Omo International Journal of Sciences

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Research Article

Leadership practices that enable agricultural transformation: The case of the Ethiopian irrigated wheat initiative

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Abstract

Agricultural innovations play a vital role in enhancing production and productivity. In the Ethiopian context, agricultural innovations are deployed in the form of integrated technological innovations. The elements of technological packages include varieties and associated management practices. The rate of adoption and the pace at which such innovations are disseminated is normally slow. Thus, organizations involved in innovation development and dissemination activities need to be agile to cope with the fast-changing production environment as well as the pressing need for increased production and productivity are assessed. Enabling leadership refers to leadership practices that enable the positioning of individual and organizational actors by creating adaptive spaces. An adaptive space is about the social arrangements of the innovation system actors in ways that enable the creation of adaptive processes that eventually lead to an adaptive organization. Thus, being acquainted with leadership practices that enable the creation of adaptive spaces and facilitation of the vitality of associated adaptive processes is crucial. Activities that stimulate adaptive processes eventually facilitate the creation of adaptive organizations. Knowledge of factors that enable the creation of adaptive spaces, and leadership practices that help expedite the creation of vibrant adaptive processes is vital to be able to deploy appropriate adaptive interventions. This further enables the design of a refined intervention for future implementation under varied contexts. Knowledge of enabling leadership practices that affect the success of adaptive interventions is important for policy-makers to rethink their innovative food production policies. Thus, it is important to document process-oriented and relational approaches that facilitate the creation of adaptive spaces in which agricultural innovations are generated, diffused and adopted in networks based on information gathered from field-level implementation experiences. The Ethiopian irrigated wheat production initiative was the subject of study. Some of the project evaluation questions for the retrospective analysis from the perspective of an enabling leadership model were: who were the agents involved in the irrigated wheat project? What were their roles? What were the enabling leadership practices that facilitated the creation of the adaptive space vital for the sustainability of the project? To answer the above questions, a template analysis of existing irrigated wheat project documents was done. One of the key lessons from the current analysis is that is the

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https://doi.org/10.59122/14438kl

Received February 11, 2025; Accepted April 10, 2025; Published June 27, 2025

fact that leadership is a co-creation. An additional lesson also is that we must understand that leadership and followership are a complex social phenomenon of interacting leaders and followers in ways that co-produce enabling leadership and its outcomes.

Keywords: Agriculture; Ethiopia; Innovation; Irrigation; Leadership

1. Introduction

Agricultural innovations are indispensable for enhancing agricultural production and productivity. Under the Ethiopian context, such innovations are deployed in the form of integrated packages with key ingredients being crop varieties and their management practices (Diriba, 2020). But the rate of adoption of such innovations has remained low. This entails that organizations involved in innovation dissemination activities need to be agile to cope with the fast-changing production contexts as well as the pressing need for increased production and productivity.

In today's fast-changing organizational landscape, organizational agility is considered to be essential. Organizations oriented to agricultural development must thus be more liquid than static to be able to thrive in such contexts. Yet many organizations try to reinforce their rigidity at the expense of agility. Thus, it is vital for such organizations to allow ideas to emerge and flow in the organizational system so that their agility would be enabled. The critical question yet is how innovative ideas emerge and flow in organizations. The answer lies in the creation of adaptive spaces that provide a sense of connectivity and agility.

Adaptive spaces can be thought of as the relational, emotional and sometimes physical space necessary for innovation system actors to freely explore, exchange and debate ideas associated with development and dissemination of innovations. It is achieved by opening the connections through which people, ideas, information and resources flow and interact within an organization so as to enhance learning and agility (Burt, 2004; Fleming, Mingo and Chen, 2007; Cross, Baker and Parker, 2003). Adaptive spaces enable connections among actors; foster environments where business-as-usual subsystem of an organization is tamed for disruption; and create bridges between the innovative and the business-as-usual subsystems of an organization paving the way for enhanced agility and adaptability of the latter.

From the perspective of agricultural transformation, an adaptive space is not about available agricultural innovations, innovation dissemination strategies, or the capacity of agents involved in such transformation efforts as it used to be claimed in the past. Rather, it is about the social capital which enables organizational repositioning so that research and development organizations can leverage innovations, strategies and actors' competencies so that an agricultural

transformation is realized. An adaptive space is about the social arrangements of the innovation system actors in ways that enable the creation of adaptive processes that finally lead to an adaptive organization. Thus, being acquainted with leadership practices that enable the creation of adaptive spaces and facilitation of the vitality of related adaptive processes is crucial. But creating adaptive spaces is not a stress-free endeavor as organizations usually inclined to risk aversion and are more likely to shut such spaces down than nurture them. Adaptive spaces are created by focusing on the social, rather than human, capital (Kane *et al*., 2016; Arena and Uhl-Bien, 2016; Uhl-Bien and Arena, 2018; Cross and Cummings, 2004)

Knowledge of factors that enable the creation of adaptive spaces, and leadership practices that help expedite the creation of vibrant adaptive processes is vital to be able to deploy appropriate adaptive interventions. This further enables the design of a refined intervention for future implementation under varied contexts. At the policy level, knowledge of enabling leadership practices that affect the success of such adaptive interventions is important for policy-makers to rethink their innovative food production policies. Thus, it is important to document process-oriented and relational approaches that facilitate the creation of adaptive spaces in which agricultural innovations are generated, diffused, and adopted in networks based on information gathered from field-level implementation experiences. The Ethiopian irrigated wheat production initiative is used as the object of the present analysis. The project was based on the concept of agricultural adaptive space. The analysis aims to address the following key questions: who were the actors that contributed to the effective implementation of the irrigated wheat project? What roles did the agents play in the initiative and implementation process? Did the project work as envisioned? For which communities and contexts did it work? What were the enabling leadership practices deployed to facilitate the creation of the irrigated wheat adaptive spaces?

The generation of adaptive solutions to complex farm problems through leadership approaches rooted in outdated leadership thinking has now become obsolete. This implies that there is a need to use enabling leadership, which facilitates the creation of adaptive space. This is the reason why an enabling leadership approach was used to design and implement the irrigated wheat initiative. The initiative was co-designed at the beginning by the EIAR and the MoA and later implemented in collaboration with other regional and federal stakeholders.

The irrigated wheat project aims to cope with the national wheat self-sufficiency challenge and it endeavored to achieve this by creating adaptive spaces. The effective implementation of

such projects was believed to depend on the presence of diverse actors with each actor having a role to play in stimulating an adaptive process. Project implementers and beneficiary communities, and public entities engaged in the process were expected to effectively implement the project, which was envisioned to eventually lead to an adaptive organization that can thrive under emergent adaptive challenges.

The success of such a project was also assumed to be dependent on the mechanisms that emanate from the elements of the sectoral social structure that constitute the contextual landscape in which it is implemented. Mechanisms that emanate from the context into which the project was deployed comprise the competence of agents that are involved in the workings of the adaptive space, the social capital, and existing formal and informal rules that condition the behavior of agents. The availability of infrastructures and associated facilities was also considered crucial for organizational adaptability to be realized. A further concern also is that leadership practices that are used to enable an adaptive space eventually result in an adaptive organization that can thrive under complex contexts. The concept of adaptive space is thus rooted in complex thinking. The concept of adaptive space was expounded in the previous chapter. It is also vital to further clarify other associated concepts: complexity, adaptive challenge, adaptive response, and adaptive space, and enabling leadership from a perspective applicable to the irrigated wheat project, which is used as an objective of the analysis in the present chapter.

2. Complexity

It is common for present-day work organizations to experience complexity. Rich interconnectivity means that when entities or actors interact, they change one another irreversibly. In complexity terms, such interconnected systems are not decomposable to their original elements. Complexity emerges when interactions in networks allow events to link up and create unexpected outcomes, the latter commonly termed emergence.

For example, food inflation can represent a complex event as quite a lot of factors intersect and give rise to it. The factors that bring about food inflation can be volatile and may give rise to other far-reaching consequences when interconnected. As food inflation is the result of the interaction among different factors, it is not an occurrence that can be easily avoided. Getting rid of food inflation rather requires concerned organizations to operate in an interconnected way that enables them to cope with the challenge. It was against this complex challenge that the irrigated wheat project was designed as an adaptive response aiming at the realization of wheat self-sufficiency.

In the irrigated wheat project portfolio prepared by the Ethiopian Institute of Agricultural Research (EIAR) and submitted then to the Ministry of Finance (MOF) for funding, the adaptive challenge was described as follows:

"Ethiopian population will grow to 180 million by the year 2050, of which 50% will live in urban areas and the remaining 50% in rural areas. This entails that the government will continue to engage in massive food imports should the present production trend continue at the current low-input and low-output production system. It was stated in the project document that climate change will put more pressure on wheat production, worsening the gap between wheat grain demand and supply unless the coping mechanism is properly designed. The country is currently importing wheat alone with a value of 600 million USD per year leading to the depletion of the national foreign currency stock. However, Ethiopia is endowed with a huge potential for wheat production. This rationalizes that the country needs to close the gap between the potential and actual wheat yields. Both intensive and extensive wheat production strategies must be considered as potential options to transform wheat production. This project is initiated to promote proven wheat technologies and innovations (this refers to potentially available wheat technologies available at EIAR to double wheat production by harnessing the potential of the country for wheat and sustaining the positive changes over the years. To achieve such an aspiring plan, strengthening the current capacities of the research system and associated services is critical where optimized use of production inputs, irrigation schemes, and mechanization will help realize smallholder farmers and private sector actors' productivity, then leading to national wheat self-sufficiency. It is time to act now as the country is spending $1.5 billion to import agricultural produce among which wheat is the major one and the import bill is predicted to increase at a higher rate owing to rapid population growth and booming urbanization. On the other hand, the country has huge potential in terms of arable land, water resources, suitable agroecologies, and agricultural technologies to boost national wheat grain production. For this ambitious idea to be realized, it was stressed that engagement of a coalition of potential actors is required and that enabling leadership must be deployed to facilitate the adaptive process to positively evolve (Diriba, 2020).

This indicates that food price inflation is a complex adaptive challenge requiring the creation of an adaptive space where innovative activities that facilitate the creation of an adaptive space occur, and which finally gives rise to an adaptive organization that can cope with the emergent adaptive challenge.

3. Adaptive Challenge

An adaptive challenge is a challenge for which there is no set solution, against which people must work together in partnerships. It is a challenge in which partnerships towards solving it are characterized by conflicting views, and where agents endeavoring to tackle the challenge must not operate in isolation but with interdependent arrangements. In extreme cases, agents striving to deal with the challenge may be required to adapt together or breathe their last breath together. Under such circumstances, leaders need to be in an agile mode.

For example, Ethiopia has faced several adaptive challenges in recent years, which have implications for national food production efforts. Among these, food price inflation, covid-19 pandemic, desert locusts, drought, and wars can be cited. The past five years have indeed witnessed what complexity leadership scholars have been saying since the 1990s: the world is more and more becoming complex and if leaders are to cope with such challenges, they need to practice appropriate leadership. For example, with the COVID-19 pandemic, we witnessed adaptive pressures everywhere: preparation of the agriculture sector COVID-19 response plan, the organizational framework of which is depicted in Figure 1, the need to social distance, partial lockdown of offices, pressing employees to operate from home and conducting meetings using zoom facilities. It is vital to also mention here that the COVID-19 pandemic blended with other systemic challenges that have over the years been stifling the agriculture sector, making the challenge more complex.

