

MCC Agricultural Economy Program Design Toolkit

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ABBREVIATIONS

ACA: Agricultural Constraints Analysis
 AfCFTA: African Continental Free Trade Agreement
 AgCLIR : Agribusiness Commercial, Legal, and Institutional Reform
 CA: Constraints Analysis
 CAADP: Comprehensive Development Program for African Agriculture
 CGIAR: Consultative Group on International Agricultural Research
 CRSA: Climate and Resource-Smart Agriculture
 DPE: MCC Department of Policy and Evaluation
 EIF: Entry into Force
 ERR : Economic Rate of Return
 ESP: Environmental and Social Performance
 FAO: Food and Agriculture Organization
 FOLU: Food and Land Use Coalition
 FIT: Finance, Investment, and Trade
 FTF: Feed the Future
 FVC: Food Value Chain
 GFSS: Global Food Security Strategy
 GSI: Gender and Social Inclusion
 HPGI : High-Potential Growth Industries
 HRV: Hausmann, Rodrik, and Velasco model
 LAE: Land and Agricultural Economy
 MCA: Millennium Challenge Account
 MCC: Millennium Challenge Corporation
 OM: Opportunity Memo
 PEA: Political Economy Analysis
 PPAM: Project Proposal Assessment Memorandum
 PSA: Productive Sector Analysis
 PSOA: Private Sector Opportunity Assessment
 RBF: Results Based Financing
 RCA: Root Cause Analysis
 SPS: Sanitary and Phytosanitary Standards
 TBT: Technical Barriers to Trade
 TCB: Trade Capacity Building
 TFA: WTO Trade Facilitation Agreement
 TVS: Transportation and Vertical Structures
 UNEP: United Nations Environment Program
 USDA: US Department of Agriculture
 WSI: Water, Sanitation, and Irrigation
 WTO: World Trade Organization

EXECUTIVE SUMMARY

This Agricultural Development Toolkit is designed for development practitioners and partners in both the public and private sectors to assist in the design of high-impact programs in the agricultural economy—from inputs to the farm to the consumer.

This paper first provides an overview of the critical role agriculture development plays on food security, poverty reduction, and in job creation in the economies of the global south. It then provides an overview of the compact development process at MCC from the country level constraints analysis to examination of the competitiveness of the agriculture sector guiding the reader through each phase of compact development.

The paper discusses methods and tools available to conduct a deeper assessment of the agricultural economy, with the examination of agricultural constraints, market failures, value chains, commodity economics, and leading practices to integrate gender and climate in the analysis and design of the programs.

The Toolkit then describes in detail the project definition and design process, with a focus around potential project types, private sector investment, and policy and institutional reform. This sets the stage for further work in project development, the development of program logics, calculating the Economic Rate of Return (ERR), and locating projects for maximum impact. A key principle for design is to ensure any project can be effectively implemented within MCC's five-year window.

The final section of the Toolkit provides a high-level overview at sustainability issues, implementation, and program evaluation.

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I. INTRODUCTION

The Millennium Challenge Corporation (MCC), created by the US Congress in January 2004 with strong bipartisan support, is an independent United States Government foreign assistance agency whose mission is *reducing poverty through growth*. MCC's approach is built on competitive selection of relatively well-performing countries via a scorecard system, country-led solutions, and country-led implementation.

MCC's compacts are designed to ameliorate a country's binding constraints to growth—which will increase long-term economic growth and development and reduce poverty.

MCC has changed the conversation on how best to deliver smart US foreign assistance by focusing on good policies, country ownership, and measurable results. MCC through bilateral agreements provides time-limited grants called “compacts” that promote economic growth, reduce poverty, and strengthen institutions in partner countries. These investments not only support stability and prosperity in partner countries but also enhance American strategic and economic interests. With cost-effective projects, a lean staff, and an evidence-driven approach, MCC is a good investment for the American people.

To date, 22 of MCC's bilateral compacts have included food security-related investments totaling over \$5 billion. These MCC compacts, which average around \$350 million each, include transportation and storage infrastructure, policy and institutional reform, irrigation systems, access to finance, farmer training, and nutrition. Alongside its work in the agricultural economy, MCC also strengthens property rights and improves land policy to ensure that farmers—many of whom are women—have secure access to land, and that government institutions can effectively manage land resources. Reflecting the links between the sectors, the land and agricultural economy team are housed in the same MCC practice group.

MCC manages the compact development process to reflect its core principles that include a) competitive selection of countries based on their actual performance as measured by a 20-indicator scorecard updated yearly; b) a preference for country-led solutions to economic development and poverty reduction challenges that are developed in partnership with civil society and the private sector; and c) reliance on country-led implementation of development programs, with strong controls to ensure technical quality and the prudent expenditure of funds.

This document establishes guidance for the conceptualization, design, preparation, and execution of MCC investments in the agricultural sector, broadly defined to include the entire value chain from inputs to agricultural production, processing, and marketing. The goal of this paper is to outline practical and implementable approaches to agriculture development that are actionable and have a firm grounding in both theory and real-world experience.

Critically, the approaches suggested in this document are not meant to substitute for country ownership and the immense local knowledge of our country partners, which is both a key MCC principle and a sound development practice. Instead, they are meant to help guide collaboration with MCC partners to enable the co-creation of agricultural projects that are impactful, sustainable, inclusive, and co-owned by the countries.

Although primarily focused on MCC, we hope that this paper may also be useful for other donors or potential partners, along with others seeking to invest in agricultural transformation. For example, some of the tools in this paper may also be useful to assist investors as they consider investments in the agricultural sector in developing countries.

Note: This detailed approach was created primarily for larger projects that are often typical of MCC's work. Although this paper outlines many detailed processes for considering work in the agricultural economy, not all steps may be appropriate. This is often true for smaller projects where

the cost of complex analysis may exceed the benefits. While the menu of approaches offered in this paper is long, these are best employed after considering a Cost-Benefit Analysis for the level and cost of effort needed for implementing these techniques.

II. AGRICULTURE WITHIN MCC'S MISSION

A. AGRICULTURE: AN ESSENTIAL SECTOR FOR POVERTY REDUCTION AND ECONOMIC GROWTH

According to [McKinsey \(2015\)](#), food and agribusiness is a \$5 trillion global industry representing 10 percent of global consumer spending and 40 percent of employment. Although sizable productivity improvements over the past 50 years have enabled an abundant food supply in many parts of the world, uneven productivity growth and food availability around the globe continues to be a critical issue. Increased incomes in developing countries are further increasing demand for meat and high-value foods, which will magnify the impact on agriculture and resources. The United Nations Food and Agriculture Organization (FAO, 2019) projects that to meet the needs of an estimated 9.8 billion people by 2050 food and animal feed production will need to rise by at least 50 percent.

While productivity improvements are ongoing in many countries, many in the global south are facing growing levels of acute food insecurity, reversing years of development gains. Even before COVID-19, chronic and acute hunger was on the rise due to various factors, including conflicts, trade policy, fuel and fertilizer prices, natural hazards, and climate change. COVID-19, climate shocks and the war in Ukraine have led to severe and widespread increases in global food insecurity, affecting vulnerable households in almost every country. According to the [United Nations World Food Programme \(WFP\)](#), 345 million people face acute food insecurity; this is an 156 percent increase compared to pre-COVID-19. It is estimated that by 2030, the number of people suffering from chronic hunger could be between 860 and 909 million. [CE-RES2030](#) has estimated that donors will need to contribute an additional \$11-14 billion per year until 2030 to eradicate hunger.

While the global food system is sometimes described as “broken,” the reality is more complex. On the one hand, over the last several decades agricultural productivity has sharply increased in many countries; in the second half of the 20th century alone, grain yields rose by 93 percent globally ([Food and Land Use Coalition, 2019](#)). While population growth has increased demand, many food systems have been able to adapt and respond to needs with the support from public and private sector investments in people and technology. Technological solutions cover a wide range and include improved seeds, fertilizers, irrigation, cold chain, Information and Communications Technology (ICT), machinery, or value-added processing equipment. However, while these gains have been real in the aggregate, they have been far from universal, especially in the poorest countries.

Despite this progress, many food systems are also underperforming relative to their potential in some important ways. The most important challenges arise from low farmer income and pervasive poverty, environmental degradation, price and weather shocks, poor market access, and other market failures that undermine performance at a high cost to people and the planet. Moreover, there are issues in food sys-

tems related to the challenge of adapting to digital technologies given the different questions of technology ownership, data security, privacy and bridging the gap from technical to economic feasibility.

At the global level, agriculture and food systems offer an opportunity to improve global well-being by playing a pivotal role in supporting the effort of governments, donors, and the private sector -to reach the Sustainable Development Goals (SDGs). The SDGs were created by the United Nations in 2015 as a “blue-print to achieve a better and more sustainable future for all” and reflect a global consensus on key goals to be achieved by 2030 (See Figure 1).

Figure 1: UN Sustainable Development Goals (SDGs)



Source: United Nations

While SDG #2: Zero Hunger, is directly linked to agriculture, other goals are also deeply connected to it, especially SDG 1: No Poverty, SDG 3: Good Health and Well-being, SDG 5: Gender Equality, SDG 8: Decent Work and Economic Growth, SDG 9: Industry, Innovation, and Infrastructure, SDG 12: Responsible Consumption and Production, SDG 13: Climate Action, and SDG 15: Life on Land.

MCC's work advances the SDGs in these specific ways:

- Facilitates access to productive resources, finance, and services, including infrastructure, land resources, inputs, and technologies (SDG 1, 2, 5, 7, 8, 9, 14, 15).
- Connects smallholders to markets with higher efficiency, transparency, and competitiveness because of improved infrastructure, public goods, regulations, and policy and legal environments (SDG 1, 2, 5, 8, 9, 11, 12, 14, 15).
- Encourages diversification of production and income to reduce risk and protect biodiversity (SDG 1, 2, 8, 11, 15).
- Builds producers' knowledge and develops their capacities through integrated, market-oriented, and farmer-driven methods, often involving multi-stakeholder participatory processes that focus on women and youth (SDG 1, 2, 4, 5, 8, 9, 13, 15).
- Enhances soil health and restores land by supporting practices that reduce soil fertility loss, pollution, and degradation (SDG 1, 2, 11, 12, 15).
- Protects water and manages scarcity by supporting the sustainable management and development of water resources (SDG 1, 2, 6, 7, 8, 9, 11, 12, 14, 15).
- Reduces losses and waste of resources by reducing post-harvest losses (SDG 2, 7, 12).
- Empowers people and mitigates inequalities by promoting secure land rights and smallholder participation in producer organizations and commercial value chains, especially for women and marginalized groups. (SDG 1, 2, 5, 8, 9, 10, 13, 14, 15, 16).
- Improves nutrition and promotes balanced diets through the promotion of nutrition-sensitive agriculture and food systems and programs that have positive nutrition impacts (SDG 1, 2, 3, 5, 12).
- Prevents and protects against shocks and enhances resilience by diversifying activities, improving soil management, and pursuing climate-smart agriculture (SDG 1, 2, 9, 11, 13, 14).
- Addresses and adapts to climate change by moving to climate-smart agriculture that sustainably boosts agricultural productivity and incomes and builds resilience to climate change while reducing greenhouse gas emissions (SDG 1, 2, 11, 13, 14).
- Strengthens innovation systems by promoting technologies and practices and new collaboration through public-private partnerships and farmers' cooperatives. (SDG 1, 2, 5, 9, 12, 14).
- Strengthens the business-enabling environment by promoting policy and institutional reforms that promote market-led growth and enhance investment and trade (SDG 1, 2, 5, 9, 12, 14).

The connections between agricultural systems, the environment, and climate change are well-established and should be considered in policy and program development. Agriculture is both a contributor to climate change and is impacted negatively by it. On the one hand, agricultural activities contribute approximately 30 percent of total greenhouse gas emissions, mainly due to the use of chemical fertilizers that contribute to air pollution in both their manufacturing and use; pesticides that deplete the soil of critical micro-nutrients-- reducing carbon sequestration potential; the expansion to protected areas; and animal waste and methane production.

On the other hand, climate change has a profound impact on the sustainability of agricultural production systems. Climate change has the potential to adversely impact agricultural productivity at both the local and regional levels through alterations in rainfall patterns, the more frequent occurrence of climate extremes (including high temperatures or drought), altered pest pressure patterns, and changes in seasonal and diurnal temperature patterns. [The U.S. Department of Agriculture](#) notes that the impacts of these on crop yields, nutrition content, prices, water availability, vulnerability to natural disasters, and livestock productivity have been studied extensively and are expected to become far more severe.

