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## Enabling Markets and Public-Sector Actions for Catalysing Transformation for Small-Scale Agricultural Producers under Climate Change

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### Highlights

- Well-designed markets and public-sector actions can incentivise the adoption of climate-resilient agriculture and improve livelihood opportunities for farmers.
- Several novel initiatives to incentivise the adoption of sustainable practices have demonstrated potential to contribute to food system transformation.
- Private-sector co-investments with small-and-medium enterprises (SMEs) and farmer cooperatives aim to accelerate financial inclusion and scale climate-resilient agriculture.
- National policy should promote the adoption of low-emissions practices, such as alternate wetting and drying (AWD) innovations in rice systems.

### 5.1 Introduction

There is now widespread consensus to support transformative change processes in food and agricultural systems, to mitigate and adapt to climate-induced shocks and ensure equitable livelihood outcomes, particularly for small-scale agricultural producers (Steiner et al., 2020). Well-designed markets and public-sector actions can incentivise the adoption of climate-resilient practices and radically improve livelihood opportunities for farmers. Although numerous nascent initiatives have been deployed to incentivise adoption, far fewer have demonstrated the potential to catalyse transformation in the small-scale sector, to build resilience as well as place farming systems on low-emission trajectories, where possible.

This chapter outlines market-based and public-sector actions that have been implemented to drive adoption of climate-resilient practices by small-scale producers on a large scale and which demonstrate potential to contribute to food system transformation. Among these are public-sector market-based actions that unite farmers with small and fragmented landholdings in agricultural

commercialisation clusters. In recent years, various countries have established agri-based clusters among small-scale producers, to create diversified markets that enhance household incomes. The emphasis on investing greater resources towards market-orientated opportunities for such farmers is partly in response to rapidly growing cities and urban food markets, particularly in Africa, which offer opportunities for stimulating local and regional markets (AGRA, 2020).

Other novel efforts comprise private-sector co-investments with small-and-medium enterprises (SMEs), or SME agribusinesses and farmer cooperatives to accelerate financial inclusion and the scaling of climate-resilient agriculture. A few leading financial institutions such as Rabobank have supported initiatives that leverage co-investments into small-scale agriculture while fostering inclusive business cases that build farmers' capacities and incentivise the adoption of climate-resilient practices. Finally, several developing countries, particularly in Southeast Asia, have taken public-sector actions to incentivise low-emission practices, such as alternate wetting and drying (AWD) innovations in rice systems (Enriquez et al., 2021; Tran et al., 2018). Such efforts are implemented as part of countries' Nationally Determined Contributions (NDCs) and policy goals to limit global warming to within 1.5–2°C. Public-sector support towards mitigation activities linked with adaptation co-benefits, for example, improvements in productivity and livelihood security, will be crucial given that reducing greenhouse gases (GHGs) is not usually a goal for small-scale producers.

## **5.2 Public-Sector Market-Based Actions**

Small-scale producer participation in local and regional markets is often limited and impacted by volatile prices, high transaction costs, and unpredictable and unstable policy interventions. These risk factors associated with market engagement also tend to discourage small-scale producers from adopting well-known climate-resilient practices, particularly if they do not see immediate livelihood benefits. At the same time, supportive agricultural policies can also be a powerful tool to achieve market integration and food system transformation when they provide incentives and allocate resources to increase production, productivity, and value addition, while addressing the need for functioning markets and institutions (ASARECA, 2021). In the coming decade, one of the key challenges will be to bring about 200 million farmers into appropriate markets that can enhance rural incomes and incentivise the adoption of climate-resilient practices (Steiner et al., 2020). Various countries in Asia, Latin America, and Africa have implemented geographically focused commodity value-chain clusters to facilitate small-scale farmers' access to appropriate technologies, agronomic services, and markets, to drive agricultural transformation and rural industrialisation (Gálvez-Nogales, 2010).