Traditional top-down leadership models, as argued earlier, cannot help manage such challenges. For traditional leaders, it is perplexing to easily steer through such complex adaptive challenges. This is where the practices of enabling leadership come in to enhance organizational adaptability. Troubles faced in the deployment of such adaptive response is that stakeholders considered to contribute to the adaptive response were yet dependent on outdated leadership styles mired in disabling bureaucracy and were rather inclined to work in a silo mindset. Under such contexts, collective action may not occur without trouble. Even departmental entities within an organization may not be in a position to effortlessly align their energies, hindering organizational capacity to pivot in real-time.

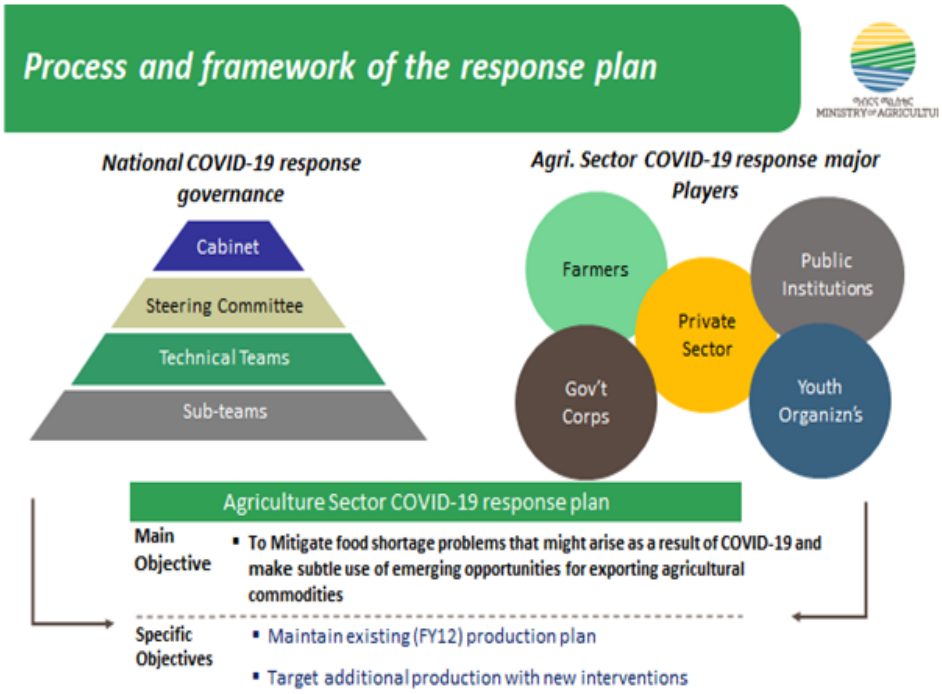


Figure 1. National organizational framework of the COVID-19 agricultural development response plan

Such situations were also observed to work against partnership and collaboration efforts meant to facilitate the attainment of the objectives of irrigated wheat adaptive response plans. Even many have also doubted the success of the initiative and have stereotypically attacked it. This required the creation of an adaptive space where partaking agents interact in ways that facilitate innovation, learning, and emergence so that the adaptive process would evolve faster. The EIAR and the MoA leaders unfailingly worked to create and enable the adaptive space of the irrigated wheat project and this resulted in a historic success, which is extensively promoted at present. This entails that enabling leadership does indeed matter; the notable success of the irrigated wheat project points to this.

4. Adaptive Responses

Adaptive responses help leaders and followers thrive in the face of adaptive challenges. It is thus, vital to understand the concept of an adaptive response and how to enable same. In a complex setting, an adaptive response is an emergence dynamic. For example, adaptive response to food inflation triggered ideation processes, which led to the taking to scale of the already in-progress irrigated wheat production. There was also a further call to put any available free land under crop production. Food production in urban spaces was also promoted by high-level policy-

makers, which was later cascaded to and mainstreamed by the regional states. The food inflation adaptive challenge further required that EIAR and the MoA intensify irrigated wheat production.

The challenges encountered in the process of implementing the proposed adaptive response, among others, include the prevalence of bureaucratic organizing systems pervasive across public organizations. Traditional bureaucracy was observed to stifle efforts to enable the adaptability of the organizations involved. Organizational adaptability is believed to enable the implementation of government-endorsed adaptive responses. The weakness, however, was that the pervasive traditional bureaucracy has been hindering organizational adaptability by hindering competencies required to generate valid adaptive responses. This situation can lead to one critical question. What can leaders do with the bureaucratic systems of organizing that hinder their ability to deal with emergent adaptive challenges? This is based on the common perception that present-day bureaucratic organizations experience an insulated condition and are not agile enough to reposition themselves to face such pressures. Such rigid and complacent organizations are rather expected to fast respond to the adaptive challenges they face. This suggests the need to facilitate conditions that reinforce the occurrence of an adaptive space, the concept that refers to conditions that enable the occurrence of an adaptive process. An adaptive process paves the way for the creation of an adaptive organization that can thrive under an adaptive challenge. In the next chapter, the concept of an adaptive space and how this space is created and enabled will be further explained.

5. Adaptive Space

In the enabling leadership model, in addition to the dimensions discussed above, understanding the concept of adaptive space is very important. Adaptive space refers to conditions that enable the occurrence of an adaptive process. An adaptive process occurs when actors engage the tensions that occur between pressures for change and pressures for equilibrium through conflicting and connecting activities, which finally result in an adaptive organization. In the enabling leadership model, adaptive spaces allow individuals and systems to develop and advance new ways of thinking and innovative ways of doing things.[1]

[1]With regard to adaptive challenges associated with food inflation discussed earlier, some adaptive responses were: intensification of irrigated wheat production, promotion of food production in urban areas and engage in food production activities on unseeded open land spaces. Adaptive spaces emerge to facilitate the vitality of adaptive processes and loosen the formal operational sub-system of an organization so that the formal exploitative sub-system of an organization would embrace the proposed adaptive responses.

Adaptive spaces enable the translation of existing adaptive challenges into opportunities. Adaptive spaces opened up under conditions of crises, and facilitate adaptability of the business-as-usual organizational sub-system and for the same sub-system to evolve to an adaptive status. The conceptual model of enabling leadership is depicted in Figure 2. Having an adaptive and emergent mindset enables leaders to fast recognize and capitalize on adaptive space, which enables the occurrence of a much-needed adaptive change in an otherwise rigid system.

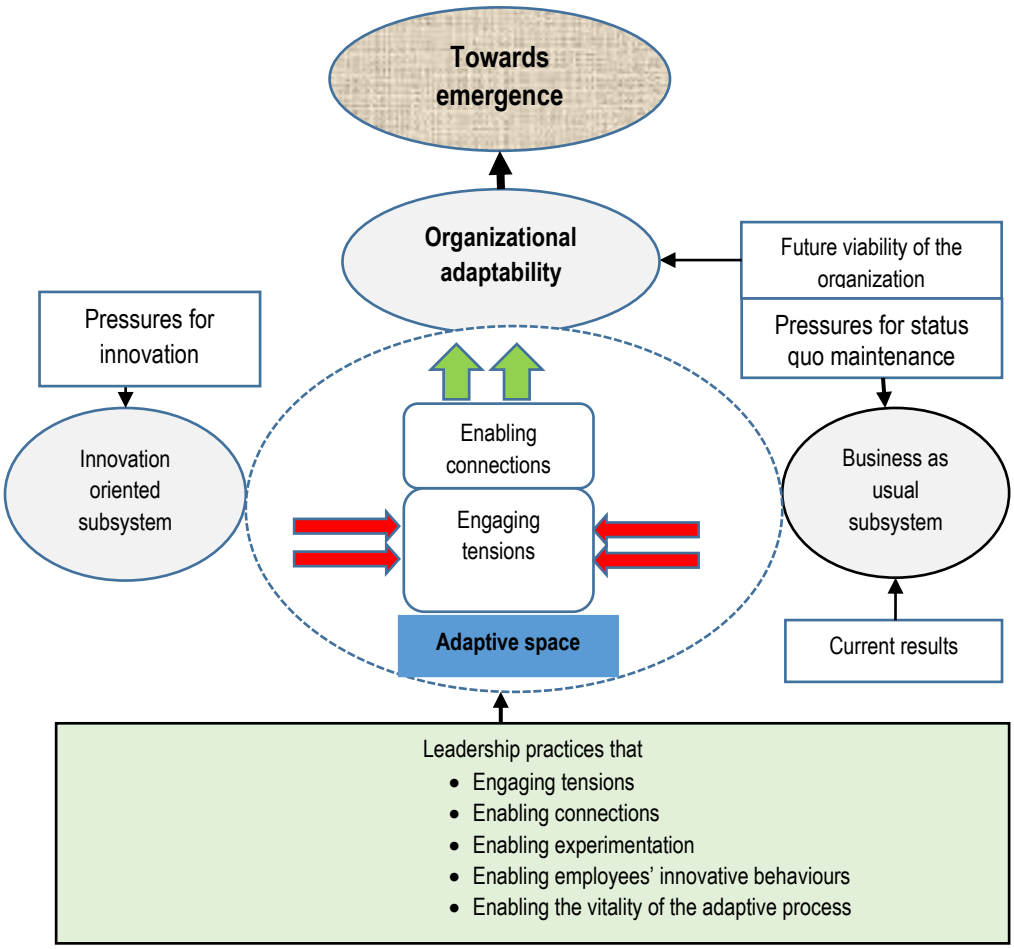


Figure 2. A conceptual model of enabling leadership used in implementing the Ethiopian irrigated wheat project initiative

6. Enabling Leadership

Enabling leadership is a leadership approach in response to complex challenges that contemporary organizations face. Enabling leadership occur in-between operational and entrepreneurial leadership and blends the two behaviors to enable the connecting and conflicting activities in the adaptive space (Figure 3).

Although leaders commonly practice enabling leadership to deal with adaptive challenges, it often goes unrecognized because leadership scholars did not coin a lexicon to describe it and did not publicize such vocabulary extensively. Worse, because it does not fit the traditional conceptualizations of the roles of leaders, the actions of leaders who engage in enabling leadership can be misunderstood. The implication is that organizational leaders have to clearly understand, develop and reward enabling leadership practices as complexity is an important feature of present-day organizations.