Many of the most significant effects of climate change appear to be concentrated in poor countries (FAO, 2017). Although the 2015 Paris Agreement and the updated commitments from [COP21](#) attempts to reduce emissions and the severity of these changes through major commitments by governments, significant adjustment by agricultural and food systems will be essential. There are tools—in the form of science-based farming practices and traditional and indigenous knowledge—that can buffer farmers from the impacts of climate damage and help make their operations more resilient and sustainable for the long term. Among those are new crop varieties and livestock that are stress resistant, provision of irrigation water, and changes in agricultural production practices to incorporate regenerative agriculture practices or climate-smart agriculture.

These may also include redesigning farms as diverse agroecosystems—incorporating trees and native perennials, reducing dependence on chemicals, reintegrating livestock, building healthier soils through planting cover crops, reducing tillage, etc. Farmers face many obstacles to changing practices, which makes it critical that donors and others make the required investments to support and accelerate this transition. The private sector can further contribute with technological innovation and investments.

B. MCC'S ROLE IN US GOVERNMENT FOOD SECURITY ASSISTANCE

MCC participates in the US Government's Global Food Security Strategy (GFSS), an integrated whole-of-government approach and in Feed the Future (FTF), the US Government's global hunger and food security initiative.

MCC worked with 10 other US Government agencies and departments—with input from the private sector, academic institutions, and civil society—to develop the GFSS for 2017-2021, as required by the Global Food Security Act, which President Barack Obama signed into law in July 2016. This charted a course for the US Government to contribute to the achievement of global food security and the United Nations' Sustainable Development Goals, together with partners across the globe.

The [US Global Food Security Strategy 2022-2026](#) provide a more ambitious approach to addressing the impacts of climate change and the COVID-19 pandemic. This included a stronger commitment to inclusive development, a strengthened holistic food systems approach, mobilizing private sector investment, and a new cross-cutting intermediate result on water resources management. Many of these principles are reflected in this document. The updated GFSS has three objectives: (1) Support inclusive and sustainable agricultural-led economic growth; (2) create strengthened resilience among people and systems; and (3) have a well-nourished population, especially among women and children. These objectives can be achieved through programs in capacity development/extension, adaptive agriculture, finance and investment, infrastructure, ICT, nutrition, improved policy, and governance (including gender integration), public-private partnerships, improved resilience, and research and development. The role of each US Government agency is outlined in the [US Government Global Food Security Toolbox \(USAID 2020\)](#).

In addition to its role within the US Government, MCC works with partner governments in developing and implementing compacts to advance its mission of reducing poverty through growth. For compacts in implementation, the partner country establishes accountable entities usually called “Millennium Challenge Accounts” or MCAs. MCC and the MCAs then look to partner with implementing organizations, NGOs, expert bodies, and the private sector to develop high-quality programs that are economically, socially, and environmentally sustainable and can deliver significant and measurable economic returns and poverty reduction.

In addition to close collaboration with the partner government, MCC works with *Thought Leaders* to inform an overall vision of how MCC works in the agricultural economy; with Compact Development *Partners* to develop compacts and projects; with Compact Implementers to execute compacts under partner country and MCC guidance; and with Resource Partners that include the private sector, other donors, International Financial Institutions (IFI), foundations, and others.

Local organizations are a final set of collaborators in MCC Compacts and are critical to ensure that local knowledge perspectives inform the design, and that local talent contributes to its success. These can be producer organizations, trade and business groups, civil society organizations and academia. Development outcomes can be undermined by underinvestment in local people and organizations. While imported technical expertise can be critical to success, MCC should also look at ways to identify, work with, and empower local organizations at all stages of compact development, especially since these are often severely underfunded.

C. AGRICULTURE & POVERTY REDUCTION

According to [a World Bank research paper on Shaping the Food System to Deliver Jobs \(2017\)](#), 65 percent of low income working adults relied on agriculture for their livelihoods in 2016 and farming generates 68 percent of rural income in Africa and about half of rural income in South Asia. Urbanization changes in diets and rising consumer demand for convenience and prepare foods, supported by investments in infrastructure and rapidly evolving technology, are creating opportunities in the broader food system—including in manufacturing, marketing, transportation, and food preparation. [Africa’s Food Market](#) accounted for nearly 50 percent of economic activity in 2013 and could create a trillion-dollar food market and even more jobs by 2030. This is important, especially as [300 million young people in Sub-Saharan Africa](#) alone will reach

working age in 15 years.. Based on current trends, analysis shows that the food system in Ethiopia, Malawi, Mozambique, Tanzania, Uganda, and Zambia will provide more than 70 percent of total jobs in their respective countries by 2025 ([World Bank 2017](#)). To enhance the food system's contribution to economic growth and jobs, it is crucial to invest in healthier and safer food value chains and support investments that specifically target the inclusion of women and youth and aim at improving the quality of jobs.

As a result of these factors, according to the World Bank's [World Development Report \(2008\)](#), growth in the agriculture sector is two to four times as effective in reducing poverty as investments in other sectors because of its widespread influence and effects on employment and food security. This finding was echoed in 2018 in 3 different studies published in the journal *World Development*, where the authors provide new insights on how agriculture can help reduce poverty (Christiaensen, 2018, Egan, 2018, Dorosh, 2018). These studies suggest that agriculture sector growth "is generally two to three times as effective in reducing poverty as the same amount of GDP growth generated outside the sector—a result supported by both econometric and economy-wide modeling. This effect diminishes as countries become richer, and essentially disappears at high levels of average income." The studies also go beyond the traditional agriculture vs non-agriculture dichotomy to demonstrate that agriculture's linkages to other subsectors such as transport, manufacturing and agro-processing further contribute to economic growth and poverty reduction.

Throughout economic history, few countries have been transformed from a low productivity agrarian economy to a post-industrial economy without agricultural transformation. The experience from China and elsewhere also shows that in many low-income country contexts, well-structured investments in agriculture can produce a high economic rate of return for the economy. Estimates place the multiplier effect at 2.5, meaning that \$2.50 of economic growth is generated from each additional dollar coming from agricultural growth (Delgado et al, 1998). Agricultural transformation and higher food production can increase rural incomes and decrease the cost of living in urban areas, where labor market opportunities can sometimes be better than on the farm. In this way, improving food availability fosters development of markets outside primary agriculture production by boosting competitiveness. The greater availability of food can also significantly improve a country's growth potential by improving human capital through increasing educational achievement and lifetime earnings cutting health costs and reducing economic losses due to under-nutrition. (IFAD, 2016).

Traditionally, researchers, policy makers, and multi-lateral development banks expect economies to follow a path from transformation to industrialization (manufacturing) and, eventually, to a post industrialization growth (ICT, services & research). However, there is new thinking that emerging economies, such as those in Sub-Saharan Africa, may follow a different pattern of structural transformation. According to the Brookings Institution (2018), tradable services, agro-industry, and horticulture share many firm characteristics with manufacturing; thus, it may be possible to develop a strategy for structural transformation based on three factors: a) improving the investment climate (the environment within which firms operate), b) developing export capacity, and c) agglomeration (getting to larger farms and firms). ICT-based services, agroindustry, tourism, and transport are outpacing the growth of manufacturing in many African countries. Between 1998 and 2015, these sectors grew more than six times faster than merchandise exports. Vibrant ICT-based services sectors can be found in Kenya, Rwanda, Senegal, and South Africa.

[*The Brookings Institute*](#) concludes that industrialization does not equate to manufacturing and that thanks to technology and changing costs of transport, new 21st century industries such as horticulture, agro-processing, tourism, and ICT that can create the growth and job opportunities without the smokestacks. The new industries play to the strengths of global south countries, offer opportunities for poor countries especially in Africa to compete in global supply chains and move the dialogue beyond an either/or. The African Center for Economic Transformation (ACET, 2017) similarly asserts that in Africa agriculture could “provide the easiest path to economic transformation, by focusing on agricultural value-added economic activities (Newfarmer et al. 2018).

Agricultural transformation can also bring other benefits, such as improved food safety. According to a World Bank study on food safety (Jaffe, 2019), unsafe food costs low- and middle-income economies about US\$ 110 billion in lost productivity and medical expenses each year. Food-borne illnesses not only affect health and nutrition but can also impede market access for farmers. Risks of contamination lie all along the value chain and can include pesticide and chemical poisoning, industrial pollution, animal/plant borne diseases, improper storage and handling, and unhygienic processing.

Lastly, agricultural transformation can enhance the strength of food systems, which support national security. High world food prices in 2008 led to destabilizing riots in over 30 countries and changes of government in North Africa and the Middle East. The Russia-Ukraine War has also created significant stresses because of higher food, fuel, and fertilizer prices. These food crises can also aggravate armed conflict, especially when food denial is weaponized. The health of food systems also connects to national security by influencing migration, diversifying supplies, and food price volatility.

D. FOOD SYSTEMS

According to IFPRI, food systems are “the sum of actors and interactions along the food value chain—from input supply and production of crops, livestock, fish, and other agricultural commodities to transportation, processing, retailing, wholesaling, and preparation of foods to consumption and disposal. Food systems also include the enabling policy environments and cultural norms around food. Ideal food systems would be nutrition-, health-, and safety-driven, productive, and efficient (and thus able to deliver affordable food), environmentally sustainable and climate-smart, and inclusive” (IFPRI, 2022).

MCC looks at the agricultural economy through a food systems approach that acknowledges that “food systems are complex, and are closely connected to, and significantly impact upon, human and animal health, land, water, climate, biodiversity, the economy and other systems, and their transformation requires a systemic approach” (UN, 2021). This food systems approach acknowledges that any solution to food insecurity will need to account for a web of interconnecting variables to be effective. The challenge is to design interventions to address the most important of constraints to improve system performance without trying to solve everything—which increases risk, complexity, and the chances of failure.

Specifically, the food system lens requires an examination of the agricultural economy well beyond agricultural production and includes an understanding of the entire system and its linkages (inputs, food storage, processing, distribution, transportation, retailing, preparation, restaurants), without this perspective, an examination out of context increases the risk of misunderstanding the problems.

As food systems develop from traditional to modern, they tend to change. Value chains get longer and more complex with more highly differentiated products (Otsuka, 2021). In the global south, the transition phase often consists of an informal sector that serves low-income consumers and a formal sector for high-income consumers and exports (World Bank, 2013). Understanding how food systems evolve can clarify how to improve system performance.

Some of the major changes in a developing agricultural economy are summarized in Table 1 below:

Table 1: Characteristics of Agricultural Economy Systems by Development Stage			
Characteristics of Agricultural Economy Systems by Development Stage			
Characteristics	Traditional	Transitional	Modern
Markets & Outcomes			
Agricultural production	Low productivity and income	Move to higher value added but highly constrained	Effective input demand and markets
Product mix	Local niche and commodity	National commodity	Differentiated product
Value chain market	Local and on-farm consumption	Local to national	National to regional and global
Value chain employment/income	Low	Medium	High
Share of grains and staples	High	Medium with some value added	Low with higher value crops, except for large farms
Seasonality of consumption	High	Medium	Low
Food service sector	Small	Modest	Large
Dependence on trade	Low	Medium	High
Use of traceability systems and quality distinction such as certifications	Low	Medium	High
Urban share in food market	Low	Medium	High
Resilience	Low	Medium	Medium-High
On-farm employment & GDP share	High	Medium	Low-Medium
Stunting	High	Variable	Low-Moderate
Intervention & Policy			
Public good needs	Infrastructure-research-extension	Reliable seasonal finance-input/output markets	Effective private sector markets
Investment type	Highly concessional-blended finance	Impact investment-blended finance	Commercial finance

Table 1: Characteristics of Agricultural Economy Systems by Development Stage
Characteristics of Agricultural Economy Systems by Development Stage

Agriculture policy focus	Food security and supply and cereal production	Expands to micronutrient intake, dietary diversity, and agricultural transformation	Food system transitions, food quality and safety
Balanced Diet promotion	Promote production of nutrient-dense foods	Nutrition education or information campaigns around healthy eating	Require packaging labels (or QR codes) and labeling of foods eaten away from home

Adopted from Otsuka 2021, IFPRI 2020, Dorward 2004, and Reardon 2015

AGRA (2019) estimates that around 80–90 percent of the African agricultural economies have moved to the “transitional” stage, including many small firms involved with wholesale, logistics, and processing. These small and medium firms are often left out of the policy debate or programmatic priorities but supporting these actors will aid the development of the modern sector, which is expected to expand greatly in the decades to come.