One such initiative in Ethiopia, the Agricultural Commercialisation Clusters (ACC) initiative, targets nearly 5 million smallholder farmers in 24 geographic clusters, across 300 *woredas*, or districts, located within four major agricultural regions: Oromia, Amhara, Tigray, and the Southern Nations, Nationalities, and People's Region (SNNP) (Box 5.1). ACC take a value-chain approach to support activities in five priority areas, namely input supply and distribution; commodity production; aggregation, storage and transport; processing and value addition; and

### Box 5.1

#### **Agricultural Commercialisation Clusters in Ethiopia**

In 2010, the government of Ethiopia established the Agricultural Transformation Agency (ATA) and its flagship programme, the Agricultural Commercialisation Clusters (ACC) initiative, as part of the national growth and transformation agenda. Specifically, the ATA supports the Ministry of Agriculture and partners in the agriculture sector to deliver multiple interventions and address systemic bottlenecks to achieve growth and food security. The ACC initiative targets 10 priority crop commodities – wheat, teff, maize, sesame, malt barley – and horticulture crops – tomato, onion, banana, mango, and avocado – in Ethiopia's four major agricultural regions. The programme brings together smallholders with fragmented landholdings to achieve economies of scale by sharing costs related to agronomic training, certification, and technology application, as well as to collectively market produce.

Recent studies on ACC's performance and livelihood impact show increases in productivity as well as economic growth. Simulations from a representative sample of farmers in the initiative indicate average productivity increases across all considered ACC scenarios for wheat, teff, maize, and barley, with productivity improved by 29.6 percent, 21.1 percent, 12.8 percent, and 12.6 percent, respectively (Louhichi et al., 2019). ACC also contributed to improvements in farm incomes, with gross income increasing by roughly 14 percent, as well as a reduction in the extreme poverty gap, at around 2.1 percent throughout the country (Louhichi et al., 2019).

Through its innovative and timely market integration, the ACC initiative is helping a country of more than 110 million people catalyse and endorse a transformational food system. Lessons from the ACC informed African Union efforts when launching a revolutionary new tool in 2018, the Africa Agriculture Transformation Scorecard (AATS), which aims to drive agricultural productivity and development. Such a tool shows the collective interest and importance given to government-led programmes that either incentivise or provide financial resource access to smallholder farmers.

marketing and export. ACC have benefited smallholder farmers in multifaceted ways, for example, better and timely distribution of improved seed, fertiliser, and agri-chemicals; easier access to input financing, for example, through input voucher sales systems; training and large-scale demonstrations; and contract farming agreements (Louhichi et al., 2019).

### **5.3 Private-Sector Co-Investments**

In many developing countries, SME agribusinesses and farmer cooperatives serve as the primary linkage for small-scale producers to engage in markets and, increasingly, to use new technological innovations (Groot et al., 2019), while adding value to produce through cleaning, processing, and packaging. In Sub-Saharan Africa, for instance, SMEs make up about 80 percent of the private sector operating in the agricultural wholesale, logistics, and processing value chains (AGRA, 2019). However, SMEs face major obstacles in accessing financial services and growing their business. Financial institutions are often wary of serving them due to various risks associated with operating in smallholder agricultural value chains, such as numerous small-volume transactions, lack of traditional collateral, and geographic isolation.

Rabobank is among a few leading commercial financial institutions that have long recognised the potential and entrepreneurship of SME agribusinesses and farmer cooperatives in developing countries. It has supported micro-finance projects in Africa, Latin America, and Asia for nearly two decades. Today, Rabobank's foundation invests over 35 million Euros annually in financial services for SMEs and farmer cooperatives, which serve an estimated 3.3 million small-scale farmers in developing countries (Rabobank, 2019). Among the financial services offered are loans and entrepreneurial training to increase production efficiency and technology adoption, achieve economies of scale, and improve their bargaining power in value chains. With years of experience assisting SMEs and farmer cooperatives to develop viable business cases, Rabobank now works with a broad range of partners to facilitate private-sector co-investments in smallholder agriculture, catalyse even greater financial inclusion, and sustainably increase food production. Some of these efforts have the potential to aid food system transformation; this is particularly relevant in initiatives that leverage co-investments into smallholder agriculture from SMEs, farmer cooperatives, and other impact investors while fostering inclusive business cases that build farmers' capacities and incentivise the adoption of climate-resilient practices.

In East Africa, Rabobank is working with a consortium of partners as part of the Climate Resilient Agribusiness for Tomorrow (CRAFT) project, which in three years alone leveraged 12.2 million Euros in co-investments for 50 SMEs and farmer cooperatives (Box 5.2).<sup>1</sup> These actors have a targeted outreach of

**Box 5.2****Empowering SMEs and Farmer Cooperatives in the CRAFT Project, East Africa**

Running between 2018 and 2023, the CRAFT project supports inclusive agribusiness SMEs and farmer cooperatives to increase climate-resilient farming systems, through sustainable intensification along selected oilseed, pulse, and potato value chains in Kenya, Uganda, and Tanzania. The project implements the following activities to achieve its objectives (SNV et al., 2017):

1. Climate risk analysis of targeted value chains and identification of business opportunities that address climate change in agriculture.
2. Business case development and co-investment through the climate innovation and investment facility with the private sector, SMEs, and farmer cooperatives.
3. Levering investments by facilitating access to finance in collaboration with financial institutions.
4. Influencing policies to foster the large-scale roll-out of climate-smart agriculture in East Africa.