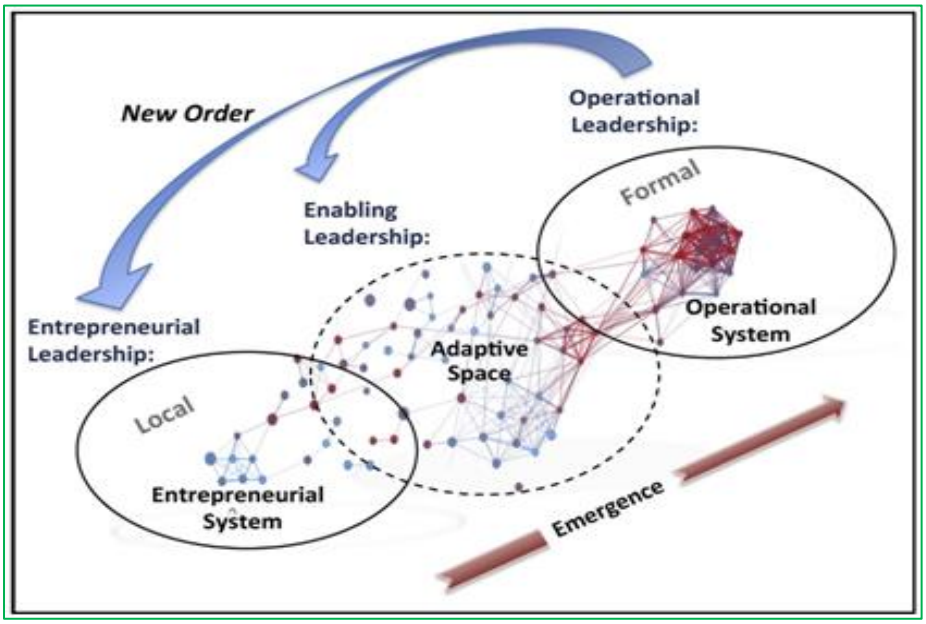


Figure 3. The enabling leadership model used in the design and implementation of irrigated wheat production (*Note*: as discussed in the previous chapter, the '*operational*' sub-system refers to the 'as is' or business-as-usual sub-system where formal order-driven organizational activities are carried out whereas the *'entrepreneurial'* sub-system of the organization refers to the pocket where the new pilot initiative of the organization is nurtured to deal with the identified adaptive challenge, in our case the challenge being food inflation. The pilot initiative of the irrigated wheat project was considered an adaptive challenge. The in-between '*adaptive space*' is where *enabling* leadership is practiced to enable the interaction between the two sub-systems aimed at facilitating an adaptive process which finally leads to an adaptable or repositioned organization to cope with the adaptive challenge)

Generally, if there is a lesson that can be learned from food production-oriented complexity challenges that Ethiopia experienced over the past five years is the fact that leadership is a co-creation. Without examining the relational dynamics of leaders and followers as they occur in particular contexts, we will not have a complete picture of leadership. An additional lesson also is that we must understand that leadership and followership are a complex social phenomenon of interacting leaders and followers in ways that co-produce enabling leadership and its outcomes. In

the next section, issues associated with the irrigated wheat project and factors that enabled the creation of related adaptive spaces will be clarified.

7. The Irrigated Wheat Initiative

7.1 The adaptive challenge that triggered the initiative

Wheat is among the most important crops grown in Ethiopia, both as a source of food and income for farmers. Wheat products represent 14% of the total caloric intake, making the crop the second (19%) most important food, after maize. The present irrigated wheat production project was initially deployed in the Middle Awash Basin located in the Afar region in response to a call for efforts to enhance self-sufficiency in wheat (Figure 4). The project was later scaled to other potential wheat-growing regions of the country such as Oromia, Amhara, and the SNNPR regions based on the experiences gained from the pilot phase efforts.

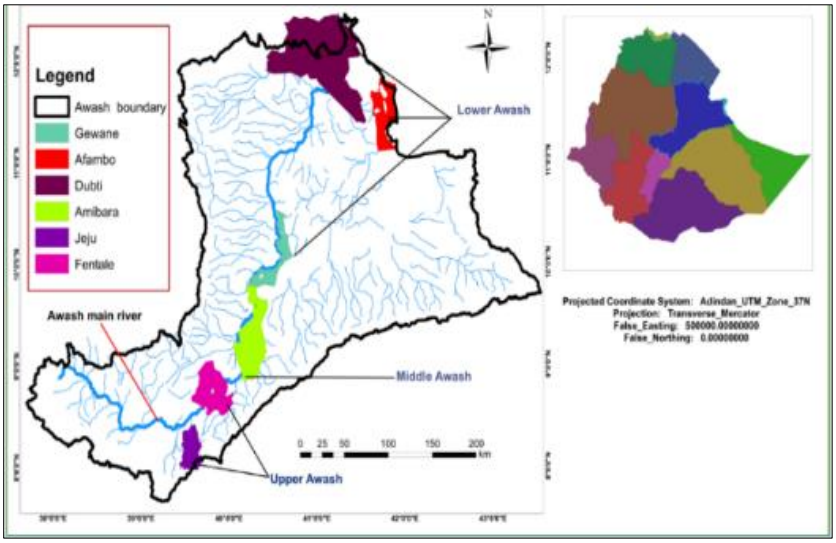


Figure 4. Map showing selected initial pilot intervention sites along the Awash River basin (2019 and 2020 crop seasons)

At present, the Ethiopian government subsidizes wheat imports, providing it to large-scale flour mills on condition that they also sell the flour to bakeries at subsidized prices. The goal is to enhance the supply of bread to consumers at a low cost. The national demand for wheat is growing faster than for any other food crop, due to the high population growth, increased urbanization, and changing trends in food consumption patterns and preferences, and this trend is expected to continue. Unless wheat grain production can keep pace, the cost of wheat imports will place an increasing burden on the Ethiopian balance of trade. At present, Ethiopia is importing wheat alone at a value of $600 million per year leading to the depletion of the national foreign currency stock.

Because of the importance of the crop and its growing import burden, the government of Ethiopia has given high priority to efforts aimed at enhanced wheat grain production under both rain-fed and irrigated systems.

Both sustainable intensifications of rain-fed wheat production and massive irrigated wheat production in the lowland areas are being promoted as key strategies to enhance wheat production in Ethiopia. The current adaptive irrigated wheat project was started in 2017 to pilot irrigated wheat production technologies initially in selected lowland districts located along the Awash River Basin, in Gode and North Omo. The initiative, as indicated earlier, expanded later to other regions of the country based on the successful experiences obtained from the initial piloting phase. The aim was to validate existing wheat innovations and generate evidence that can help further scale up the initiative and mainstream it into already existing strategies of the MOA at the federal level and also BOA at the regional level in addressing farmers' needs for agricultural innovations. Against this background, wheat technical innovations were deployed with beneficiaries being pastoralists, commercial farmers, and smallholder farmers in the highland ecoregions. Seed production activities were undertaken on the research farms of the EIAR and Ethiopian Sugar Corporation. Parastatal seed production enterprises also participate in the supply of wheat seeds.

As Ethiopia has huge potential in terms of arable land, water resources, suitable agro-ecologies, and wheat technologies, the evidence generated in the pilot phase was used as input to refine the intervention to be scaled further in other regions.

7.2 The irrigated wheat intervention design

The irrigated wheat production project co-designed and co-implemented as an adaptive response by the EIAR and the MOA since 2017 is described in this section (Figure 5). At an ideation stage, the intervention was proposed to serve as an adaptive response to cope with a food inflation challenge described in the foregoing section. The intervention was hoped to perform productively and evolve positively given the potential of the technical packages validated by previous research and technology scaling efforts. A critical concern, however, was understanding 'for whom' and 'under what contexts' the intervention does work. Gathering evidence that helps to refine the project to further scale it to other wheat-producing regions was also considered vital.

As the irrigated wheat production intervention is characterized by complexity, the adaptive space concept is used to evaluate and refine the initiative for further scaling. The present evaluation aimed to mainly document adaptive leadership practices that enabled the sustainability or

otherwise of the adaptive project. Figure 5 portrays the design and implementation process of the project and the final adaptive intervention outcome of the same