Agriculture is often the catalyst for change as it evolves from low-productivity subsistence production to commercial high-productivity systems with significant off-farm value addition. Reardon (2013 & 2015a) has described this as “interlinked transformations” including: “(1) urbanization; (2) diet change; (3) food market transformation; (4) rural factor market transformation; and (5) agricultural technology and farm scale (land size) change.” These have resulted in: (1) downstream demand side change “pulling” the system from urbanization and diet change; (2) midstream/downstream change from “intermediating” system transformation and changes in retail, wholesale, logistics, and processing; and (3) upstream change, “feeding” system transformation from the intensification of farming and farm input supply chain change.

E. AGRICULTURE PROJECT GUIDELINES

The aim of MCC’s agricultural economy projects and activities is to contribute to accelerated growth up and down the agriculture value chain, from upstream input suppliers to farmers to the downstream logistics, marketing, storage, distribution, transport, retailing, and especially food processing. This accelerated growth can generate income increases to benefit smallholder farmers, women, and youth. These groups are a critical MCC constituency. They are important in terms of numbers, their high poverty rate, importance to climate and natural resource management, the opportunity to maximize inclusion, and for understanding the constraints to economic growth in the agricultural economy.

Agriculture projects can contribute to the goal of poverty reduction through economic growth by enabling farmers and others along the value chain to improve their performance as commercial entities, and by creating jobs in the broader food system. The goal is to design programs that will encompass both the input supply chain and the output supply chain and have strong viability and inclusive benefits.

To advance these goals, MCC's agriculture projects follow these guidelines:

1. Facilitate evidence-based prioritization in growth strategies that are inclusive, promote health, and are economically and environmentally sustainable. The Constraints Analysis phase of compact development generally involves economist(s), gender and social inclusion (GSI) experts, and private sector Finance, Investment, and Trade (FIT) specialists, with others consulted as relevant. Depending on the constraints to economic growth identified in the partner country and the identified high potential growth industries (HPGIs), agriculture team members collaborate with the partner country's Compact Development Team and the MCC Country Team throughout the subsequent phases of the compact development. Practice group involvement at the country level will range from extensive focus on agriculture projects to an advisory role on other projects with agriculture connectivity such as rural infrastructure and energy.
2. Develop and deploy global leading practices. MCC's agriculture practice will continue to collaborate with outside thought leaders in the agriculture and food systems sector including other donors, impact investors, agribusinesses, and research institutions among others to further improve its work. The practice group will collaborate with outside partners to ensure designs that promote resilient value chains and environmental sustainability, and that incorporate principles of equity and inclusion and are based on market-led growth.
3. Improve the business-enabling environment through targeted Policy, Regulatory, or Institutional Reforms. To support an enabling business environment that fosters sustainable growth of the sector, the agriculture team will use the Agribusiness Commercial, Legal and Institutional Reform (AgCLIR) studies when appropriate to help country partners identify critical policies, laws, and institutions that constrain economic growth in the sector to guide the inclusion of policy or institutional reforms in the projects (USAID, 2017b). Since these studies are costly, their use will be determined by the size and nature of the envisioned agriculture projects.
4. Broaden and deepen public and private partnerships for more long-term impact and leverage. In many cases, agriculture projects include leveraged grant facilities and blended finance to de-risk, facilitate, and incentivize private sector investment in the value chains. To ensure sustainability of the investments post-Compact and increase the overall investment in a project, the engagement of the private sector as a partner is critical and can include agribusiness, impact investors, and/or other private sector entities.
5. Lead on results measurement, learning, transparency, and development effectiveness in reducing poverty. Agriculture projects were among the first projects for which MCC commissioned independent impact evaluations. Agriculture staff continue to work closely with monitoring and evaluation (M&E) colleagues to design effective impact evaluations that contribute to learning in the sector. The Land and Agricultural Economy (LAE) practice group prioritizes working with M&E colleagues early in the compact development phase to optimize evaluation design according to the program logic. As appropriate, MCC will also seek outside collaborators to further improve compact design and execution with a focus on lean and impactful investments.

6. Use market systems analysis to assess the structure, conduct, and performance of each segment of the value chain: agricultural production, value-added processes (processing, packaging, handling, and storage), and the market. A value chain analysis includes a focus on operators (who produce and handle the product as it moves downstream through the value chain), supporters (who provide essential services upstream), and regulators (who create the enabling environment). This viewpoint can also be extended to analyzing foundational support mechanisms of the agricultural sector, such as extension services, access to financial instruments, marketing capacity, food safety services, and quarantine and pest surveillance networks. To ensure that the proposed activities are based on measurable market opportunities, due diligence normally begins with an assessment of market conditions.

III. PRELIMINARY ANALYSIS & PROBLEM DIAGNOSIS

Compact development at MCC begins with a Preliminary Analysis to identify potential constraints to economic growth in the partner country and opportunities for private investment and poverty alleviation. The economic analysis is a crucial step and supports MCC's model of "seek[ing] programs with both high poverty reduction impact and high economic returns at the same time, rather than one or the other, and this approach excludes projects that promise high returns but do not benefit the poor" (Millennium Challenge Corporation, 2012). The partner country in close collaboration with MCC leads the process of Compact development including a meaningful, inclusive and iterative stakeholder consultations to ensure strong local ownership.

The MCC compact development process generally takes place over five distinct phases: (i) Constraints Analysis; (ii) Problem Diagnosis; (iii) Project Definition; (iv) Project Development; and (v) Negotiation. The following sections describing these phases are intended to provide a general overview of the process from an agriculture sector perspective. *The official and more general MCC compact development guidance is found on the MCC home page.* It is summarized in Table 2 following:

Table 2: MCC Compact Development Process

	Preliminary Analysis	Problem Diagnosis	Project Definition	Project Development	Negotiation
	Constraints Analysis	Concept Notes	Project Proposals	Investment Memo	Compact
Eligible Country	<ul style="list-style-type: none"> Names a National Coordinator and puts together a compact development team Analyzes constraints to economic growth, opportunities for private investment and poverty Undertakes broad consultations with stakeholders 	<ul style="list-style-type: none"> Expands compact development team Analyzes key root causes of binding constraints Defines, develops initial project ideas to address constraints Submits Concept Notes 	<ul style="list-style-type: none"> Defines and scopes specific projects and activities Builds strong project logic for proposed compact program Identifies intended beneficiaries Consults stakeholders on project design Submits detailed Project Proposals 	<ul style="list-style-type: none"> Conducts feasibility, environmental and other studies Measures expected economic impact Identifies risks and mitigation measures Begins establishing structures needed in implementation 	<ul style="list-style-type: none"> Finalizes monitoring and evaluation framework Negotiates legal, financial, technical terms of program Creates dedicated MCA unit for implementation
MCC	<ul style="list-style-type: none"> Staffs a country team Provides compact development guidance Advises and assists with analyses 	<ul style="list-style-type: none"> Reviews, approves Concept Notes Approves concept projects for further development 	<ul style="list-style-type: none"> Reviews, approves Project Proposals Approves projects for full development and appraisal 	<ul style="list-style-type: none"> May fund necessary preparatory studies Oversees, manages procurements Conducts thorough project appraisal Makes final decision on projects 	<ul style="list-style-type: none"> Notifies Congress of intent to negotiate Defines budget and commits funding Obtains approval of MCC's Board Signs agreements

2013-017-1246-04

Source: *Overview of MCC Compact Development Process*

A. CONSTRAINTS ANALYSIS

MCC undertakes a Constraints Analysis (CA) to identify the binding constraints that deter households and firms from making investments that would increase economic growth. MCC's CAs can focus on how to enable a higher growth rate in the first place, how to head off likely threats to future growth, and how to strengthen the relationship between growth and poverty reduction.

While this process is led by MCC's economists, the process integrates analysis conducted by three MCC practice groups. The first is led by the Gender and Social Inclusion (GSI) group and looks at gender and inclusion issues with a special focus on poor and disadvantaged/structurally excluded groups. The second is conducted by the Finance, Investment and Trade (FIT) group and looks at the enabling environment for business and investment, with a focus on developing opportunities to include the private sector. The last analysis is led by the Environment and Social Performance (ESP) group and looks at environmental issues, especially climate and related issues.

Built upon the principle that private investment, both domestic and foreign, represents the primary engine of economic growth, the CA uses a “Growth Diagnostics” methodology pioneered by economists Hausman, Rodrik and Velasco to identify the binding constraints to economic growth in a country. A detailed description of the CA process can be found on chapter 3 of [MCC’s Compact Development Guidance](#).

Accounting for Agriculture in MCC Analytics. MCC’s Hausmann, Rodrik, Velasco (HRV) growth diagnostic methodology conducts empirical tests that typically do not rely on agriculture sector data or reflect issues in agriculture. For countries where agriculture plays a large role in the economy, particularly in terms of the number of self-employed and hired labor, it may miss critical bottlenecks to economic growth in countries with large ag sectors.

The MCC Economic Advisory Council on its October 2020 meeting reflected on these observations and provided some recommendations on how the constraints analysis could better include agriculture. It explicitly addressing constraints to the agriculture sector makes sense most clearly in countries where labor is predominantly employed in agricultural economy. This may require an adaptation of the growth diagnostic or an expansion of the broader constraints analysis to include agriculture. Special attention should be placed on understanding the needs of small- and medium-size farmers, the role of spillovers among them, and questions of distribution and equity that may disproportionately affect them. Attention to farmers’ behavioral responses to interventions is important, particularly with respect to issues of risk and uncertainty.

The following factors in the CA process have been identified as areas that insert a bias in the analysis and may reduce the robustness of the results:

Sources of Information. Conversations in capital cities and data sets like the World Bank’s Doing Business and Enterprise Surveys can obscure specific challenges facing agriculture. Alternative data sources, including the World Bank’s Enabling the Business of Agriculture data set, can capture more precisely the regulatory constraints facing smallholder farmers and commercial agriculture enterprises.

Returns to Investment. The payoffs to agricultural research are high, and sub-Saharan Africa currently underinvests in this critical input, as well as other productivity-enhancing investments such as improved policy, irrigation, rural roads, and useful information technologies. The goal of these investments is to facilitate transformation of the agricultural economy so that it boosts incomes, creates quality jobs, fights poverty, and improves environmental performance. Successful transformation can create more business opportunities in ag finance and insurance, food processing, the sector growths and more technologies allow greater productivity.

Agriculture and the Private Sector. Too often, analytical work dichotomizes the farm sector and the private sector. While farming has unique challenges, smallholders are part of the private sector and operate like small businesses. MCC’s constraints analysis would benefit from integration of agriculture sector specialists to better understand constraints to growth in a sector that is critical for the economy of many country partners.

Catalogue of Binding Constraints

Binding constraints touching the agricultural economy that are commonly flagged in this phase include:

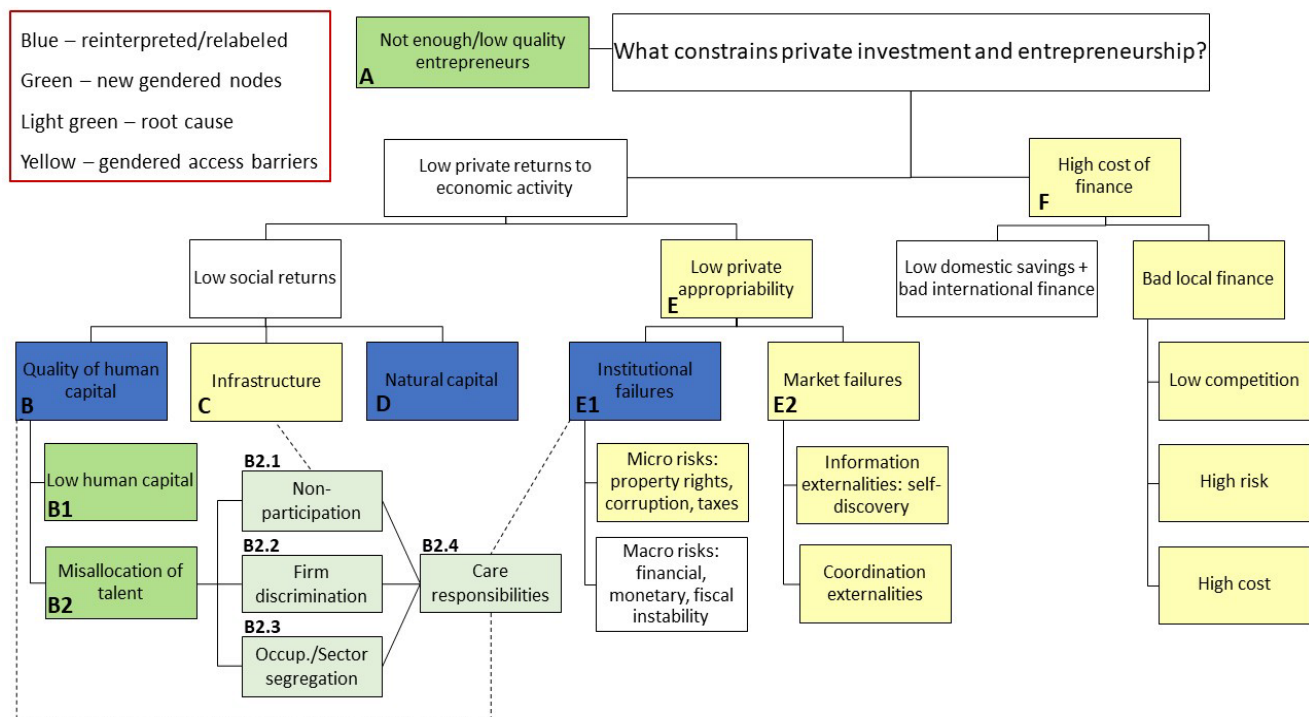
- Low appropriability: The limited probability that a household or firm will be able to retain tenure over land or another asset to enjoy the future income stream from investments in fixed capital. In land, this weak tenure security hinders investment in better agricultural practices, including soil conservation, terracing, agroforestry, or vegetative barriers for erosion control, because farmers may not be confident that they will benefit from these longer-term investments, which in turn leads to low land productivity. (Small plot sizes shrinking more and more generation after generation also create disincentives for farmers to make these long-term investments because these mechanical/biological structures would compete for production space).
- Limited human capital: This includes knowledge concerning agricultural technologies or practices. Training and extension services can help agricultural producers take up innovations, improve marketing, transport, and food processing, and boost farm yields and ultimately farmer profit. Training efforts must be approached with behavior change considerations in mind.
- Poor market access: Investments in roads, cold storage, ICT and other infrastructure can increase the quality and quantity of agricultural products that reach markets while allowing the production of higher value-added products. Better ICT infrastructure can reduce information asymmetries and reduce transaction costs for both farmers and buyers. Strengthened infrastructure of both kinds can lead to significant growth in farmers' incomes, reduce resource waste, and improve health by boosting access to nutrient-dense foods.
- Distortionary agricultural or trade policies: These policies may hamper the development of economically efficient farm production and undermine the development of agricultural and related markets. While the application of larger amounts of inputs can drive up production, the goal could be to boost Total Factor Productivity to leverage resources, especially those where input supplies are heavily constrained.
- Lack of access to inputs, including water: Improved water management and irrigation systems may allow farmers to increase crop yields and farm profit through more efficient and sustainable allocation of scarce water resources. Other resource constraints can include lack of energy or low soil quality.
- Gender inequalities: Women may perform a high proportion of labor throughout the agricultural value chain, but have systematically lower levels of health, education, and access to inputs, credit, and training, reducing their productivity. Women also face significant barriers to managing agricultural businesses, which significantly reduces their income. Women's often limited role in household decision-making can also limit their productivity and therefore impact the productivity of the farming system.

- High cost of capital: Insecure property rights, restrictions on transfer of property, unclear or ineffective mortgage regulations and enforcement mechanisms, inaccurate or inaccessible information on parcel boundaries and ownership, and difficulties in accurately establishing property values can effectively raise the cost of capital for banks, households, and commercial investors. Agriculture growth and investment are also undermined by land issues and low credit availability. Some of these costs come from restrictive regulation.
- Limited natural capital: This can affect access to resources, particularly land. Poorly defined or misunderstood property rights ineffectively developed or applied land use plans and regulations, barriers to transfer of property, or taxation systems that produce disincentives for the optimal use of land, water, soil, and other natural resources. This can contribute to land degradation (e.g., erosion or desertification) that further limits the availability of natural capital. These coordination failures can lead to the deterioration or underutilization of these resources, loss of livelihoods, and land grabs and conflicts, which limit long-run growth prospects for agriculture, energy, industry, housing, and the other sectors to which land, water, and other natural resources serve as inputs. Many of these challenges are aggravated by climate change.
- Market failures: Investment decisions and public sector management of resources (tax collection, urban planning, construction of housing and infrastructure, and supply of related municipal and social services) can be hampered by weak governance. In turn, this hinders government's ability to address market failures through effective policy and other interventions. Informal land systems tend to arise when there are too many costs or hurdles associated with the use of formal systems. Barriers affect land access, land use and land tenure security. In agriculture, market failures can arise from monopoly/oligopoly, monopsony/oligopsony, high transaction costs, positive/negative externalities (joint impact), high information costs, high fixed costs for investment/technology adoption, and other factors. These issues undermine development of agriculture as a business and growth in the sector and its related up/downstream value chains. These issues are further discussed in depth below.

While the HRV model is helpful in guiding development of the CA, it has some limitations (Felipe and Usui, 2008). One apparent shortcoming is the HRV's static nature because it focuses on constraints that are binding today, but not necessarily in the future—even though these could become more significant over time. MCC has already incorporated a forward-looking perspective into some of its recent work. In addition to nutrition, technology, and temporal issues, the list of market failures included in the tree could be expanded to enable further examination of other constraints.

There are some ways in which the HRV model can be adjusted to focus on key issues such as social inclusion. Ianchovichina and Leipziger (2019) examined options for including gender in the HRV model. A detailed approach to these issues is outlined in the paper, “The constraints that bind (or don't): Integrating gender into economic constraints analyses” (Reventa, 2020). The paper adds several nodes to the HRV decision tree that focus on gender issues such as non-participation in the labor force, discrimination, childcare responsibilities, and occupational segregation:

Figure 2: The HRV Model Focused on Gender



Source: Revenga, Ana and Dooley, Meagan. *The constraints that bind (or don't): Integrating gender into economic constraints analyses* (2020)

B. PRODUCTIVE SECTOR OPPORTUNITY ANALYSIS

Alongside the CA, MCC's Finance, Investment, and Trade (FIT) Practice Group supplements the HRV model by highlighting those parts of the economy that are both underperforming and have high latent competitiveness.

MCC's Economic Analysis team uses the Private Sector Opportunity Assessment (PSOA) to complement and validate its analysis to identify binding constraints to private investment in partner countries. This analysis enables the compact development team to map out the partner economy based on potential product competitiveness and the ability to generate income and jobs for the poor and to advance other development goals, such as combating and reversing climate change.

Within the PSOA, the Productive Sector Assessment (PSA) goes beyond CA's "economy-wide" constraints to identify "industry-specific" constraints that have impeded economic growth and job creation. This process highlights high-potential growth industries (HPGIs) that include: i) industries that are thriving in the host country but have high potential to grow much more (e.g., camels) and ii) new industries that might thrive in the host country if key constraints to their growth are alleviated (e.g., hippos).

The PSA's focus on industry-specific constraints in HPGIs is designed to: i) test and provide a more granular view of the broader economy-wide constraints that the CA seeks to identify and ii) help FIT to identify

companies and potential investors in targeted HPGIs that may be willing and able to invest in or around MCC-funded projects (whether in partnership with MCC or not).

The PSA highlights sectors with high inherent competitiveness that could be worth investigating for further investment. Conversely, the PSA also enables MCC to *exclude* sectors that will require too many interventions or programs that are overly complex to develop and implement. Overly complex compacts can significantly increase risk of program failure and tax partner country implementation resources. In addition, the need for too many interventions often reveals that the sector is not competitive and/or that the enabling environment is so poor that barriers to change may be insurmountable.

In addition to enabling MCC to avoid sectors that are fundamentally uncompetitive in either domestic markets or overseas, the PSA can also rule out those that are problematic for the environment or gender, or that fail to account for other critical social, political, or economic considerations.

C. PROBLEM DIAGNOSIS & ROOT CAUSE ANALYSIS

The next phase of compact development is Problem Diagnosis, which is based on the earlier work in the CA. If agriculture issues are identified as constraints to growth in the CA, or if the agriculture sector or sub-sectors are defined as HPGIs, a member of the agriculture team is typically assigned to the country team to support problem diagnosis. The agriculture team members work closely with the MCC Country Team economists and other relevant practice groups, including Finance, Investment, and Trade (FIT), Transportation and Vertical Structures (TVS), and Water, Sanitation, and Irrigation (WSI), as well as with the eligible country's Compact Development Team to identify the root causes or "core problems" underlying the binding constraints identified in the CA.

The Root Cause Analysis (RCA) is focused identifying the root causes of issues highlighted during the CA as opposed to the symptoms of a problems. The RCA is designed to avoid moving to project ideas that may or may not address the root cause of a problem. These are developed interactively with country partners and use the [Ishakawa](#) or fishbone diagram which explores cause-and-effect to the constraints highlighted in the CA. The process includes high engagement with stakeholders, breaking problems down into comprehensible pieces, and establishing causal relationships and identifying data gaps. The goal is to set the stage for selection of specific issues around which MCC country partners draft Concept Notes that set the stage for further compact development (for more information on MCC's approach to RCA, see [MCC, 2021a](#)).

D. MCC INVESTMENT CRITERIA

As the eligible country and the MCC country team co-create, design, and scope projects, they will need to ensure that they align with Investment Criteria. These have been developed to ensure that "proposed investments must meet in order to identify and realize sustainable, long-term economic growth opportunities owned by MCC's eligible country partners that mobilize complementary investments, raise standards of living, and contribute to achieving sustainable poverty reduction" (MCC, 2020).

The required criteria include:

- Aims to alleviate a root cause of a binding constraint to economic growth.
- Economic rate of return (ERR) is calculated at the lowest level of disaggregation and meets the minimum hurdle rate, set at 10 percent at the project level.
- Timeline supports implementation within five years, which is mandatory for all MCC programs.
- Represents country ownership of the problem and solution, demonstrated through:
 - Government buy-in and partnership
 - Consultation with domestic stakeholders
 - Coordination with other development partners
 - Country contributions.
- Complies with MCC Environmental Guidelines and MCC Gender Policy.
- Includes clear metrics for measuring results of projects.
- Ensures sustainable results (including institutional and policy reforms required for success).

The optional criteria include:

- Generates economic returns above the hurdle rate.
- The share of benefits estimated to accrue to poor segments of the population compares favorably against alternatives.
- Generates environmental and social benefits beyond the required standards.
- Promotes gender equity beyond the minimum required standards.
- Enables, promotes, or generates substantial complementary private investment.
- Improves leverage investments creating “additionalities” (or investments that would not have otherwise happened).
- Promotes innovation and creativity.

E. THE PUBLIC INVESTMENT QUESTION

The next question is to determine if these Root Causes are worth considering for public investment. IFPRI (2021c) outlines in an MCC-supported paper, “Prioritization of Types of Investments: Operational Tools for MCC Agricultural Investments,” three cases that could support investment by donors such as MCC:

1. For a public good—a good that is non-excludable and non-rivalrous—local public authority may not have the financial capacity to achieve the optimal level of public good delivery. Typical examples include investments in infrastructure, regulatory systems, certain research, and other goods that benefit the public and are difficult for the private sector to invest in.
2. Due to market failures in accessing capital (physical, financial, human, knowledge, social, or natural) private investors, including smallholders, cannot achieve the economically optimal level of investment on their own. For example, a small-scale farmer may not purchase a new, high-yield seed variety for multiple reasons, including due to lack of knowledge or information. A donor “nudge” can sometimes resolve the market failure by enabling such transactions to occur. Examples include technical training and investment facilitation.
3. The private sector, acting alone, will underinvest in comparison to the social optimum. The private sector in some cases will invest in capital that provides public benefit but is not a pure public good—a cellular network, for example. However, a private actor invests based on its (private) internal rate of return. The social internal rate of return, which is relevant for the public perspective and can include outcomes such as poverty reduction and environmental sustainability, may be higher.