In less than three years, the project has awarded co-investment grants to 50 SMEs and farmer cooperatives to scale up the adoption of CSA-related innovations, not merely through the distribution of agri-inputs but via stimulating multiple support functions to build farmers' capacities and incentives for CSA uptake. Support functions include access to reliable markets through contractual agreements, CSA agronomic extension, and the related bundled service.

The CRAFT project aims to reach 300 000 smallholder farmers in the three countries by lending support to a total of 60 agribusiness SMEs and farmer cooperatives over a three-to-four-year period. Indeed, all CRAFT-supported SMEs and farmer cooperatives have committed to increasing the number of farmers they work with, usually from a baseline of 500 or 1,000 producers to over 3,000 over three years. Responding to these much greater numbers of clients and moving from pilot to scale required SME companies to enhance their in-house capabilities to meet various demands. As such, CRAFT-supported SMEs and farmer cooperatives have also outlined plans to expand or adjust their operations, such as by hiring more field staff or village agents who can provide sales and services on behalf of companies or by acquiring additional equipment and machinery to increase processing. Emerging evidence from the project shows that SMEs and farmer cooperatives are expanding financial inclusion for their farmer-beneficiaries through strong, integrated market relations, which are also an important entry point for scaling CSA practices.

251 809 smallholder farmers, using inclusive business approaches that provide information and skills training in climate-smart agriculture (CSA) practices, together with access to climate information services, credit, and to reliable markets

through contractual agreements. The theory of change underpinning inclusive business models in CRAFT is that market players can combine profitability targets with societal and environmental sustainability impacts to help build climate-resilient food systems that increase income and food security (SNV et al., 2017). Although still in its early stage, the CRAFT initiative demonstrates the power of so-called unbankable small- and medium-market players to contribute to food system transformation in local and regional contexts. Where more broadly supported, these players can then accelerate greater financial inclusion for smallholder farmers and help catalyse sustainable agricultural development and lasting food security.

#### 5.4 National Policy Adoption of Low-Emissions Practices

While some climate-resilient practices, particularly those with immediate productivity and income co-benefits, tend to be well suited for deployment through private-sector channels, others may require greater public-sector support and incentives for large-scale adoption among small-scale producers. This is particularly true for agricultural practices with mitigation benefits, where rewards for immediate livelihood security may not be great. As such, the most promising mitigation options in agriculture tend to be those facilitated through enabling policy incentives and with co-benefits or outcomes, including improved yields, incomes, and livelihood security, while lowering demand for inputs and labour (UNEP, 2015).

Mitigation efforts in agriculture are crucial given that the sector is a major driver of climate change, contributing to 21–37 percent of total anthropogenic GHG emissions (IPCC, 2019). Indeed, the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) obliges member states to limit global warming within 1.5–2°C above pre-industrial levels. Through NDCs and related policy goals, each country must develop and implement GHG mitigation options from different sectors, including agriculture. Many developing countries, however, face challenges in implementing large-scale agricultural mitigation options considering potential trade-offs against food security objectives or farmers' livelihoods (Tran et al., 2018; UNEP, 2015). Several rice-growing nations in Southeast Asia have adopted alternate wetting and drying (AWD) techniques in their rice production systems as a key climate mitigation action in line with NDCs (Enriquez et al., 2021).<sup>2</sup> Among them are Vietnam, Bangladesh, Philippines, and Thailand.

Alternate wetting and drying is a water-saving irrigation technique in rice production, which involves periodic drying of paddy fields during the growth period. This technology is estimated to reduce GHG emissions by up to 40 percent (Ishfaq et al., 2020), while helping farmers adapt to water scarcity conditions, such as drought (Enriquez et al., 2021). Alternate wetting and drying is also shown to increase overall production efficiency, through lower irrigation costs, and if

implemented correctly can raise yields while improving grain quality (Lampayan et al., 2015). It was developed by the International Rice Research Institute (IRRI) and its partners in the early 2000s and is primarily promoted in Asia. However, after nearly two decades of successfully applying AWD, wide-scale adoption of the technology remains limited in most of these countries. In the Philippines, for instance, AWD adoption in 2016 was estimated at 60 559 farmers, covering 84 784 ha of land, which represented less than 5 percent of the total irrigated area of 1.86 million ha (Rejesus et al., 2017). Farmers were apprehensive of the technology, as reducing water and seeing dry soil phases starkly contrasts their traditional practice of continuous flooding (Enriquez et al., 2021). An exception has been Vietnam where AWD has spread more extensively (Box 5.3), mainly