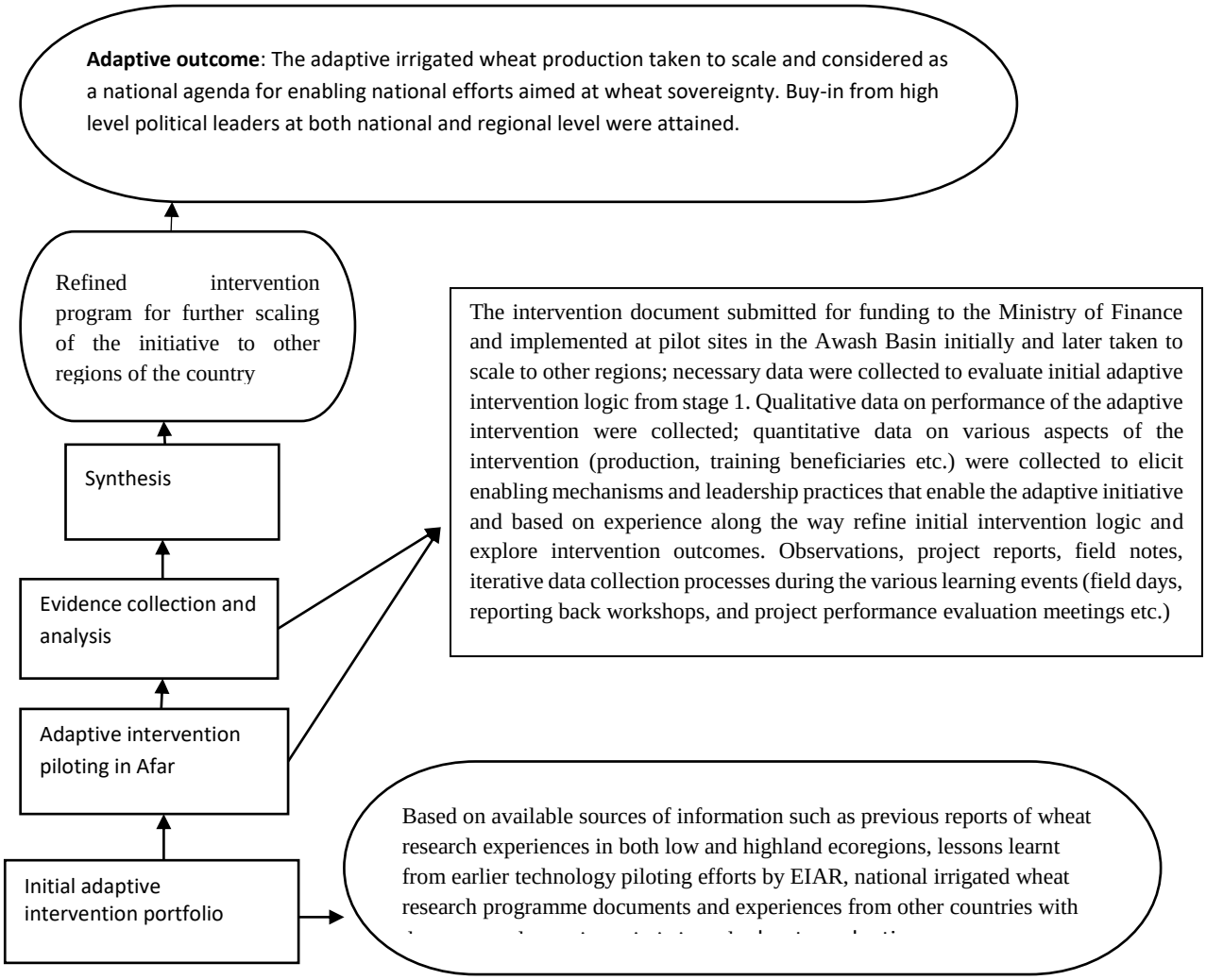
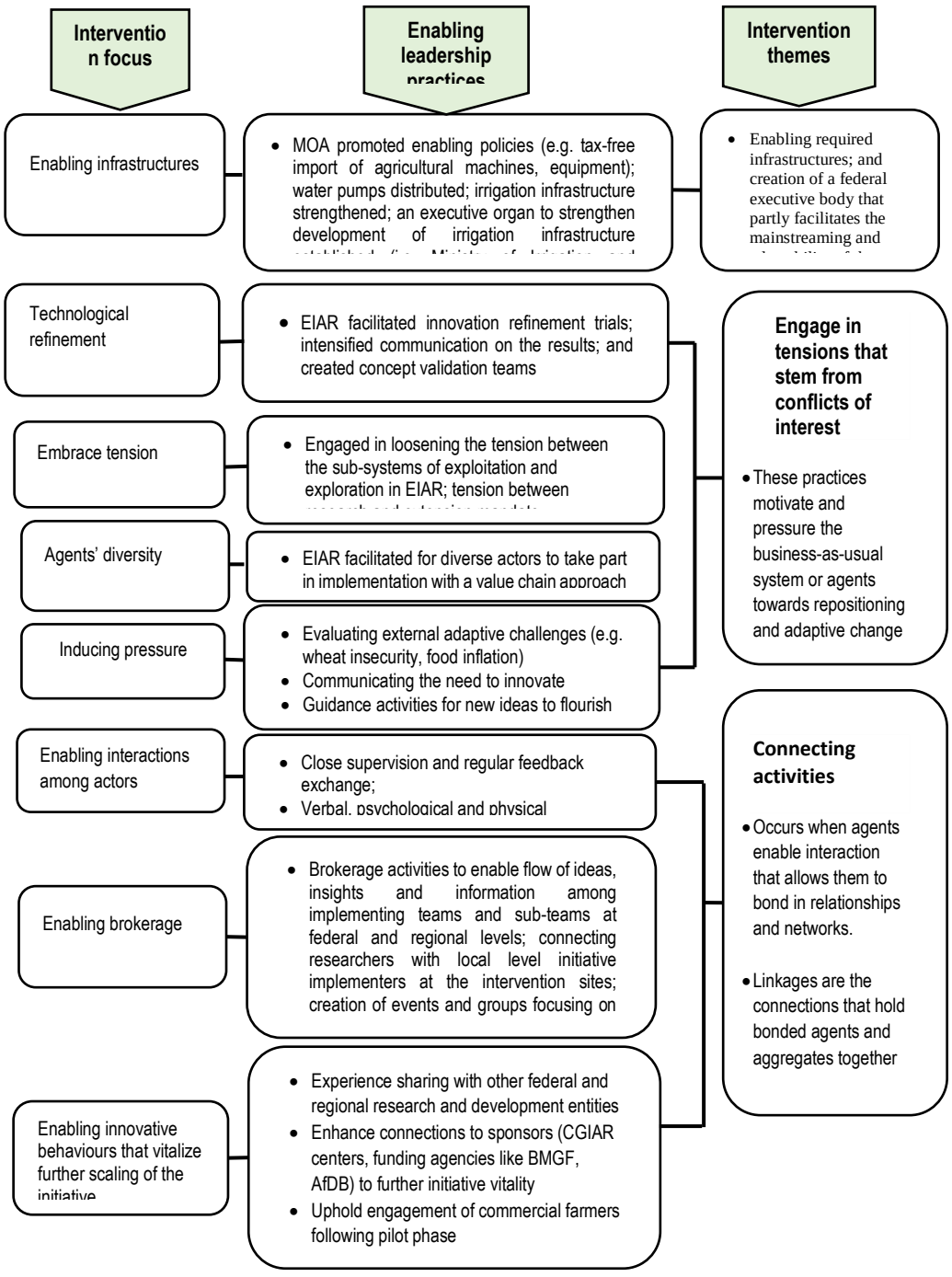


Figure 5. Design, implementation process, and expected outcome of the adaptive irrigated wheat project

Some of the evaluation questions for the retrospective analysis from the perspective of an enabling leadership were: who were the agents involved in the irrigated wheat project? What were their roles? What were the enabling leadership practices that facilitated the creation of the adaptive space vital for the sustainability of the project? To answer the above questions, a template analysis of existing irrigated wheat project documents was done. Template analysis is a form of thematic analysis that emphasizes the use of hierarchical coding but balances a relatively high degree of structure in the process of analyzing textual information with the flexibility to adapt it to the needs of a particular study. Then the

practices gleaned from the analysis were thematically structured and further discussed (Figure 6).



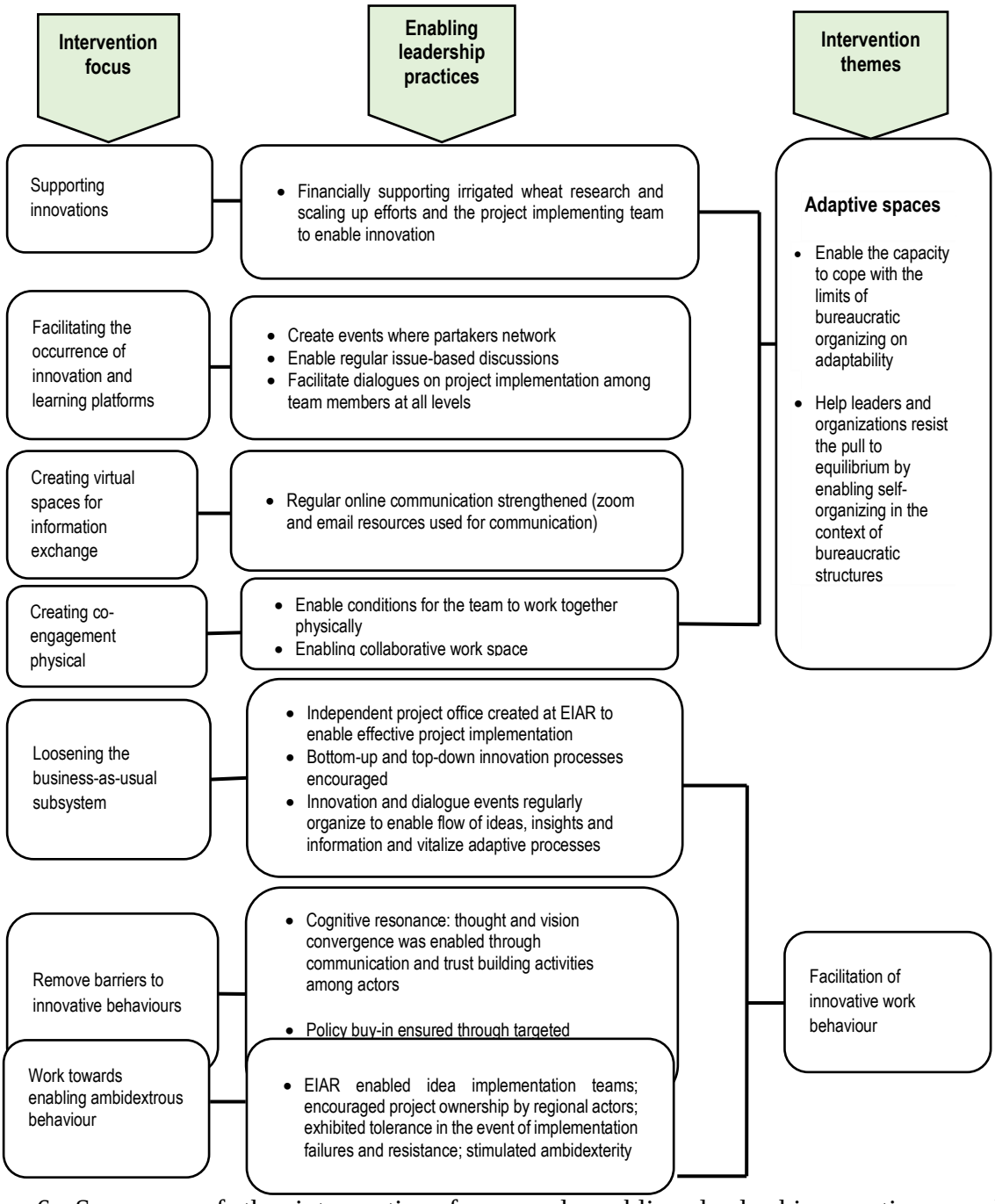


Figure 6. Summary of the intervention focus and enabling leadership practices used in implementation of an irrigated wheat project

7.3 Leadership practices used to enable an irrigated wheat adaptive space

As elucidated earlier, enabling leadership aims at facilitating organizational adaptability. It focuses on adaptive leadership practices that occur at the interface of the normal operational sub-system and innovation-oriented entrepreneurial sub-system of an organization thereby stimulating innovation and learning. Enabling leadership is a contemporary leadership model developed in

response to complex challenges and aimed at facilitating the creation of an adaptive organization that can thrive under emergent adaptive organizational challenges.

Enabling leadership practices guide leaders to manage complex adaptive systems. Enabling leadership practices depend on the context under which the organization operates. Leaders working under complex contexts are required to create a climate of collaboration, learning, and creativity that can be attained through collective engagement aimed at generating innovative ways of doing business that no one individual can produce alone. A summary of enabling leadership practices used in the process of implementing the irrigated wheat national initiative is presented in Figure 6. These practices were identified from irrigated wheat project documents through a retrospective analysis where practices were clustered using a thematic analysis approach.

Accordingly, five key thematic areas with implications for organizational adaptability were identified from the retrospective analysis of available project documents: practices that focus on enabling infrastructures; practices that helped engage in adaptive tensions; practices that enabled actors' connections to galvanize adaptive processes; practices that facilitated the evolution of the adaptive space, and practices that enabled innovative work behaviors (Figure 6).

8. Enabling leadership practices used for the implementation of the irrigated wheat project

The enabling leadership practices deployed in the process of implementing the Ethiopian irrigated wheat initiative are thematically summarized in Figure 6. In this section, some of the key practices are further expounded.

Present-day organizations operate under complex organizational settings. This implies that there is a need for them to operate in networks as doing so would enable conditions for organizational adaptability. This is the theme that was expounded in the previous two consecutive chapters. At no time in history has the complexity under which organizations operate been more obvious than it is today. The critical issue then is how organizational adaptability is enabled so that they can thrive in such complex settings.

It was underscored in the preceding chapter that leaders are required to engage in practices that help create and enable adaptive spaces in organizations. This chapter deals with the way enabling leadership is applied using the Ethiopian irrigated wheat production initiative as an illustrative empirical example. The project used in the present analysis was initiated and implemented with the vision of realizing national wheat self-sufficiency and production of surplus for export. In the following sections, the main enabling leadership practices used to enable the

irrigated wheat production initiative will further be expounded based on the results of the thematic analysis summarized in Figure 6.