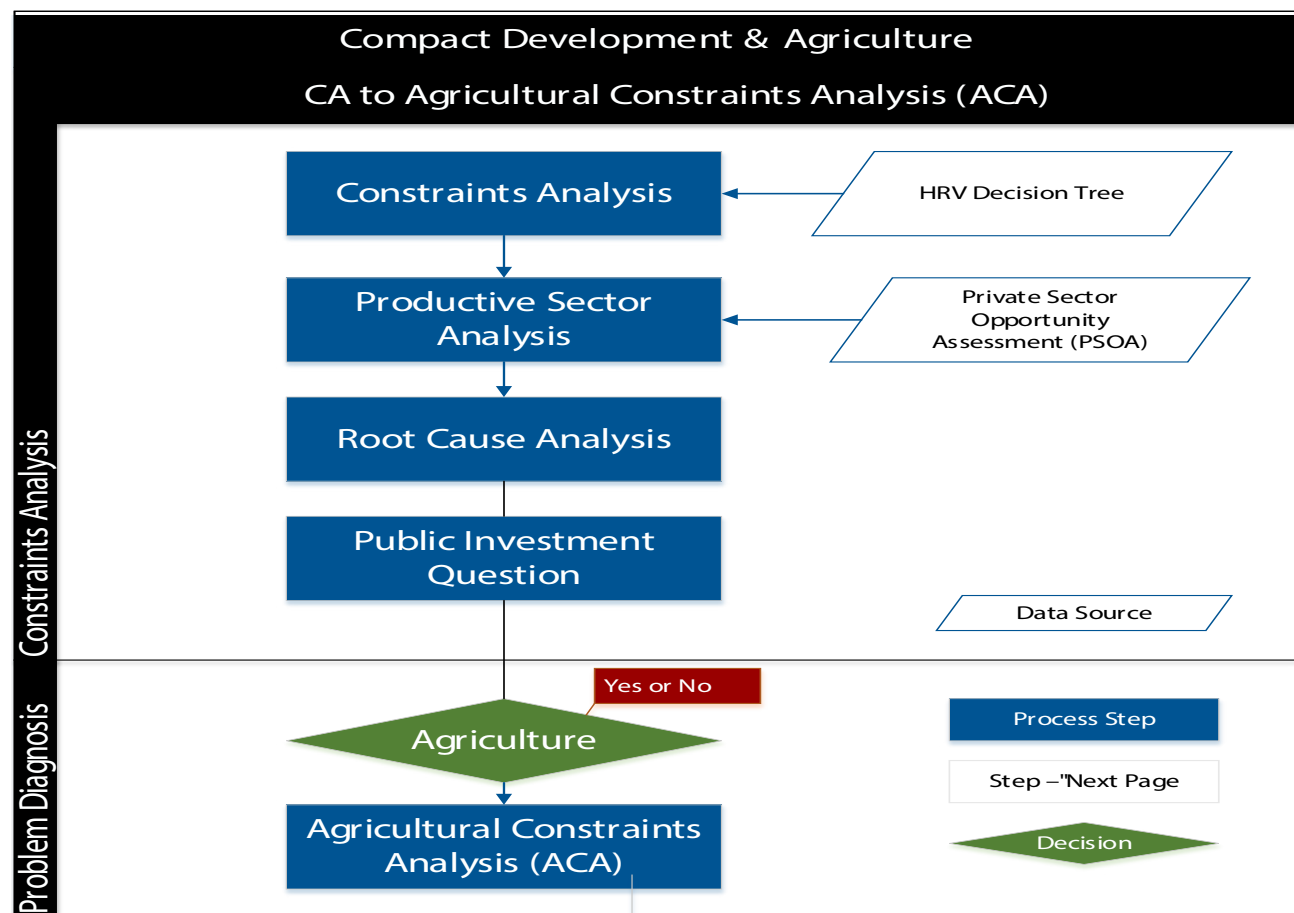
IFPRI further notes that “Understanding these situations is key to the discussion of what types of projects MCC should target for investment, since they help identify appropriate investment opportunities and provide insight on how much of the investment should be provided publicly. Situations 2 and 3 yield the insight that public investment doesn’t necessarily only involve public goods; it may sometimes involve private goods such as fertilizers, small-scale irrigation, and mechanization goods.” (IFPRI, 2022c)

After completing the Constraints and Root Cause Analyses, examining sectors with high potential competitiveness identified by the PSOA, and asking about the appropriateness of public investment, the partner country and MCC country team will decide if there is further interest in developing an agriculture economy element in the proposed compact. If there is *no* agricultural intervention, the process stops here.

However, if agriculture *is* of interest, the next step is to examine the constraints to agricultural growth through an Agricultural Constraints Analysis (ACA) to take a deeper look into sector-specific issues.

The process can be summarized in the chart below:

Figure 3: Compact Development - CA to Ag Constraints Analysis (ACA)



Source: Authors/MCC Agriculture Team

IV. DEFINING THE AGRICULTURAL PROBLEM

If the agricultural economy is being considered for further development under a potential MCC compact, the next step is to examine the determinants of its performance. This performance can be evaluated by the amount of economic activity created, employment/incomes generated, health/nutrition outcomes, sectoral competitiveness/economic sustainability, efficient resource use (water, land, soil, energy, and labor), and environmental sustainability.

The goal is to move toward an agricultural economy that supports healthy diets, promotes productive and regenerative agriculture, reduces loss and waste, and ultimately moves from the linear to the circular economy (FOLU, 2019). According to the Ellen MacArthur Foundation, “In our current economy, we take materials from the Earth, make products from them, and eventually throw them away as waste—the process is linear. In a circular economy, by contrast, we stop waste being produced in the first place. The circular economy is based on three principles, driven by design: 1, Eliminate waste and pollution; 2, Circulate products and materials (at their highest value); 3, Regenerate nature. It is underpinned by a transition to

renewable energy and materials. A circular economy decouples economic activity from the consumption of finite resources.”

To sustain long-term impact, MCC also needs to consider the long-term fundamental competitiveness of sectors in our partner country. To this end, MCC should support economic activities that “reflect an economy’s productive capabilities and a country’s productive structure.” Performance measures should also be considered vis-à-vis institutions, effects on political power, and upon overall economic structures (Constantine, 2017).

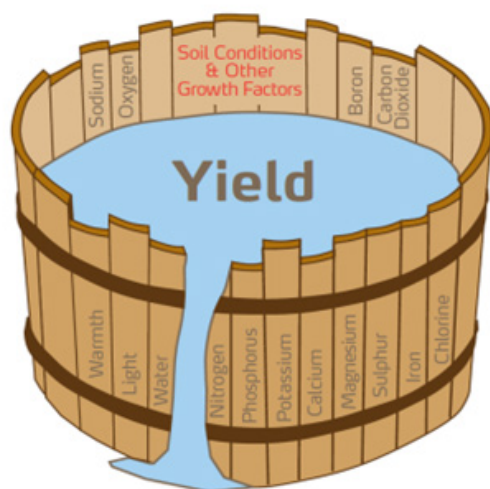
If system performance is seen as unsatisfactory, the next step is to understand why the current system performs as it does. Critical in this analysis is understanding if the market failure is due to public goods, negative externalities, monopolies/oligopolies, and/or any other considerations connected to political, social, economic, or other considerations.

Specifically, this examination should focus on why the private sector has not made a change. There are many possible reasons for why the private sector has not acted. The goal of the next step is to better understand these causes.

A. AGRICULTURAL CONSTRAINTS ANALYSIS (ACA)

While several factors may be inhibiting agricultural transformation, the key is to focus on those that are the most binding instead of trying to do everything at once. A useful approach was described by Carl Sprengel and Justus von Liebig. The Liebig Law of the Minimum states that growth is limited not by total resources, but by the scarcest resource. This means that the greatest benefits come from improving the shortest stave (limiting factor) instead of trying to extend all of them at once. This is often illustrated by a barrel (see Figure 7 below), in which a focus on the most important problem can yield the greatest impact per dollar of investment. The example below focuses on limits to crop yield:

Figure 4 : Justus von Liebig’s Barrel—An Agriculture Example



Source: Yara—Canada: Wheat Nutritional Summary <https://www.yaracanada.ca/crop-nutrition/wheat/nutritional-summary/>

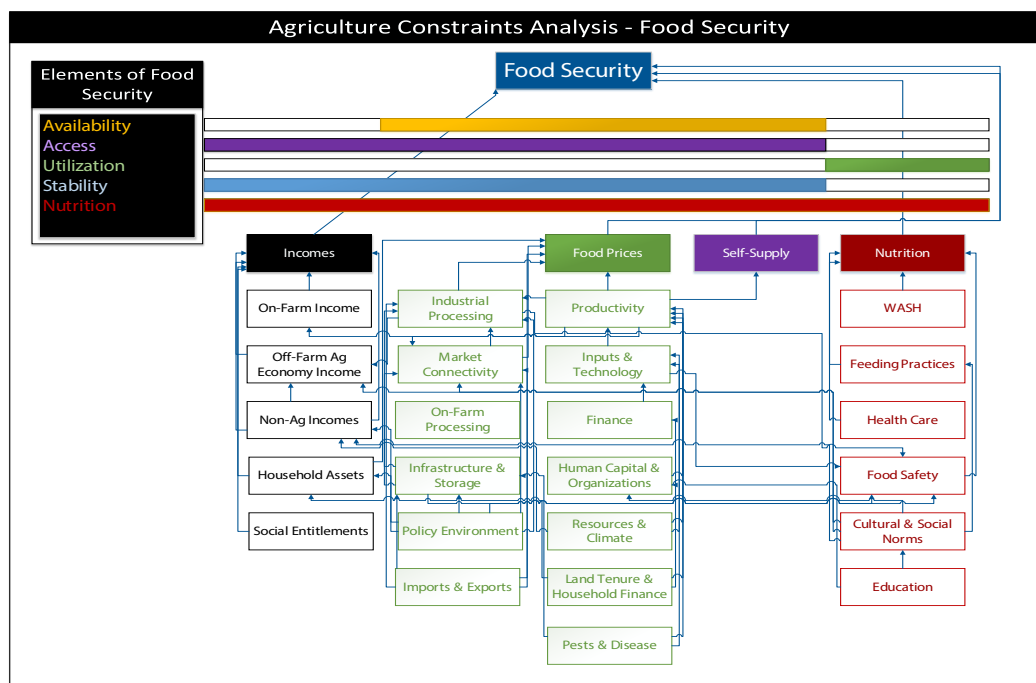
To ensure a thorough examination of the most important variables, these constraints can be consolidated into HRV-style decision trees to highlight challenges and opportunities within sectors and market systems. These performance problems usually arise from market failures that impede better system performance.

Since these system performance issues are usually examined through either a food security lens or an agricultural economy performance lens, two sample problem trees are illustrated below in Figures 8 and 9 that can facilitate better understanding of the problems. The trees are often connected since the food security tree will often lead to a deeper examination of agricultural economy performance through the other problem tree.

These problem trees are designed to guide examination of the agricultural systems in MCC partner countries. For example, a food security related constraint may have identified in the Constraint Analysis. The Agricultural Constraint Analysis (ACA) decision tree would guide questioning to better understand the reasons for this constraint.

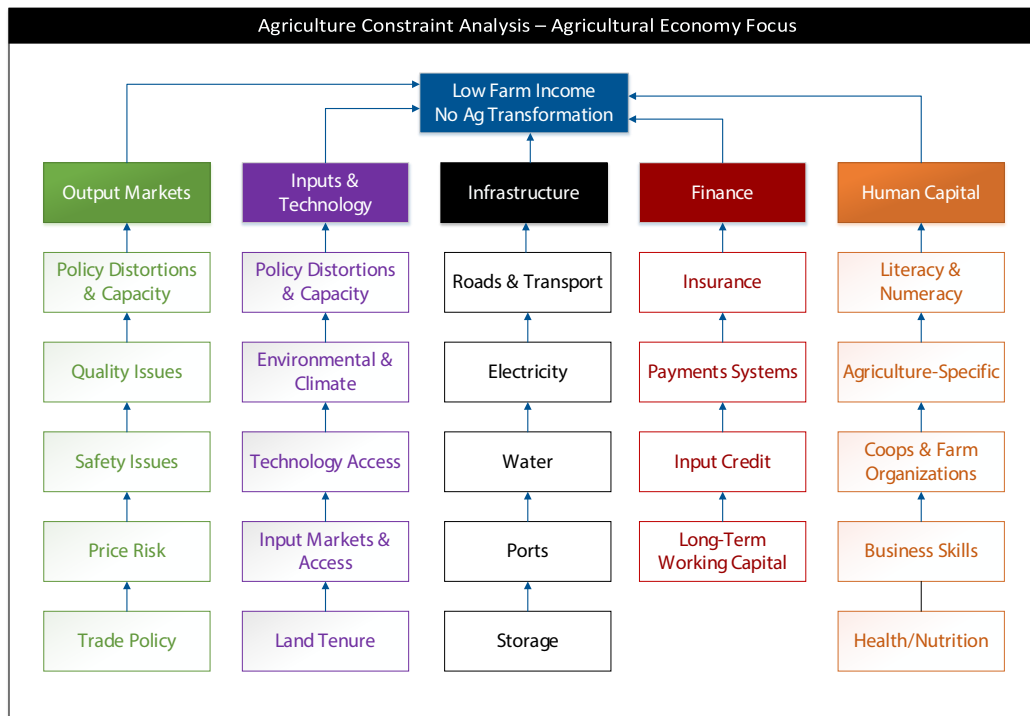
In the ACA for Food Security could the problem be high food prices (marked in green)? If so, it is because productivity is low? Does this arise from a lack of access to inputs such as fertilizer or seeds? Alternatively, is this a nutrition problem (marked in red) that might come from poor access to water and sanitation (WASH)? Alternatively, if the focus is more on agricultural businesses, the second tree facilitates understanding of what factors are holding back commercial agriculture. This focuses on input/output markets, infrastructure, finance, and human capital.