### Box 5.3

#### **AWD as a Policy Priority in Vietnam**

Vietnam is the world's fifth-largest producer of rice, growing multiple rice crops annually on 7.7 million ha of planted area, of which more than 90 percent, or 7 million ha, is irrigated; this includes irrigation through continuously flooding, recognised as a major source of GHG emissions (IRRI, 2020). The Mekong River Delta (MRD) accounts for more than half of Vietnam's rice production. IRRI initiated AWD in the Delta in 2003 and provincial MRD governments quickly incorporated the technology into their agrarian policies and extension programmes (Yamaguchi et al., 2016). By 2009, AWD was officially adopted as the primary water-saving technology, which the Department of Agriculture and Rural Development helped disseminate through training workshops and field exhibitions, as well as by provision of water channels for irrigation and drainage (Yamaguchi et al., 2016). Farmers in this region saw increases in rice productivity due to AWD and adoption of the technology also expanded. By the 2014–15 production season, over 120 000 farming households had implemented AWD on roughly 120 000 ha, accounting for 52 percent of the total paddy area (Yamaguchi et al., 2016).

The Vietnamese government was also early to recognise the benefits of large-scale AWD implementation, including reductions in water use and methane, as well as increased nitrogen-use efficiency. Alongside other water-saving techniques, since 2011, Vietnam's Ministry of Agriculture and Rural Development has also prioritised AWD as a key option for agricultural GHG reduction, a measure that has been reinforced under its NDC (IRRI, 2020). The government aimed for 3.2 million ha of rice cultivation areas to utilise AWD by 2020 and an additional 1.5 million ha by 2030 (CCAFS, 2014; IRRI, 2020). In recent years, various countries in Southeast Asia have also put in place national policies to scale-out AWD, considering it a key adaptation and mitigation measure for meeting their NDCs (Enriquez et al., 2021). The technology is now being mainstreamed in extension efforts by public institutions, as well as by multiple other stakeholders such as NGOs and research organisations.

because government policies identified it as a primary water-saving technology since the early-to-mid 2000s and provided the necessary incentives and support for its uptake (Yamaguchi *et al.*, 2019).

### 5.5 Way Forward

We have shown that well-designed markets and public-sector actions can help small-scale producers improve their farm productivity and livelihoods while mainstreaming climate-resilience practices, both at the farm level and in the broader agriculture sector. In this respect, both public-sector and private-driven initiatives are critical to facilitating markets that benefit small-scale farmers in ways that mitigate the risks associated with price fluctuation, intermediary and transaction costs, and unpredictable government regulations. For instance, working together with partners, the Ethiopian government has implemented geographically focused commodity value chain clusters, ACC, to expand access to improved inputs and credit, extension services, and markets. Rabobank is working with a consortium of partners in several other countries in the region to facilitate private-sector co-investments in smallholder agriculture, with SME agribusinesses and farmer cooperatives, to accelerate financial inclusion and the scaling of climate-resilient agriculture.

Considering not all climate-resilient practices carry immediate productivity or other co-benefits – particularly mitigation interventions – public support and incentives will be crucial in facilitating large-scale adoption among small-scale farmers. Various rice-growing nations in Southeast Asia, namely Vietnam, Bangladesh, Philippines, and Thailand, have identified AWD as a key climate action in their NDCs and other policy provisions, and have set targets to scale-out the technology to more farmers. Overall, the most promising climate mitigation options likely to drive food system transformation tend to be facilitated through enabling policy incentives, while having adaptation co-benefits or outcomes, including improved yields, incomes, and livelihood security while lowering demand for inputs and labour (UNEP, 2015).

#### Notes

- 1 CRAFT is being implemented by a consortium of five partners: SNV, Wageningen University (WU) and Wageningen Environmental Research (WEnR), the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), Agriterra, and Rabo Bank.
- 2 Rice cultivation, particularly flooding of irrigated rice fields, is a major source of methane emissions, accounting for 10–14 percent of total global anthropogenic methane emissions (Tivet & Boulakia, 2017).



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