8.1 Leadership practices used to strengthen and enable required infrastructure

The inadequacy of effectively functioning infrastructures was pinpointed to be one of the limitations to the creation of well-functioning irrigated wheat adaptive spaces. Enabling infrastructural resources is crucial for the project's adaptive process to evolve and finally result in an adaptive organization that thrives under emergent challenges. The present irrigated wheat project did suffer from limited infrastructure, among which limitations associated with irrigation schemes and the availability of water pumps can be cited. Shortage of vehicles to regularly monitor and embark on regular project supervision, especially at lower-level executive structures had also been critical. To enable the infrastructure base, the MoA and the MoF facilitated the design and implementation of enabling policies for the tax-free import of agricultural machinery and water pumps, among others. Together with other federal and state-level actors, the MoA has also facilitated the procurement and distribution of water pumps to improve the water use efficiency of existing irrigation schemes. At all levels, significant attention has been given to maintaining already existing irrigation infrastructures. Furthermore, the Ministry of Irrigation and Lowlands was recently established with a legal mandate of strengthening irrigation infrastructure specifically aimed at enabling the implementation of irrigated wheat in the lowland eco-regions of the country.

The EIAR leadership has also given significant attention to partnering with donors such as the BMGF and CIMMYT both of which have supported the initiative. In 2018, the EIAR leadership signed a partnership project that enabled the production of wheat foundation seed production with the Werer Agricultural Research Center as the project implementing center. With the support of this project, about 515 Qt of breeder seeds, 3804 Qt of pre-basic seeds, and 60,795 Qt of certified seeds could be produced, which remarkably supported the lowland irrigated wheat production initiative. In addition, the project also supported the acquisition of tractors and other farm implements to sustain foundation seed production.

Likewise, as of 2021, CIMMYT is also supporting the lowland irrigated wheat initiative, particularly focusing on support for wheat variety development through the introduction and screening of wheat genotypes for disease tolerance and other production traits.

8.2. Leadership practices to enable process of fine-tuning available wheat technological ingredients

Historically, research on irrigated wheat was started in 1969/70 at the then Werer Research Station in Afar, now Werer Agricultural Research Center.[2;3] Historical timeline of Ethiopian irrigated wheat research is depicted in Figure 7. The work was, however, discontinued in 1986/87 mainly due to a lack of attention by the then government. The irrigated wheat research work was reinitiated in 2006/07, twenty years after it was stopped.[4] In 2007/08, Werer Agricultural Research Center, in collaboration with Debre Zeit Agricultural Research Center, released its first Durum Wheat variety called *Werer-1* for production under irrigated conditions in the Afar region, and Fentale district of Oromia. Innovation refinement activities of previously released bread and durum wheat varieties were also carried out during the 2009/10 to 2010/11 period.

Research conducted over the past 15 years (means since 2006/07) has resulted in the official release of nine bread wheat, and one durum wheat variety, for production under irrigated conditions. The government has now given significant attention to wheat research and development work by designing enabling policies. It is hoped that the country's vision for wheat self-sufficiency and production of surplus for export can be attained by putting the potentially irrigable lowland areas under wheat using the available technical production options. This rationalizes the refinement of available varietal technologies under on-farm conditions. The EIAR leadership facilitated the technological refinement activities to validate the suitability of the available varietal options for irrigated conditions and the results from the activities are succinctly described in Table 1.

[2]The experiments then were initiated by Holeta Agricultural Research Center at Werer Research station

[3]During those early years, wheat genotypes introduced from the International Wheat and Maize Improvement Center (CIMMYT) were used. This gave rise to the release of three wheat varieties: Chenap, Blue-Jay and Paven-76. These varieties were recommended for the Middle and Lower Awash areas. Foundation seed of Paven-76 was multiplied by the then Middle Awash Development Enterprise in the late 1970s at Melkasedi Cotton Farm after cotton harvest. Though Paven-76 was recommended for production in the irrigated lowland areas, the then government polices did not enable its implementation. Productivity of irrigated wheat piloted at Werer between 1969/70 and 1986/87 revealed that a mean yield of 4.4tha-1 could be realized. This indicated the possibility of irrigated wheat production in lowland areas. Despite such potential, wheat production under irrigation did not receive significant attention. As a result, the initiative was discontinued in 1986/87.

[4]Source: Dr. Bedada Girma, personal communication

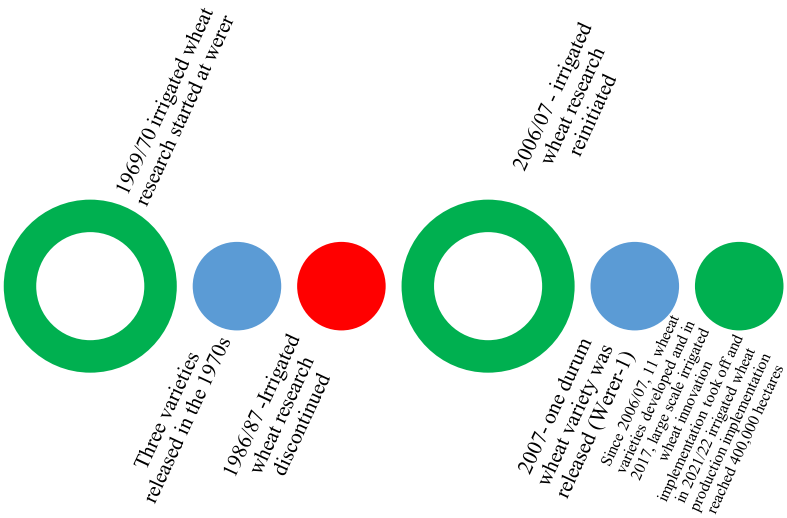


Figure 7. Historical timeline of irrigated wheat research in Ethiopia (Werer Research Center)

Table 1. Technology fine-tuning activities undertaken and the varieties recommended (Source: Werer Agricultural Research Center)

Location	Recommended	Source of information
On-station at Werer and Amibara	Amibara and Fentale	International Journal of Agricultural Innovations and Research 6 (2); 2017
On-station at Werer and Gewane	Werer-2 and Lucy	In: Proceedings of the 3rd Regional Wheat Progress Review and Planning Workshop, Adama, Ethiopia; 2014
On-station at Werer and Amibara	Amibara and Fentale	Journal of Development and Agricultural Economics. Vol. 13(17); 2018
Fentale and Gewane	Fentale-2, Fentale and Ga'ambo	Advances in Crop Science and Technology 8 (1); 2020
Amibara and Fentale	Amibara-2 and Fentale-2	Bio-Technology: an Indian journal. Research article Vol. 16 (1); 2020
Dubti	Ga'amboo, Utuba, Mangudo, Worer-2, Amibara and Fentale	Journal of Computing Technologies 7(1); 2018.
Arba-Minch	Lucy, Fentale-1, Amibara-2, Alidoro, Ogolcha, Daka, Fentale-2, Ga'ambo, Amibara-1 and Werer-2	African Journal of Plant Science 14(12); 2020

8.3 Leadership practices to loosen the rigid organizational sub-systems

Embracing tensions and interest conflicts in the adaptive space enables the loosening of the rigid business-as-usual sub-system, and facilitates the occurrence of flexible attitudes of actors engaged in the intervention implementation. To realize this, the EIAR and the MoA encouraged

organization-wide communication on issues of irrigated wheat production. Efforts were also made to create teams that take part in project implementation. Supports to wheat researchers, seasonal implementation teams, and other actors at the regional state level were given so that their innovative working behaviors were enhanced, which further enabled the innovation process to move forward. In the events of execution failures, a tendency to tolerate failures was demonstrated. As was also true in other organizations, EIAR departmental entities that usually are known for their disposition to operate in specialized professional silos were also stimulated so that they adapt and positively contribute to the success of the initiative.

Leadership practices that help to cope with the tensions that occur between research and technology implementation sub-systems of EIAR were also used to enable organizational agility. Pressures against normal operational cultures of the research system were intensified so that the research system would not remain in a state of insularity. This was partly accomplished by tirelessly communicating the adaptive challenges at hand to the research actors.

Demographic factors, global issues affecting national food supply, national economic challenges, and emerging technological trajectories were issues considered in the formulation of the adaptive challenge.[5] Efforts were also made to translate population growth-related challenges into a constructed form of pressure while designing the initial irrigated wheat project portfolio. This enabled the positive evolution of the irrigated wheat innovation process. By exploring external developments, emphasizing their significance and communicating the need to create an adaptive process, and framing the activities of the actors involved with guiding ideas, it was further endeavored to vitalize the activities of the irrigated wheat adaptive process. This was critical as adapting to changing external environments requires the exploration of external opportunities and challenges. In the original irrigated wheat project portfolio, the external and internal challenges were articulated, as quoted below, to create a sense of determination and speed up the evolution of the irrigated wheat innovation process.

"Ethiopian population will grow to 180 million by the year 2050 of which 50% will live in urban areas with the remaining 50% in rural areas…Climate change will put more pressure on wheat production worsening the gap between wheat demand and supply. The country is currently importing wheat alone with a value of $600 million per year leading to the depletion of the national

[5]These include issues such as Covid-19 pandemic and wars, the latter epitomized by the domestic war between the central government and other anti-government agents, and the war going on between Russia and Ukraine as they have implications for food security.

foreign currency stock though the country is endowed with a huge potential for wheat production. Intensive and extensive wheat production should be seen as alternative strategies to transform wheat production. It is also vital to promote wheat technologies and innovations to double wheat production by harnessing the potential of the country for wheat and sustaining positive changes over the years. To achieve such an ambitious plan, strengthening the current capacities of the research system and associated services is critical where production inputs, irrigation schemes, and mechanization will enable smallholder and commercial farmers' productivity, then leading to national wheat self-sufficiency. The country is spending $1.5 billion to import agricultural produce among which wheat is the major one and the import bill for the latter is predicted to increase at a higher rate owing to rapid population growth and booming urbanization. On the other hand, the country has huge potential in terms of arable land, water resources, suitable agroecologies, and agricultural technologies to boost national wheat production."

8.4 Leadership practices deployed to enable actors' diversity

Efforts were also made to bring diverse actors on board to partake in the implementation of the irrigated wheat project. Actors' diversity enables the creative potential of those actors participating in the execution of the wheat initiative. This was also believed to contribute to the advancement of innovative ideas and enable the innovative working behaviour of implementing entities. This is the result of the diversity in perspectives and knowledge sets within a group which can be leveraged to facilitate the adaptive process. Actors' diversity was thought to be vital as it reinforces the ability of organizations involved in the implementation to cope with adaptive pressures. Enabling leaders need to embrace diversity so that they can facilitate the exploitation of organizations' creative potential. It endeavored to achieve this by diversifying the composition of individual and organizational actors and connecting individuals of diverse backgrounds to work on the initiative.