Figure 5: Food Security Problem Tree



Source: Authors/MCC Agriculture Team

Figure 6: Agricultural Economy Problem Tree



Source: Authors/MCC Agriculture Team

Using the ACA, it is possible to understand both the general agricultural economy across several commodities along with specific agricultural production systems that face their own individual constraints.

An example of how such constraints identified by the ACA may limit agricultural development is illustrated in the World Bank's Growing Africa Report (2013). For example, Table 3 suggests that in Senegal the lack of market access, poor land rights, poor transport, and other issues pose significant barriers to rice production. If these kinds of challenges are identified in an MCC partner country, they may offer an opportunity for meaningful MCC intervention.

Table 3: Agricultural Constraints Analysis (ACA): Sample Value Chains & Constraints

Constraint	Rice: Ghana and Senegal	Maize: Zambia	Cocoa: Ghana	Dairy: Kenya	Green beans: Kenya
Output markets					
Policies distorting markets	*	***	*	**	

Constraint	Rice: Ghana and Senegal	Maize: Zambia	Cocoa: Ghana	Dairy: Kenya	Green beans: Kenya
Quality issues	**		*	**	***
Food safety		*	*	**	***
Social and environmental issues			**		***
Regional integration issues	**	***		**	
Price risk	**	***	**	*	*
Inputs and technology					
Policies distorting markets	**	***	*	*	
Access issues	***	***	***	*	
Land access issues	***	**	**		
Infrastructure issues					
Transport	**	**	**	*	
Other	***	**	*	*	*
	(irrigation)	(rural roads)	(energy for grinding)	(collection points)	(cold chain)
Access to finance issues	**	**	***	*	
Skill issues	*	*	**	*	***
Issues with engaging smallholders				*	***

Note: Number of asterisks denotes relative importance as a constraint, with *** as the highest priority.

Source: Growing Africa Report, World Bank, 2013

Applying the Tools I: Lesotho

The Agricultural Economy Problem Tree and the ACA can be applied to Lesotho, which is moving toward implementation of a project around irrigated horticulture under the [Lesotho Health and Horticulture Compact](#).

The process began with identification during the CA of a constraint focused on, “ineffective policy planning, coordination, and execution. This constraint is characterized by the Government’s ineffectiveness in delivering the public goods and services necessary to create private-sector led, poverty-reducing growth in Lesotho.” In other words, the private sector was too small to demand quality public goods and services from the government. If the problem lay in the weakness of the private sector, the question was what sector offered the most opportunity for strong private sector growth.

The PSOA tool was then applied to examine what sectors offered high inherent competitiveness, strong job creation potential, and prospects for social inclusion. In Lesotho, one of the high-potential growth industries (HPGIs) was the horticulture sector. Although it was clearly underdeveloped sector, an examination of Lesotho’s resource endowments, markets, labor market, and other factors pointed strongly toward this industry.

An in-depth problem analysis during the Root Cause Analysis (RCA) enabled the team to better understand what factors were holding back development of what could be a thriving industry. These and other insights could be used to conduct an Agriculture Constraints Analysis (ACA). Since this is primarily an Agricultural Economy focus rather than a Food Security focus, that can be used. To best understand the problem in horticulture, the country team asked what problems were the most important. While problems can be found in almost every box, the key was to keep Justus von Liebig’s Barrel in mind and only focus on the most significant binding constraints.

The ACA ended up identifying Policy Distortions, Land Tenure, Water, Storage, and Business Skills as the most binding. To address these, the Lesotho Compact will include interventions in all these spaces to increase rural incomes related to commercial horticulture, including for women, youth, and the rural poor, and establish a sustainable and inclusive model of irrigation, water resources, and land management.

After the specific agriculture-related constraints are identified, the next step to understanding system performance is to determine why the private sector has not addressed this problem. These challenges often arise from market failures—which are more closely examined in the next step.

B. MARKET FAILURES

Accounting for market failures is a key step in better understand agricultural system constraints. These often occur where the allocation of goods and services by a free market is not efficient, often leading to a net social welfare loss. It can also occur when markets result in outcomes that undermine long-term development objectives and/or are not socially, politically, or morally acceptable.

In practical terms, determining the existence of a failure means asking some basic questions about the performance of the *status quo ante* to determine whether something is a “problem.” These often come out

in the CA process. Once these are agreed upon, the next step is to determine whether it is a result of a market failure. In some cases, certain goods are not amenable to a classical market equilibrium because of characteristics that deviate substantially from theory that can lead to market failure(s).

Specific market failures connected to the nature of the good may include:

- Natural Oligopoly/Monopoly and Oligopsony/Monopsony: Markets are dominated by a few companies or a single company that can use limited competition to charge economic rents above market equilibrium prices, where high margins indicate non-competitive markets, often with lower quality and less propensity to innovate. These goods often exist in environments with high-entry barriers because of high fixed costs, a strong existing incumbent, and economies of scale. However, the extraction of high economic rents is not a foregone conclusion. In some markets, there is competition between firms, such as Boeing and Airbus that compete for market share, creating oligopolistic competition. In addition, a few vertically integrated firms may dominate a market, but with efficient outcomes. These types of issues are found in agricultural markets where high barriers to entry result in limited markets for producers and/or uncompetitive markets for inputs.
- High Exclusion Costs/Joint Impact/Externalities: Goods that add or subtract social value are not captured in the pricing system. Products with positive externalities are often provided as public goods while other goods come with costs (negative externalities) not captured in the pricing system. This can result in underproduction of goods with positive externalities (such as health care) and overproduction of goods with negative externalities (such as a factory that pollutes the water) compared to optimal production levels. Agricultural production systems can have profoundly positive or negative effects, especially on climate and the management of natural resources, especially water and soil.
- High Information Costs/Information Asymmetry: Goods where one side has more information than the other because of the complexity of the product and/or opacity of markets. This can often result in the principal-agent problem where a principal delegates an action to another individual (agent), but the principal does not have full information about how the agent will behave. This often results in the party with more information taking advantage of its counterpart by either charging more as a seller or underpaying as a buyer. Information asymmetry is common in agricultural markets when smallholders are disadvantaged compared to counterparts either on the sell-side because they do not see the market or on the buy side because they may not understand the value/cost of inputs such as seeds.
- High Transactions/Search Costs: Goods with high transactions or search costs push markets toward limiting the number of transactions—which undermines efforts at price discovery and depresses private investment: These are the result of “spatial dispersion of producers and consumers, lags between input application and harvest, sensitivity to weather extremes, variable perishability and storability of agricultural products, and political sensitivity of basic food staples.” (World Bank, 2017) This can result in strengthening localized market power to the disadvantage of farmers.

- Insecure Property Rights or poor functioning land systems: The issue of land rights is critical because availability of credit is often tied to land access. In rural areas in partner countries where there is not a well-functioning land market, financial institutions are not inclined to use land as collateral and the land is not easily convertible to cash and the costs of valuation are high. Moreover, lack of land tenure security limits permanent investments such as perennials or live barriers, drilling of wells for irrigation, among others. Finally, the unequal land access to women who play a critical role in food production in Africa in particular creates challenges for a greater impact on poverty and more inclusive growth.
- High Market Volatility: High price instability can result in wasted resources and a high amount of hedging. Although this is a normal practice in many sectors, it can impose high costs if it results in resource waste, strong risk adversity, crisis-fueled dis-saving, and other decisions that reduce long-term productivity. Agricultural markets are infamously volatile because of seasonal production, weather-related supply shocks, inelastic demand, and perishability (which limits storage).
- High Fixed Costs & Market Entry Barriers: Goods that require a large upfront investment can prevent production of new goods or block efforts to improve productivity. This is often connected to goods that have low marginal costs of production. Together, these can result in natural monopolies and oligopolies. This often applies also to infrastructure, where a natural (government) monopoly is the socially efficient solution. The transition to commercial agriculture can be blocked by the need to invest in new capital-intensive goods, such as irrigation. This can often limit innovation and competition by preventing new firms from entering a market. It can also allow incumbents to extract economic rents. Finally, there may be disincentives for firms to formalize, such as burdensome registration processes or excessive taxing structures; leading to a tendency for informal market actors to dominate, oftentimes to the detriment of a robust formal agricultural sector.
- Bounded Rationality: People are only partly rational and are emotional/irrational in the remaining part of their actions. Boundedly rational agents experience limits in formulating and solving complex problems and in processing (receiving, storing, retrieving, transmitting) information. This can result in optimizing solutions that appear to work in the short-term but may be detrimental over time. Farmers may lack the information to make decisions that boost the long-term strength of their business.
- Inefficiencies & Market Failures: Agricultural markets often also suffer from one or more market failures related to the dispersion of agricultural production, high variation in quality, perishability, and the small scale of most farmers in developing countries. Below are some examples of inefficiencies in agricultural markets that are caused by market failures.
 - Input and output market inefficiencies—Problems with infrastructure and with supply chains, compounded by weak contracting environments, make it more costly for farmers to access input and output markets and access the benefits from technology adoption.

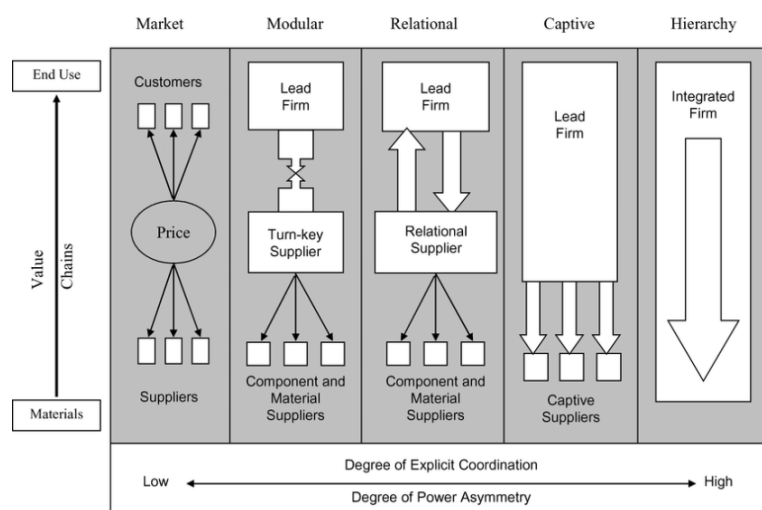
- Labor market inefficiencies—New technologies need different types and timing of labor input. Restrictions on labor mobility and high costs in the labor market will interfere with adoption opportunities.
- Credit market inefficiencies—Many farmers have difficulty accessing credit and face high interest rates, which prevents investment in profitable technologies. Financial decisions may be difficult for farmers without high levels of financial literacy. Due diligence and enforcement are costly (high transaction costs) and the honesty of borrowers is not observable (information asymmetry).
- Risk market inefficiencies—Technologies that carry a small risk of a loss may not be worth large, expected gains if risks cannot be offset. Psychological issues around risky decisions further lower levels of adoption. This is especially true with the poor, who are especially risk averse because the price of failure is especially high because of their poverty and lack of a social safety net, and/or because they already operate under risky conditions.

If there are identified market failures, the next step is to understand the structure of value chains.

D. VALUE CHAINS

In addition to understanding market failures connected to an agricultural system, another step is to understand the structure of markets since any gains to the agricultural economy will be measured by improved performance of specific value chains. Several possible relationships were suggested by Gereffi and Fernandez-Stark in 2011: (See Figure below.)

Figure 7: Value Chain Typologies



Source: Reardon (Otsuka, 2021)

To better understand these relationships, a value chain can be examined using questions suggested by Reardon (Otsuka, 2021) to examine the structure of a value chain:

First, it can be viewed “chain-wide”:

- What are the number of segments of the value chain and thus what we call its “intermediation length”? For example, the elimination of a segment, such as wholesalers, between retailers and growers, is “disintermediation” and reduces the intermediation length.
- What is the value chain’s “spatial length” (and geographical orientation)? For example, is it a long chain stretching from distant rural areas to cities, or a short local chain? Is it rural to rural, or urban to rural, or rural to urban? Is it domestic or international?
- What is the distribution across the segments of the chain of the formation of costs and value-added? This can be thought of as “cross-segment concentration.” Viewed another way, what is the share of the post-farmgate segments (and its complement, the share of farmers) in the total value of output of the value chain?

