potential to change innovation practices structurally across the whole system is very limited. Overall, the hierarchical planning logic of the context (the regime) was too strong to allow for the sustainable integration of a needs-driven, interactive innovation logic after the project came to an end. The study suggests that projects need to make anchoring activities part of the design of their intermediation approach, to facilitate scaling up/out and to attain broader impact and sustainable change. When it comes to the state, the study suggests a ‘strategy of harmonization’ is needed to embed a more AIS-based innovation logic in a context where a TOT logic predominates. This needs to be combined with a mix of systemic instruments such as an IP (to create space for interaction) and enabling incentive structures (to provide a more conducive institutional environment), to ensure scaling.

When Prime Minister Abiy Ahmed came to power in 2018, some rhetorical changes (for example: advocating a centralised and unitary state in which the centre determines the political, economic, and cultural policies of the periphery) and practical changes (liberalizing some state-owned

sectors) were made. However, due to the fragile, evolving political dynamics, it is not clear how the agriculture sector and the Ethiopian AIS will be affected by the proclaimed reforms. As far as Tigray is concerned, the recent and ongoing war in this area raises even more uncertainties about federal governance and the rhetoric and practice of agricultural innovation and development.

About the author

Mikinay Hailemariam Seifu was born in Mekelle, Tigray in 1982. After completing high school, she joined Alemaya University (now Haramaya University), Ethiopia where she obtained a degree in Agricultural Extension in 2005. After graduation, she briefly worked as supervisor of agricultural extension activities in Alamata district office of agriculture and rural development, Tigray regional state, Ethiopia. After one year, she received a scholarship from ILRI to continue her masters. She re-joined Haramaya University and attended the Master of Rural development and Agricultural Extension (Agricultural Communication and Innovation stream) and graduated in 2008. The title of her master thesis was: ‘Social Networks and Gender Dimensions in Use of Irrigation by Farmers in Alamata woreda, Southern Tigray, Ethiopia’.

In 2009, after completing her master study, she started her career as a lecturer in Mekelle University, College of Dry Land Agriculture and Natural Resource, department of Natural Resource Economics and Management. She continued to work in Mekelle university and in 2015 she was promoted to an assistant professor of Rural Development and Agricultural Extension. She took a leading role in establishing the department of Rural Development and Agricultural extension, and the Value Chain Oriented Agricultural Extension, mid-career program in Mekelle university.

In August 2013, Mikinay joined Wageningen University, knowledge, Technology and Innovation chair group in the sandwich PhD programme. While teaching at Mekelle university, she conducted this PhD research focusing on anchoring ‘novel’ interactive innovation approaches in the context of Ethiopia, where a top down and linear agricultural research and extension approach is predominant.

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Mikinay Seifu
Wageningen School of Social Sciences (WASS)
Completed Training and Supervision Plan

Wageningen School
of Social Sciences

Name of the learning activity	Department/Institute	Year	ECTS*
A) Project related competences			
Introduction to Communication and Innovation Studies, CPT 23804	WUR	2013	4
Qualitative Data Analysis: Procedures and Strategies, YRM 60806	WUR	2014	6
B) General research related competences			
Writing Research Proposal	WUR	2014	6
WASS Introduction Course	WASS	2013	1
Research Methodology: From topic to proposal	WASS	2013	4
Systematic approaches to reviewing literature	WASS	2013	3.7
Information Literacy Including EndNote Introduction	Wageningen UR Library	2014	1.2
The Essentials of Scientific Writing and Presenting	Wageningen in to languages	2017	0.6
Academic publication and presentation in the social sciences	WASS	2018	4
C) Career related competences/personal development			
Participated in an international forum: "Strengthening functional capacities to innovate"	Capacity Development for Agricultural Innovation Systems (CAAIS) International Forum, Gembloux, Belgium	2019	1
'State facilitated multi-stakeholder platform as a systemic instrument: case study from Ethiopia'	16th Global Network for Economics of Learning, Innovation, and Competence Building Systems (Globelics), Accra, Ghana	2018	1
The concept of agricultural Innovation System (AIS) and the role of Innovation Platforms (IP) on structural change of AIS	College of Dryland Agriculture and Natural Resources, Mekelle University	2016	1
<i>'Characterization of Agricultural Innovation Platforms (AIPs) as Systemic Instruments; based on Functional-Structural System Analysis'</i>	College of Dryland Agriculture and Natural Resources, Mekelle University, Ethiopia	2016	1
PhD workshop carousel participation	WG	2016	0.3
3 rd Wageningen PhD symposium participation	Wageningen PhD council	2016	0.3
Teaching Undergraduate Students	College of Dryland Agriculture and Natural Resources, Mekelle University	2016	2
Advising Undergraduate Students	College of Dryland Agriculture and Natural Resources, Mekelle University	2016	2
Total			39.1

*One credit according to ECTS is on average equivalent to 28 hours of study load

The research described in this thesis was financially supported by CApacity building for SCAaling up evidence based best practices in Agricultural Production in Ethiopia (CASCAPE) project. CASCAPE was financed by the Dutch Ministry of Foreign Trade and Development Cooperation, through the Royal Dutch Embassy of the Netherlands in Addis Ababa, Ethiopia.

Financial support from Wageningen University for printing this thesis is gratefully acknowledged.

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