Diverse agents did take part in the implementation of the Ethiopian irrigated wheat. The agents who participated in the project comprised actors involved in entrepreneurial, knowledge development, knowledge brokering, and advocacy activities (Table 1). Of the different actor groups involved, the role of entrepreneurial actors was thought to be crucial. These mainly include commercial farmers and seed producers. The commercial farmers mainly those in the Afar region well innovated with the irrigated wheat project and facilitated product marketing mainly during the early years of the initiative. This in some way encouraged the irrigated wheat adaptive process

to get moving forward. However due to challenges associated with finance and machinery, the entrepreneurial activities did not progress as envisioned in the later years, particularly in Afar. The engagement of commercial farmers was not sustainable and was generally rated to be weak which stifled the creation of a vibrant irrigated wheat adaptive space in the lowland areas. Key actors that participated in the implementation of the project are presented in Table 2 along with their roles in the process of implementation.

Table 2. Agents that participated in the irrigated wheat response initiative and their roles

Actors' domain	Agents	Agent's role
Entrepreneurial	• Pastoral community; and private commercial farmers	• Host and implement the intervention
	• Federal and regional state parastatal seed enterprises	• Seed supply for the initiative
	• Adama Tractor Assembly Factory	• Farm tractors and accessories supply
	• Herbicide and pesticide traders	• Herbicide and pesticide supply
	• Flour factories	• Market destination for wheat grain
Research	• Ethiopian Institute of Agricultural Research	• Wheat innovations; foundation seed production
	• International research centers (CIMMYT, ICARDA)	• Technical support; advocacy; partial grants; technical and financial support to learning-oriented platforms for enhanced skill development
	• Regional Agricultural Research Institute	• Intervention implementation partner; sources of technologies
Intermediary	• Federal and regional extension service departments	• Extension advisory services
Demand	• Flour factories; urban consumers	• Wheat and wheat product markets
Policy	• Ministries of Agriculture; Finance; Planning and Development; Ministry of Water and Energy	• Overall supervision; policy advice; lobbying and advocacy; finance support
Multilateral	• Africa Development Bank	• Grants to partially support the irrigated wheat initiative through the TAAT project; advocacy
Philanthropic	• Bill & Melinda Gates Foundation	• Grants to partially support seed production targeted for the irrigated wheat project; advocacy

8.5 Leadership practices to facilitate collective learning of project stakeholders

The exchange of ideas opens up adaptive spaces and enables the innovation process to be on track. An innovation process has two stages: innovation generation and innovation implementation. Dialogue events are thus vital to facilitate the stages of an innovation process. In the present wheat project, leaders of both EIAR and MoA fostered the creation of irrigated wheat

adaptive spaces by enabling dialogue platforms and regular interaction events among actors. The approaches were: co-planning and joint monitoring, organizing field days at different stages of crop growth, and post-implementation evaluation meetings, among others. See Figures 8a–h portraying sample events for the activities that were implemented in the Amibara district of the Afar region for the 2018 season.

Further connecting activities were also carried out: across-organizational interaction, for example, that of research and development, which worked against the business-as-usual professional silos. An effort was also made to encourage site-level implementation team members to maintain broad networks (connection with teams operating at other sites). An important lesson also was the fact that innovation implementation is a social process requiring interaction through weak ties or broad networks as such ties enable the innovation process to move forward (Perry-Smith and Mannucci, 2017).

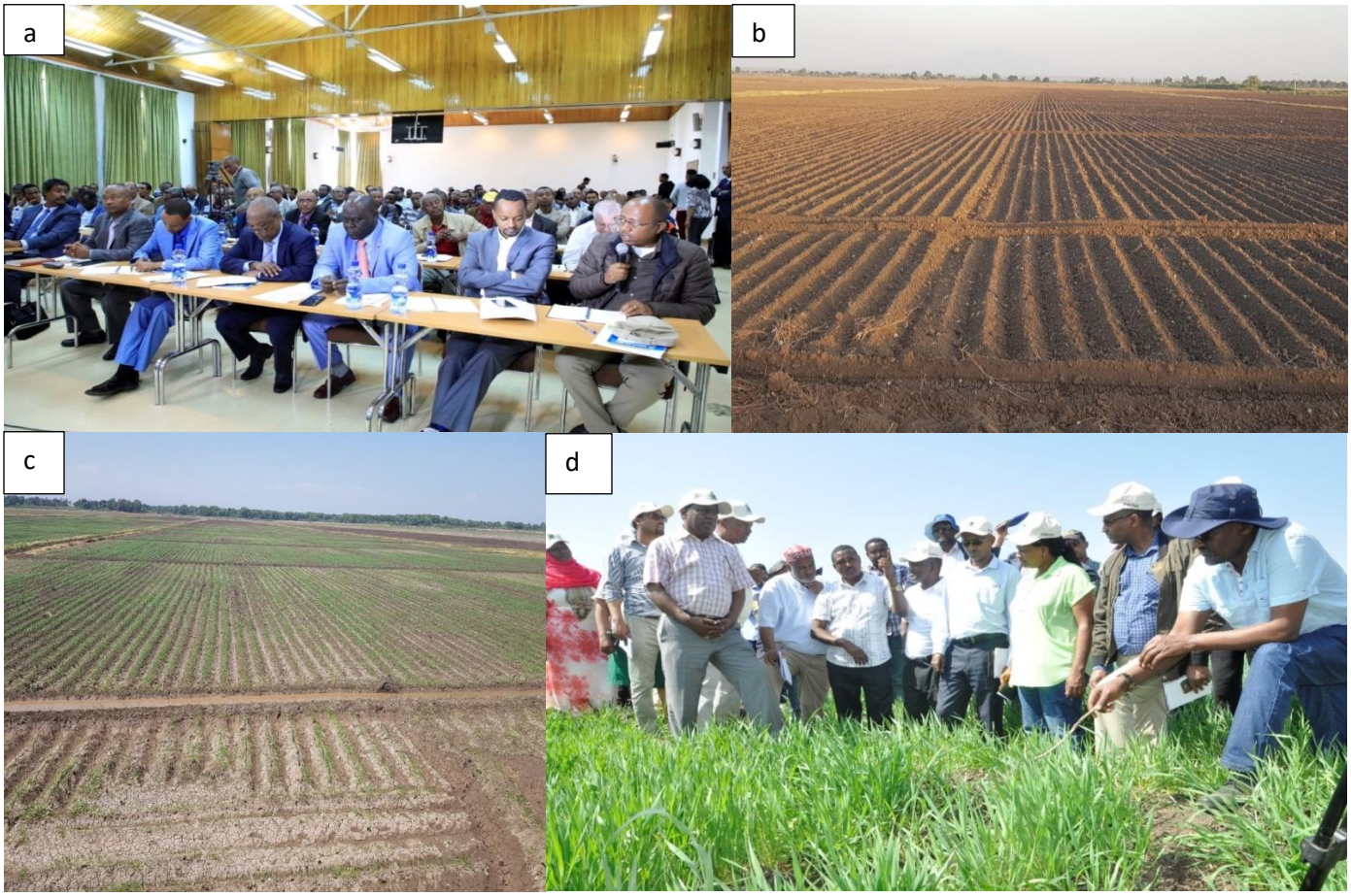


Figure 8. (a) Irrigated wheat production planning meeting conducted at EIAR HQ in 2019, (b) Land ready for planting, Amibara site in Afar, (c) Wheat at seedling stage, Amibara site in Afar, (d) Monitoring and evaluation in the presence of the Minister of MOA, Mr. Oumer Hussien, with a blue sunhat on the right-hand side (upper picture) and left-hand side (the bottom picture); and various members of the Standing Committee for Agricultural Development of the House of Peoples Representative of the Federal Democratic Republic of Ethiopia (FDRE), Amibara site in Afar, (e) Discussion being held at Werer Agricultural Research Center after the field visit was conducted at the vegetative stage (in the middle, the Minister, Mr. Oumer Hussien; to the left of the Minister, the then chair of the Agriculture Development Standing Committee of the House of Peoples' Representatives (HPR), Hon. Ms. Almaz Mesele; to the right of the Minister, the then State Minister for Agricultural Development Sector, Mr. Sani Redi), (f) Illustrating national field day at wheat maturity stage held at Amibara of Afar region (in 2018), (g) Post-implementation progress evaluation and planning event at EIAR headquarter (the above picture in 2019); in the middle is Dr. Sileshi Bekele (the then Minister of the Ministry of Water and Energy; to his left Mr. Oumer Hussien (Minster of the Ministry of Agriculture); to his right, Dr. Eyob Tekalign (State Minister of the Ministry of Finance), and (h) Post-implementation progress evaluation held in 2021 with discussion themes focusing on wheat technology development, foundation seed production, technology scaling, and enabling infrastructures

8.6. Leadership practices to enable the vitality of the adaptive process

Adaptive space activities that facilitate the occurrence of adaptive processes comprise brokering, connecting, inspiring, and challenging activities carried out by enabling leaders. The activities induce dynamism and enable the adaptive process to progress toward the creation of an adaptive organization. These activities will be discussed in the following four sub-sections.

8.6.1 Practices deployed to enable brokerage connections

In the present context, brokerage connection refers to the process of connecting a team innovating with the irrigated wheat ideas at a given site with a team at another site. This helps bridge existing structural holes, discover ideas, link with innovators outside the teams, and enable further innovations. It also facilitates the creation of an enabling landscape for the effective implementation of the initiative beyond the pilot sites (see the model in Figure 9). Brokerage connections provide intervention-implementing teams with access to new ideas from the other intervention sites. It is also used to spark creative solutions and enable opportunities to further scale the wheat initiative.

In the implementation of the irrigated wheat initiative, it was learned that collaborative teams that work at a site and across sites are vital in enabling the evolution of the irrigated wheat adaptive process. The retrospective analysis revealed that the intensity of connections among teams enabled innovative behaviors. Cohesively working teams enable the flow of ideas, insights, and information within and across sites.

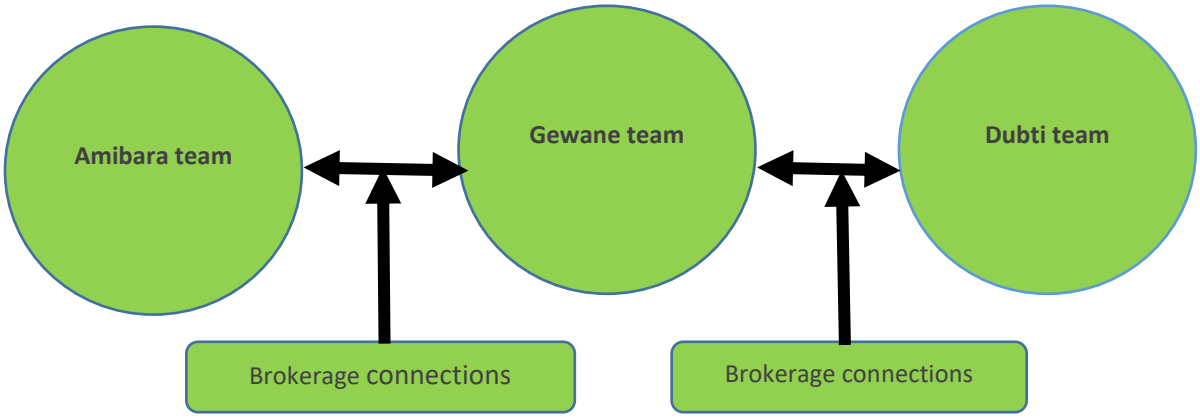


Figure 9. Depiction of a model brokerage activity across teams for irrigated wheat in Afar

Brokerage activities are critical in overcoming the overwhelming tendency of a team at one site to work in silos, which is normally called insularity. Insularity is a situation that stifles innovative work behaviors by locking people into a specific comfort zone. In the presence of insularity, team members become excessively influenced by the people within their main circle of influence - people with similar skills, experiences, and mindsets – and dismissive of individuals holding different views. Insularity limits the ability of organizations to drive to agility. Brokerage activities rather help overcome these silo inclinations by enabling the flow of ideas across operational teams located across wider project regions.