Second, a value chain’s structure can be viewed *per segment*:

- How concentrated (over firms) is a given segment (such as measured by the Gini coefficient of, for example, processing firms in the value chain)?¹ Another way to look at this is in terms of the share of the largest scale stratum of the actors within a segment in the total output of the segment. For example, what share do large mango farms have in the total output of mangoes in a province in Indonesia (compared with medium and small farms)? The share of output can differ from the share of a stratum in the number of firms or farms in that segment.
- How specific are a given segment’s actors to the product of that value chain versus supplying products or services “horizontally” across several product value chains? For example, the vegetable trucks of the logistic segment of the tomato value chain may also carry cucumbers for the cucumber value chain. So, vegetable trucks are both a (vertical) segment in one vegetable value chain but also a shared segment across several vegetable value chains.
- What is the spatial distribution of the actors in each segment? Are the firms or farms clustered or dispersed? Is this correlated with firm scale and thus with concentration in the industrial organization sense? An example is whether small dairy farms tend to be concentrated in hilly areas and larger farms in valley bottomland, or whether large feed mills are peri-urban and small feed mills are scattered in rural areas.
- What is the capital ownership pattern, such as what share of the capital is foreign owned, or collectively owned?

¹ Although Gini Coefficients are used mostly as measures of income quality in a population, they also measure the level of inequality of distribution of wealth within a specific industry. A Gini coefficient of 0 is perfect equality, while a measure of 1 signifies all wealth being in a single firm.

Understanding the overall and agriculture-specific constraints, along with market failures and the structure of value chains together, can reveal why an agricultural system is performing well below its potential. Some of the ways are like the structured tests used in the CA process that look at prices, shortages, and the costs of compensating for bottlenecks, low investment, high market concentration, and so on.

The structure of a value chain could also have significant implications for program design. For example, if a sector is marked by asymmetrical market power with monopsony, captive producers, and resulting low farmgate prices, it raises important questions about how a program could rebalance power in favor of producers. Alternatively, if it is a market-based value chain, are there investments that can help producers more effectively meet the market demand. In general, the approach to these systems will depend on the value chain problem and structures and will look for ways to ameliorate the market failures informed by an understanding of the value chain.

At the fundamental level, understanding the potential and the ability of a partner country to move convincingly toward it will require the kinds of system thinking built into the food systems approach. This examination should, at a minimum, include both conditions of production (weather, soil, pests, and climate) and markets (competitiveness and trade). While the determination of commodity potential will always be subject to some judgment, MCC's approach has been to bring in subject matter experts with in-depth experience in the commodities in question.

For example, in developing the second Zambia compact, MCC is getting support from experts in the oil-seed and horticulture sectors who understand what a competitive sector for these commodities could look like—and what it might take to close the performance gap with global market leaders.

While some data and support for this analysis could come from national data, partner country teams, and papers by other donors, such as FAO and the World Bank, it will most likely need to be further developed based on interviews with stakeholders, especially producers, farmer-based organizations, and commercial agriculture. In practice, this will be conducted by a combination of literature review and ground-truthing by the team's economists, agriculture lead, and subject matter expert consultants who can add information where there are important gaps.

Applying the Tools II: Lesotho

In Lesotho, the country team deepened its analysis of the agricultural problem by looking at market failures and value chains—and how the constraints limited the ability of the horticultural sector to develop. The most significant issues were high transaction costs that limited market access to farmers, the lack of property rights, high fixed costs that prevented the provision of water needed for horticulture, output inefficiencies resulting from an underdeveloped cold chain (which reduced food availability and prices for perishable products), and high credit market inefficiencies that prevented the development of commercial agriculture.

Because of limited commercial production, most value chains for horticultural products were very short and limited to local markets where prices tend to be low. This has further reduced the incentive for commercial production for horticultural products. Where there are commercial agricultural relationships, they tended

to be either short-term market-driven or, for the supermarkets, usually relational, where off-takers provide some technical assistance and support for high-quality suppliers.

If there is to be any real progress in building a vibrant commercial horticultural sector, these questions need to be addressed.

Before considering next steps, it is important to understand the economics of each commodity under consideration to ensure that changes in production benefit partner country constituents.

D. COMMODITY ECONOMICS

The next step is to understand the economics of the value chain(s) in question and how agricultural investments designed to boost the productivity of production, processing, or marketing of a commodity could negatively affect farm income by reducing food prices, resulting in lower farmer income and increased poverty. Even the introduction of new technology can be counterproductive if it has a negative effect on prices and farm income. This is the risk that farmers will be caught on a “technology treadmill,” where the flow of yield-increasing technology continually lowers prices, resulting in wins only for early adopters or consumers (Martin and Minot, 2021). The key is to ensure that the beneficial effects of productivity improvements exceed any negative effects on farm incomes stemming from increased supplies.

In some cases, the effects on prices will be small. If a commodity has a large market, that will be largely unaffected by increased production; the assumption that the price of the commodity is fixed will be essentially true. In this case, a traditional cost-benefit analysis that measures benefits by multiplying the expected increase in output by the price of the commodity, after adjusting for distortions on input and output markets, can be used.

However, if expanded production will have a significant impact on the price of the commodity or if the investment has other objectives, such as poverty reduction, environmental sustainability, regional equity, and/or improvements in nutrition, other tools will be needed. There may also be a need to examine how changes in production may affect input markets.

IFPRI has outlined these tools in an MCC-supported paper, “Prioritizing agricultural investments across commodities: Tools based on partial and general equilibrium approaches” (Martin and Minot, 2021), which discusses both partial and general equilibrium models designed to capture the market effects of potential commodity-specific interventions.

The *partial equilibrium approach* “simulates the effect of an assumed increase in the productivity in the commodity supply chain on commodity prices at the producer and retail levels. These price changes may then be combined with nationally representative household survey data to explore the distribution of benefits on different types of households, including the effect on different measures of poverty. Typically, income is taken as given in partial equilibrium models.”

The *general equilibrium approach* uses a model that includes the process of income determination and its implications for economic behavior. In many computable general equilibrium (CGE) models, the returns

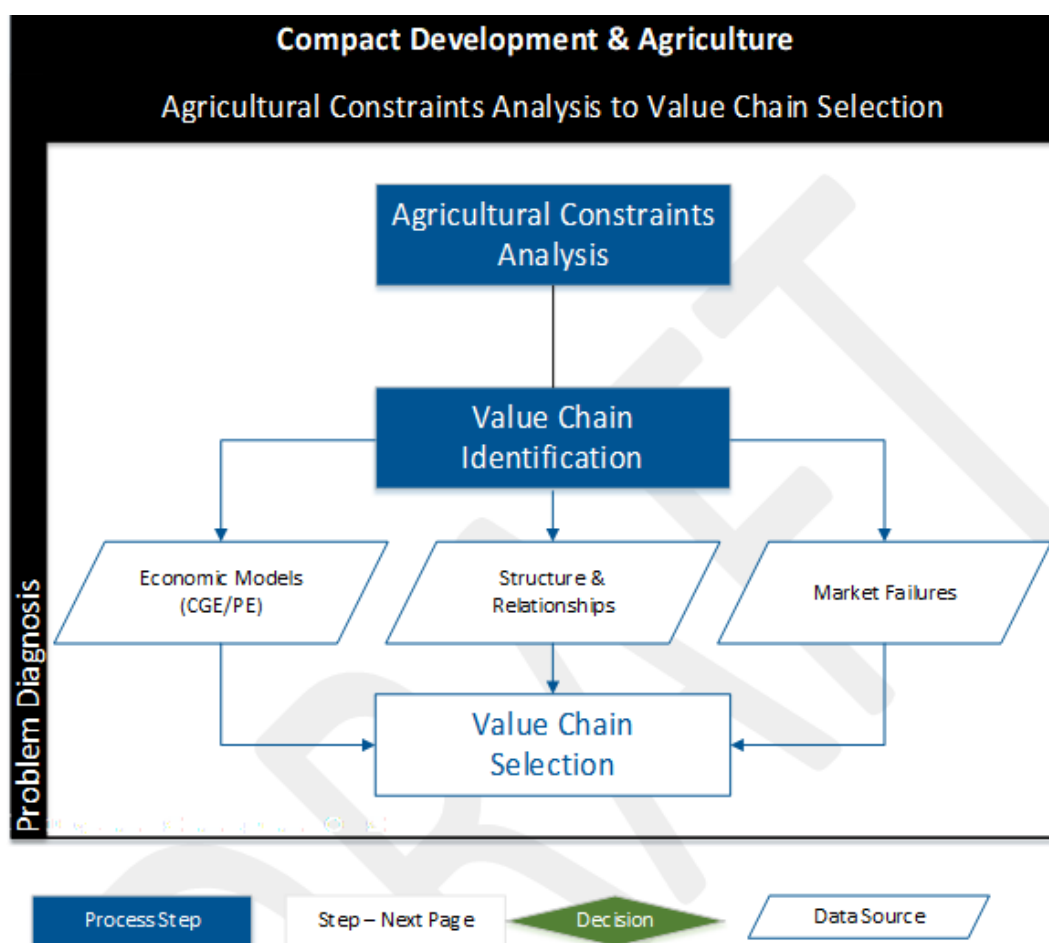
to factors of production are tracked as changes in, for example, wages that can have important impacts on both the level and the distribution of income. Such a model can be linked to nationally representative household survey data to examine the impact of the investment on different types of households, again including the effect on various measures of poverty.

The partial equilibrium analysis has lower data and skill requirements, but using it requires some strong simplifying assumptions about the way the economy works. A general equilibrium analysis incorporates interactions among sectors and between production and factor markets, but also requires more data and analytical skills and must always be run on specialized software at a much higher cost.

While some of these approaches can be conducted by economists in-house, the more sophisticated CGE modeling will generally need to be contracted to outside consultants. Given the expense of CGE modeling, it is best suited to examining value chains that are central to large projects.

The process from the ACA to Value Chain Identification, commodity economics and structures and market failures to commodity selection are outlined below.

Figure 8: Compact Development - Agricultural Constraints Analysis (ACA) to Value Chain Selection



Source: Authors/MCC Agriculture Team

A final question is around how these value chains are selected. While the tools presented so far can highlight best prospects and rule out poor ones, in the end farmers and others in the agricultural economy should decide what to produce. It should not be an MCC or partner government decision. The role of MCC or any donor is to identify and qualify promising sectors, engage with stakeholders, and then with their support play a nudging role to help agricultural systems approach their potential. In addition, the volatility of markets should support caution in focusing too narrowly on one or a few value chains. Instead of focusing on one crop, MCC investments are best focused on a larger basket of commodities. For example, investments should not just be focused on cabbage, but on horticulture.

Beyond the agricultural economy-specific issues, it is also important to consider other critical issues, such as the political economy and effects on climate and natural resource management. These are discussed next.

E. POLITICAL ECONOMY ANALYSIS (PEA)

To better understand opportunities and barriers to change, the compact development process often includes a political economy analysis (PEA) to address questions about the organization of power, money, and other socially valued resources. The [*USAID's Thinking and Working Politically Through Applied Political Economy Analysis: A Guide For Practitioners*](#) (2018) describes PAE as an, “analytical approach to help understand the underlying reasons why things work the way they do and identify the incentives and constraints impacting the behavior of actors in a relevant system. By helping identify these influences — political, economic, social, and cultural — PEA supports a more politically informed approach to working, known as ‘thinking and working politically’”. It looks at the incentives of all actors involved by looking their position and relationships in based in politics, history, social organization, and formal and informal institutions. It includes asking how various actors across the social system have been incentivized to maintain (or simply ignore) the *status quo*.

USAID (2018) also discusses PEA in detail, which it describes as “thinking and working politically”. Characteristics of PEA include:

- A concern with the role of formal and informal “rules of the game.”
- An analysis of power and the processes of contestation and bargaining between economic and political elites.
- A focus on the interests of different groups.
- An analysis of how these interests impact development outcomes, at times to the detriment of broader development objectives.