In the process of implementing the Ethiopian irrigated wheat project, the wheat research team worked cohesively with the technology dissemination team; a team at one innovation piloting site worked with a team at another site through the exchange of information and resources; regional research and extension teams worked closely with federal research and extension teams; donors worked closely with the research system to further the evolution of the irrigated wheat innovation process; the MoA team closely worked with EIAR team; all these bonds challenged insularity and enabled the wheat innovation process to positively evolve.

8.6.2. Leadership practices used to facilitate inter-team connections

Connecting activities, in the present perspective, refer to the degree of connectedness of a team at a specific initiative implementing site with a team at another site. This can be exemplified by the interconnections that might occur among the different teams established to implement the initiative at various locations along the Awash River in Afar during the early years (for example, see Figure 10).

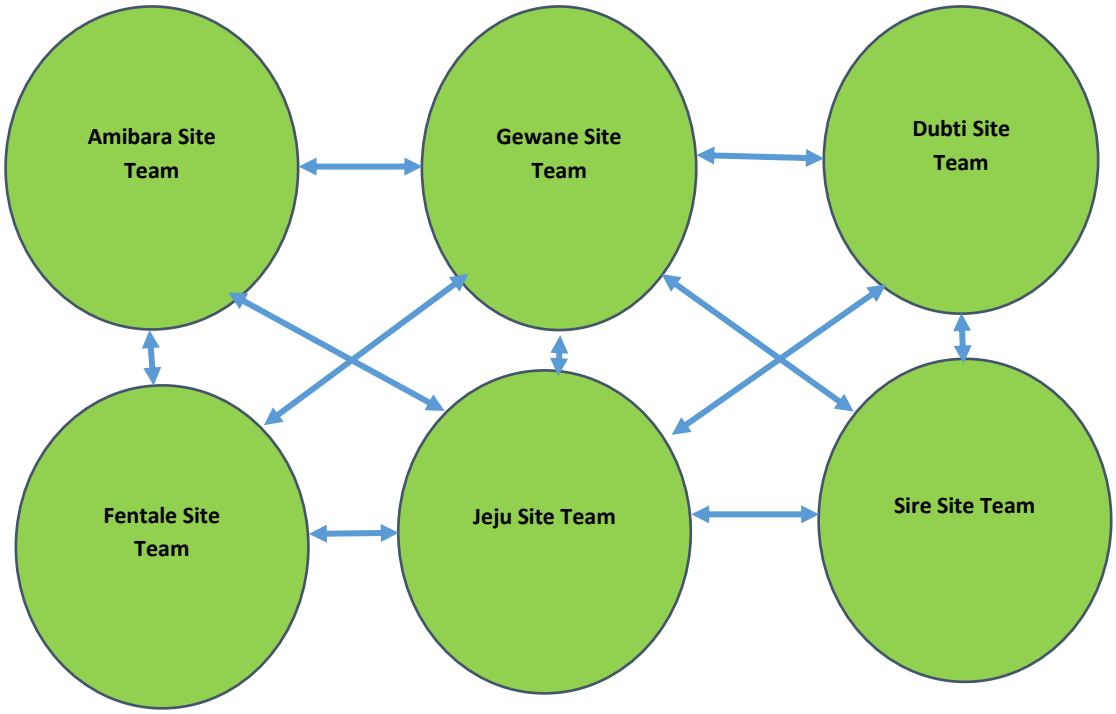


Figure 10. Depiction of inter-team connecting activities to energize the implementation of irrigated wheat initiative at three sites in Afar and Oromia in the early years of the project

A comparable approach has also been used in the later years to further scale the initiative to other regions such as Oromia, Amhara, Somali, and the SNNP regions. Connecting activities

enabled experimentation with the ingredients of the wheat innovation and further refined the same.

Connecting activities enable the diffusion of innovative ideas across teams. They also enable cohesion, help build trust, and diffuse ideas, among others. To enable connecting activities, two practices were deployed for the context of the irrigated wheat initiative: facilitating regular events to enable the occurrence of team spirit and facilitating across-location inter-team interactions. Such connections enabled the dynamism of the wheat innovation process and dissemination of the experiences gained across implementation teams (Figure 11).

Figure 11. Oromia region Rural and Agricultural Development Supreme Office officials visiting wheat at the mature stage located at Fentale, Sire, and Jeju sites in Oromia

Connecting activities favoured wheat variety development, foundation seed production, and refinement of existing and newly developed wheat varieties. These activities were aimed at refining available wheat innovations and have been facilitated by the EIAR. Enabling factors such as finance, reinforcement of irrigation infrastructure, crop health-related services, and realization of policy buy-in were mainly facilitated by the MoA. The EIAR and the MoA also created and enabled irrigated wheat buddies in the regional agricultural research institutes such as OARI and

SORPAI and activities of these regional teams were facilitated by the EIAR and the research leadership at the regional level.

At the national level, diverse connecting activities were facilitated. The EIAR and the MoA's top leadership did act as connectors of the various teams. The leadership wisdom at all levels was that of enabling a set of social interactions that enabled the fast evolution of the wheat innovation process. The process has at times been coarse and puzzling, with teams challenging one another to move faster, but they could enable the success as they had established a level of trust that allowed them to feel safe even when they were aggressive with one another. The lesson was that wheat technologies alone are insufficient, without technology diffusion and further refinement, innovation can't happen and an innovation process cannot thus progress and for these connecting activities of the adaptive space is vital.

8.6.3 Leadership practices used to enable broader network connections for wheat innovations to scale

A leadership that leverages broader networking is vital to scale innovations beyond the pilot sites. In the current irrigated wheat case, innovation refinement and further scaling were enabled by connecting the teams in the Afar region with the teams in Oromia during the early years. This led to further scaling of the innovations first to selected districts of East Shewa. Then dissemination of innovations further continued to the other zones of Oromia in the later years. This resulted in Oromia being one of the regions actively engaging in the production of irrigated wheat. To facilitate further scaling of irrigated wheat innovations, leaders at all levels facilitated the connectivity of the innovation teams with experts or specialists of different regions and zones, eventually making irrigated wheat production a national agenda and an integral component of organizational activities at both federal and regional levels.

This entails that the introduction of innovations into the normal organizational system requires innovative individuals and leadership that enable champions of change, and this further creates opportunities for further scaling. Some regional states lacked confidence in the irrigated wheat initiative during the early years where a high degree of uncertainty was demonstrated. But as the present wheat innovation process was championed by high-level policy-makers, the hesitation of the regions has gradually diminished. High-level policymakers supported the initiative by brokering the initiative with supporters. For example, the African Development Bank

and the World Bank have now allocated a substantial amount of loan money to enhance the sustainability of the government initiative toward wheat self-sufficiency.[6]

A key lesson from the wheat initiative was also that the commitment of high-level policy-makers helped energize the innovation process. This facilitated a further intensification of the irrigated wheat innovation by loosening the traditional normative pressures widespread across agriculture development-oriented organizations. Most of the regional governments that joined the initiative later could quickly adjust themselves quickly to the new irrigated wheat production for enhanced national wheat self-sufficiency.

8.6.4. Inspirational leadership demonstrated by high-level policy-makers facilitated the positive evolution of the wheat initiative

The implementation of the Ethiopian (irrigated) wheat initiative had been perplexing mainly during the early years. Leadership at the EIAR and MoA inspired the teams engaged in its implementation so that innovative ideas could flow freely and the team could easily push on. But the situation had sometimes been fatiguing. Looking back, there were times within EIAR when the leadership and implementation teams left their office de-energized primarily as a result of a lack of resources for executing the initiative. But those ups and downs mattered significantly as they encouraged agility in some or depressed others to be meek passengers on the bus.

The above situation forced the EIAR leadership to strive to acquire buy-in from high-level policy-makers. This was based on the reasoning that once a policy buy-in is achieved, future implementation of the project would be stress-free. It was believed that high-level policy-makers, once convinced, could facilitate the effective implementation of the initiative. As a result, efforts were made to bring them aboard through meticulous communication on the successes registered during the pilot phase, and this was effectively done. Accordingly, financial support was sustainably made for the project. The high-level policy-makers were also inclined to own the initiative and further amplified its importance and this reinforced the vitality of the actors involved.

Inspirational leadership enhanced the performance of the implementation teams by serving as an energizing factor. Inspirational leaders have a unique ability to actively engage others in driving a given initiative. In the case of the wheat initiative, this critical role was played

[6]For example, project preparation for the disbursement of some 70 million USD and 600 million USD from AfDB and the World Bank, respectively is close to finish line at present.

mainly by the Minister of the Ministry of Agriculture, the Prime Minister, and presidents of some regional governments (Figure 12). These patronages enabled the fast diffusion of the concept of the project across a network of actors vertically and horizontally. Policy directions from and discussions with high-level policy-makers inspired the diverse actors involved to act resourcefully. Regular dialogue events and encouragement from the Minister, the Prime Minister, and some regional presidents had a viral effect on the wheat initiative. It also enabled extra effort from the different stakeholders involved. As indicated earlier, high-level leaders also approached multi-lateral donors to support the irrigated wheat initiative. For example, the Prime Minister and the Minister of the Ministry of Agriculture attracted donors to support the initiative and join in for the cause mainly by coining the wheat initiative as "a matter of national sovereignty", which finally won the financial support of the multinational financiers such as the African Development Bank and the World Bank.

Figure 12 (a) The Ethiopian Prime Minister and other government officials visiting the irrigated wheat farm in the Adama district of East Shewa zone with African Development Bank and World Bank officials, and (b) The Ethiopia Prime Minister discussing with African Development Bank and World Bank officials after visiting the mature wheat field located in the Adama district

8.6.5 Leaders challenging the prevailing status quo enable positive organizational disruption and help facilitate the emergence of an agile organization

For organizations to be agile, they must create a space to embrace tensions and conflicts of interest. Challenging leaders have the vigor to incite a positive organizational disruption by ushering in new, bold ideas. They enable agility by challenging the prevailing status quo and breaking down barriers to agility. Challenging leaders diffuse the idea of change through the brick walls within organizations, and this in the end enables progress. The irrigated wheat initiative was started some 20 years back in Ethiopia (Figure 13). Even leaders within EIAR once considered it a futile exercise and that the program was abandoned. In 2016, a team in EIAR (challengers),

started communicating the idea of promoting irrigated wheat in lowland areas for national wheat self-sufficiency to be realized. The feedback from early piloting efforts was so positive that EIAR was able to convince policy-makers to take the initiative to scale. The initiative was a huge success, and later the Ethiopian government started financing it.

Overall, challenging leaders provoke positive disruption by promoting the new initiative as a new normal. Challenging leaders ignite change from within an organization by leveraging external demands as a catalyst for innovation. They enable agility by positively disrupting the status quo and breaking down barriers to progress. Old habits are hard to break. Challengers recognize that the world is changing rapidly and they need to help position their organizations to respond wisely to these changes. In the contemporary positively disrupted or be disrupted world, organizations need to provide the space to engage challenges openly. This scenario did occur in the process of implementation of the Ethiopian irrigated wheat. The initiative has now become the normal organizational activity as opposed to the frequent opposition it experienced at the outset.

Figure 13. The Ethiopian Prime Minister visiting a wheat field in Somali Region with the regional president

8.7. Leadership practices used to manage tensions

Operational tensions commonly occur between the innovation-oriented and business-as-usual sub-systems of an organization. In the case of the present wheat initiative, this tension was considered vital to enable an ambidextrous and innovative behavior of the actors involved. To

embrace this tension and enable actors to be ambidextrous, it was endeavored to allocate adequate financial resources for actors to concurrently switch between exploitative and explorative activities. Under the Ethiopian context, research and development organizations are reliant on the government for the financial resources required to enable adaptive space activities. If the government allocates the necessary financial resources for the ambidextrous and innovative processes to advance, actors involved in intervention implementation can further the vitality of the adaptive process.

It was also necessary to deliberately assign agents and teams to either explorative or exploitative activities. In this regard, an independent coordination unit working on irrigated wheat was created within EIAR. The coordination office enabled the actors involved to pivot in real time to some degree and facilitated the wheat adaptive processes to keep going forward. This was possible due to the freedom the office had from the stifling effects of the normal bureaucratic organizational structures. The creation of this separate entity for the initiatives at the EIAR headquarter was rooted in the concept of structural ambidexterity that aims at striking a balance between explorative and exploitative organizational units. This can also be considered as one of the aspects of engaging conflicts in the adaptive space to intensify the agility of the irrigated wheat adaptive processes. An effort was also made to create an innovation and learning platform where actors interact with each other and engage in dialogues on issues of irrigated wheat production. Regular online communication platforms using virtual spaces such as zoom and email facilities were strengthened to enable effective communication. Implementation teams were also provided with physical space where they actually come together to discuss issues relevant to the wheat subsector in general and the irrigated wheat initiative in particular.

8.7 Leadership practices used to enable innovative work behaviors

Two themes related to practices that enable innovative work behaviours were identified that were found to significantly contribute to the success of the Ethiopian irrigated wheat initiative: loosening the business-as-usual operational sub-system of the research and development organizations, and the removal of barriers to innovative work behaviours the actors involved. With reference to the loosening of the business-as-usual operational systems, the irrigated wheat project was led through a distinct coordination office established at the EIAR headquarter. This specific unit enjoyed a certain degree of freedom to act and was free from the stifling features of business-as-usual and the technology generation-oriented sub-system of the

research institute. The technology generation sub-system of the institute is well-known for its emphasis on experimental activities than the irrigated wheat innovation development-oriented sub-system. Most of the technical research entities were covertly suspicious of the realization of irrigated wheat initiative. Rather they were more inclined to their normal research activities, the role which is consistent with the formal mandate of the institute.

Quite the reverse, team members who participated in the irrigated wheat project embraced both open and closed tendencies to enable the tension that arises between the traditional and innovative sub-systems of the institute. The main trouble encountered in the process of implementing the irrigated wheat initiative was the traditional thought pattern that stem from normal organizational sub-system within both EIAR and the MOA system. Such traditional outlooks favour formal organizational activities, which rather hinder adaptive dispositions. An important issue to stress at this juncture, however, is that though this inclination can be perceived as unfavorable to innovation, it is yet necessary to support the regular activities of the institute. The mixed-use of opening and closing leader behaviours as discussed in the 12th chapter is thus vital to enable the evolution of the irrigated wheat adaptive process.

The coordination office together with the top leadership of EIAR further facilitated the occurrence of bottom-up and top-down adaptive processes and enabled the occurrence of a series of dialogue events to enhance learning and innovation, which was hoped to enable flexible dispositions that further facilitate the creation of a dynamic adaptive process. The leadership at EIAR and the MOA also devotedly worked to enable regional-level project implementers in the later years. A distributed form of leadership was also adopted where leaders at the federal level passed responsibility down to the regions, this aimed at enabling region-level project teams to effectively undertake their duties. Those actors at the federal level mainly engaged in key support areas such as input supply, finance disbursement, and technical capacity building so that the initiative will be sustained.

To remove barriers to the irrigated wheat innovation process, two factors were found to be vital: cognitive resonance and policy buy-in. Cognitive resonance refers to the convergence of thought and vision of actors, and this was found to be critical for the success of the irrigated wheat initiative. Cognitive resonance was enabled mainly through regular communication facilitated by the top management of the Ministry. A major challenge associated with cognitive resonance was the failure of some individual and organizational actors partaking in the project implementation

to recognize the long-term and multi-dimensional role of the irrigated wheat initiative, commonly judging it from the technical feasibility point of view. Some actors were also suspicious of its sustainability. The initiative nevertheless had a substantial policy buy-in which contributed to its wider promotion and momentous achievement, the success of which has been extensively popularized within and beyond Ethiopia (see Table 3 for the irrigated wheat productivity and production accomplishment trend data). Key government ministries directly or indirectly enabled the initiative. Policy buy-in was further reinforced by continuous and extensive information sharing on the initiative.

Table 3. Trends of irrigated wheat area and productivity (2012-2021) (Source: Werer Agricultural Research Center)

Year	Area covered (ha)	Productivity (tone ha^{-1})
2012	1	2.9
2013	3	3.9
2014	30	4.2
2015	58	3.7
2016	109	2.9
2017	804	3.8
2018	3,502	4.4
2019	15,100	4.1
2020	187,240	4.0
2021	400,000	4.0

Virtual and physical meetings were also used to enable the occurrence of a networked innovation process. These events were considered as illustrations of an adaptive space, as they combine enabling leadership activities that open up adaptive spaces. Different forms of meetings, such as networking events or facilitated group settings were used to bring diverse actors together deliberately for their different sets of knowledge to clash and spark ideation processes. Concerning the conflicting process, this combined features of heterogeneity with the networked idea generation theme. In view of the connecting process, meetings enabled networked innovation development, for example, by connecting individuals around specific topics. Virtual space, primarily in the form of online innovation platforms did also support the adaptive process by connecting diverse actors. A collaborative workspace allows employees to meet at random and contribute to the emergence of broad network connections that embrace heterogeneity, the latter favoring networked idea generation. Physically working together enabled project team members

to create cohesion. This helped to create a safe environment where individuals would share and refine their ideas.

9. Conclusion

By and large, the past five years have required the country's leadership to be adaptable to cope with several complex challenges that the country faced. In the food and agriculture sector, the challenges encountered, among others, include: food price inflation, covid-19 pandemic, desert locust, drought, and wars. Though the leadership style used in the implementation of the irrigated wheat initiative was not designated as such, it was the enabling leadership, which was deployed to cope with these complex challenges. Enabling leadership refers to leadership practices that enable the positioning of individual and organizational agents by creating adaptive spaces. The connecting and conflicting dynamics in the adaptive space further stimulate adaptive processes. Activities that stimulate adaptive processes ultimately enable the creation of adaptive organizations. The EIAR, the MOA, and some regional agricultural development Bureaus have now become adaptive organizations that can pivot in real time to take part in irrigated wheat initiatives with no trouble. In enabling leadership framework, leaders' effort changes from a technical process to an adaptive process, the latter aimed at facilitating flexibility so that employees, leaders, and organizations can deal with emergent complex challenges that the organization is striking with head-on. The enabling leadership framework incorporates three main leadership styles that facilitate the creation of adaptive spaces, enable the adaptive processes and eventually create an agile organization. These include operational, entrepreneurial, and enabling leadership styles. Operational leadership style is the managerial approach to leadership to undertake normal order-driven organizational activities. Entrepreneurial leadership is the source of new ideas, innovation, learning, and growth for the organization and this leadership style enables the diffusion of new ideas and innovations into the business-as-usual sub-system of an organization. Enabling leadership is about enabling conditions that sustain an adaptive space, and is a unique form of leadership introduced by complexity thinking. By engaging in operational and entrepreneurial leadership, enabling leadership facilitates organizational agility under complexity. An enabling leadership approach brings with it a unique set of leadership skills listed below.

- Enabling leaders are personally adaptive and can adjust their leadership styles in response to emergent adaptive challenges and their read of the situation.

- Understanding the nature of complexity and emergence, enabling leaders are able to initiate the emergence process by energizing others to act and then when the shift begins, be disciplined enough to step into the background so the innovation process can move forward.
- Enabling leaders know that the only way to build an adaptable organization is to unleash the capacity of actors to regularly see and enact adaptive responses.
- An adaptive space enabled by enabling leadership is an active learning process. It involves an ongoing balance of knowing when to be visible to catalyze others and when to be invisible to enable others. Thus, at times enabling leaders need to act as a catalyst, standing up and challenging the organization to be bolder, and at other times stepping away so that others can rise up.
- In the present-day complex world, it is vital that leaders employ enabling leadership. Complexity requires that leaders understand the interconnectivity that triggers the forces of change in organizations and learn to interact and engage with it. Therefore, using enabling leadership rather than order-driven responses is recommended to cope with complex challenges that an organization might face.

References

Geleti, D. (2020). Revitalizing the socio-technical transition of Ethiopian Agriculture (Unpublished Doctoral Thesis). Ethiopian Institute of Agricultural Research, Ethiopia.

Kiron, D., Kane, G. C., Palmer, D., Phillips, A. N., & Buckley, N. (2016). Aligning the organization for its digital future. MIT Sloan Management Review, 58(1).

Arena, M. J., & Uhl-Bien, M. (2016). Complexity leadership theory: Shifting from human capital to social capital. People and Strategy, 39(2), 22.

Uhl-Bien, M., & Arena, M. (2018). Leadership for organizational adaptability: A theoretical synthesis and integrative framework. The Leadership Quarterly, 29(1), 89-104.

Cross, R., & Cummings, J. N. (2004). Tie and network correlates of individual performance in knowledge-intensive work. Academy of Management Journal, 47(6), 928-937.

Burt, R. S. (2004). Structural holes and good ideas. American Journal of Sociology, 110(2), 349-399.

Singh, J., & Fleming, L. (2010). Lone inventors as sources of breakthroughs: Myth or reality? Management Science, 56(1), 41-56.

Fleming, L., Mingo, S., & Chen, D. (2007). Collaborative brokerage, generative creativity, and creative success. Administrative Science Quarterly, 52(3), 443-475.

Cross, R., Baker, W., & Parker, A. (2003). What creates energy in organizations? MIT Sloan Management Review, 44(4), 51-56.