These contrasts between traditional and PEA-driven approaches were summarized by USAID:

Table 4: Traditional Versus More Politically Aware Ways of Working

	More Traditional Approaches	More Politically Aware Approaches
Problem Definition and Identification	Technical problems due to lack of resources or technical capacity. Problems are identified through an orderly top-down process.	Institutions, power dynamics and incentives that are not aligned with reform efforts; problems are identified, debated, and refined by domestic actors in an ongoing process of reflection and learning.
Vision of Change	More normative, based on what ought to be.	More strategic and pragmatic, based on what exists.
Changes Sought	“Best practice” based on a pre-established understandings or blueprints, top-down diffusion of innovation.	“Best fit” grounded in contextual realities, more organic change and “good-enough” reforms based on what is politically feasible as well as technically sound.
Implementation Approach	Linear, rational sequencing in fixed annual work plans and results frameworks; fidelity to plan, with more limited attention to risk, uncertainty and the potential of failure.	Iterative cycles of planning, action, reflection, revision (drawing on local knowledge). Explicit attention to risks, which are managed by making “small bets.” Incrementalism based on trial and error.
Ways of Working	Provision of expert technical assistance and capacity development within limited timeframes.	Facilitating, convening, and brokering partnerships and spaces for collective action based on long-term engagement, with focus on local ownership.
Ways of Learning	Periodic formal evaluation.	Rapid cycles of learning and reflection throughout program implementation.
Key Partners	Traditional donor stakeholders, including government institutions at different levels, regulators, service delivery civil society organizations, etc.	Greater attention to stakeholders outside the traditional comfort zone of donors, including “development entrepreneurs”, local chiefs and power brokers, youth leaders, religious leaders, etc.
Indicators of Success	Easily quantifiable (and usually short-term) outputs aimed at higher-level outcomes.	Process-based indicators, with focus on fostering relationships and building trust, as a measure of gradual progress toward higher-level outcomes.

Source: USAID, *Thinking and Working Politically Through Applied Political Economy Analysis: A Guide for Practitioners*, 2018

While ideally, any project under consideration should be continually informed by this kind of analysis to ensure that it has a realistic chance of being implemented in the environments of the partner country. The cost and complexity of undertaking this kind of analysis probably means that it should be mostly used for larger programs and those where the ACA revealed that effective change may require significant policy and institutional reform. Like all tools, teams should consider its costs and benefits relative to program size and potential impact.

Beyond the general political analysis, policy plays a central role in creating the milieu for the agricultural economy in both developing and developed countries. While there are many different types of agricultural policy interventions, they can generally be categorized into two larger categories of producer (farm and industry) or consumer support. The policy goals of these policies are typically meant safeguard against shocks or ensure affordable domestic food prices. While some can play positive role, these measures can sometimes result in imbalances that create incentives for overproduction, as in the case of price supports, or block private sector competition when the state plays an outsized role in inputs and financing. The following table offers an idea of these types of policy measures but is not exhaustive.

Table 5: Political Economy: Agriculture-Related Policy Measures

Producer Support Measures	Consumer Support Measures
<ul style="list-style-type: none"> • Minimum support price • High (protective) tariffs on selected goods • Input subsidy programs • Concessional financing and insurance • Agricultural research and extension • Trade services and promotion 	<ul style="list-style-type: none"> • Fixed prices or subsidies for consumer goods • Safety net programs • Sanitary and phytosanitary services (SPS) • Low tariffs on selected goods
Industry Support Measures	Other items to consider
<ul style="list-style-type: none"> • Restricted export of low value-add products • Subsidized storage infrastructure • Reduced operating costs (taxes, electricity, or fuel) specific to agriculture 	<ul style="list-style-type: none"> • Natural resource allocations (land, water, agroforestry) • Environmental policy related to effects of ag • Agricultural schools • Minimum wage for agricultural labor • Ethics of animal treatment

Source: USAID, *Thinking and Working Politically Through Applied Political Economy Analysis: A Guide for Practitioners*, 2018

Like any system, the political economy *milieu* can change over time, which is why it needs to be an ongoing part of the compact development process. There are numerous examples of what can trigger a change. A reform-oriented governments can come to power and be open to change to systems that restrict marketing and trade rules that disadvantage farmers. An economic crisis can compel a government to reduce an expensive seed or fertilizer subsidy program. MCC compacts can also play a role in advancing reform

with Conditions Precedent or other less formal agreements. This “MCC Effect” has often been observed in the past (MCC, 2022b).

Finally, as agricultural policy measures typically result in both direct and indirect transfers, MCC may also elect to perform a fiscal incidence analysis to study how fiscal policies benefit (or burden, in the case of taxes) people and households in different parts of the income distribution. This can have significant impact on populations of interest, oftentimes smallholders ([World Bank, 2022](#)). It can have significant effects on the inclusiveness of any project.

F. GENDER INCLUSION

MCC’s [Inclusion and Gender Strategy \(2022\)](#) requires that all MCC funded projects identify systemic and institutional barriers to equal opportunities for women and marginalized groups. The agriculture team works in close collaboration to ensure gender and social inclusion analysis informs the design of the agriculture interventions. While women are essential to the agricultural economy, in many countries there are multiple intersecting barriers to their successful entry into commercial agriculture, particularly at scale. Women are often concentrated in production for household consumption, and in lower-value segments of agricultural value chains. Higher-value commercial crops tend to be constructed as “men’s” domains, and women’s extensive domestic burdens typically make time-intensive commercial activity, particularly any marketing which requires travel, challenging. Their access to resources such as inputs, equipment, finance, training, information, and labor are typically lower compared to men. In addition, their incentives to earn cash may be limited by their husbands’ control over household income, decision-making, and budgeting.

Commercial farming schemes often make land access a requirement of membership and have minimum volume requirements for purchase—but women often lack clearly defined land rights, and their plots tend to be too small to meet the volumes required by higher-value markets. Finally, the structure of commercial contracts often discourages women’s participation or encourages their unremunerated participation by registering the entire family in the name of the head of household, and paying him directly (Schneider, 2010). While women often do work in commercial agriculture, they are often unpaid laborers on their husbands’ plots. Where women are formal members of commercial farming schemes, they are typically producing lower-value crops, which require few inputs and minimal labor, and which can be grown on small plots and combined with food crop farming (Farnworth, 2017).

Commercialization schemes are likely to primarily benefit men, unless they are designed in a way that addresses systemic barriers for women’s participation. As an example, a 2014 World Bank/UNCTAD study of 24 commercial agriculture investments found that only 1.5 percent of outgrowers were women (Mirza, 2014). Case studies of outgrower schemes across a range of crops and Sub-Saharan African contexts have found similarly low levels of female participation (Schneider, 2010).

There are specific interventions that can work to increase women’s participation and success in agricultural commercialization. The basic due diligence task during project development is to identify what is *already working* in the country to increase women’s uptake of commercial contracts and other opportunities in commercial agriculture in the country.

G. CLIMATE & NATURAL RESOURCE MANAGEMENT

Another consideration is the connection between agricultural systems and climate change because agricultural systems are both vulnerable to change and contribute to greenhouse gas emissions. The environmental impact of global food and land use is so high that, by some measures, it may be costing the planet more than it produces in value.

According to the Food and Land Use Coalition (FOLU), the hidden costs of global food and land use totaled \$12 trillion in 2019, compared to a market value of \$10 trillion (FOLU, 2019). This included health effects of \$6.6 trillion from malnutrition, \$2.1 in losses in rural welfare and product waste, and \$3.1 trillion in greenhouse gases and degradation of natural capital.² The largest opportunities to improve system performance lie with regenerative agriculture and restoring and protecting nature. Only moving to healthier diets comes close in possible economic impact.

To address these issues, partner countries and MCC could consider and evaluate new Climate and Resource Smart Agriculture (CRSA) approaches to agriculture and food systems that are developed over time. The challenge will be to objectively focus on the merits of emerging farm systems without giving in to approaches that collapse because they are insufficiently attached to science and sound economics.

The World Bank notes several ways in which agricultural systems can improve their climate and resource use performance, while also generating benefits for farmers: silvopastoral livestock systems, agroforestry, intercropping, diversification of production systems toward less water- and emission-intensive crops, improved pasture management, better fertilizer use, minimum tillage, alternative wetting and drying of rice, biogas production from agricultural waste products/livestock manure, improved irrigation and drainage efficiency that includes lowering GHG emissions by reducing energy consumption of pumping stations, and reducing food loss and waste (World Bank, 2015a).

To further reduce climate and resource impacts arising from agricultural systems, FAO has outlined ways to reduce energy and other resource consumption on-farm and beyond (Simms, 2015). The potential for reductions in energy use looks particularly promising in food processing, irrigation, farm machinery, and transport. In the case of irrigation, for example, lower energy costs could reduce the costs of operations that can undermine the long-term viability of projects. Changes in grazing patterns and trees in croplands could also reduce climate impact (Hallstein and Iseman, 2021).

A McKinsey study (Ahmed, 2020) used a cost curve to outline the cost-effectiveness study of specific possible climate interventions for agriculture. Interestingly, 15 of the 25 measures discussed would result in cost savings or are cost-neutral and could contribute to a 27 percent reduction on greenhouse emissions. The most effective interventions included: Zero emissions on-farm machinery and equipment; variable rate fertilization/improved nutrient management; dry direct seeding; no/low till planting; improved

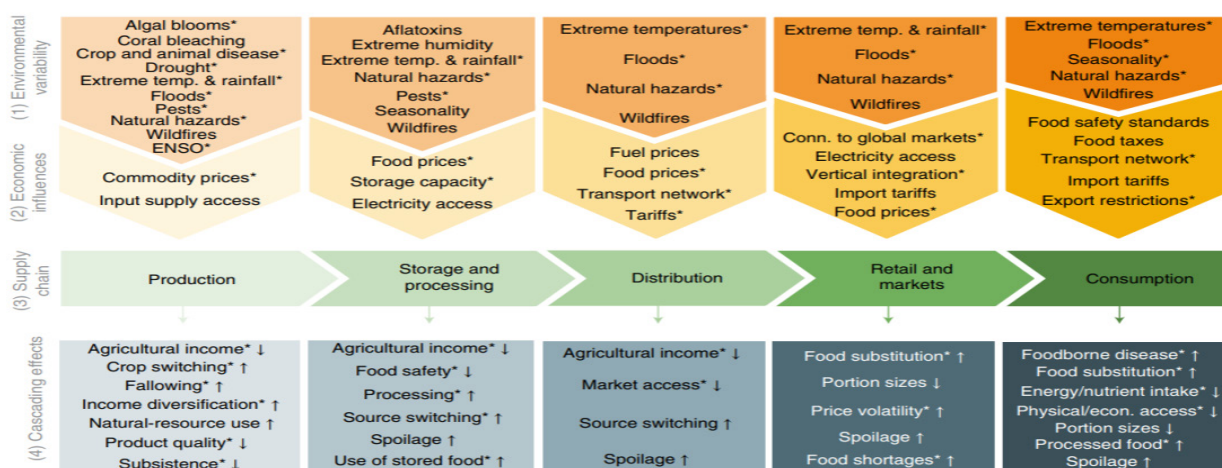
² These are not fringe findings but do define costs widely to include the environment and diet/health. The cost of producing unhealthy/low nutrition food is included in this figure. FOLU is a coalition drawn from highly respected institutions, including Alliance for a Green Revolution in Africa (AGRA), Global Alliance for Improved Nutrition (GAIN), World Business Council for Sustainable Development (WBCSD), World Resources Institute (WRI), IFPRI, Cornell University, FAO, and Wageningen University.

equipment maintenance; improved rice paddy water and straw management; and improved animal health monitoring and illness prevention. All these changes could both reduce GHG emissions and improve farm economics. This alignment of farmer and value chain actor incentives and climate imperatives is critical to success in this area. Change needs to come from collaboration with farmers—and not just be something done to them.

The question of farm profitability for generative agriculture is key as it will be the lever that motivates farmers to adopt particularly as most smallholder farmers face liquidity constraints. It will also influence MCC's decision making to invest based on the cost/benefit analysis. A paper by [LeCanne and Lundgren \(2018\)](#) found that regenerative agriculture systems over time require less external inputs (seeds and fertilizer), due to the increase in soil organic matter. The cost of inputs in conventional farming practices is 30% of the total costs, compared with 12% with regenerative agriculture. Thus, although it takes longer to see the benefits, in the longer-term regenerative agriculture is profitable. This failure to change may be a market failure where negative externalities (environmental damage, contribution to greenhouse gases, etc.) are not internalized in the business model or the cost benefit analysis model. It will be important to explore financial incentives to farmers to help them transition to regenerative agriculture or other sustainable practices and to explore ways to integrate in MCC's CBA the costs of maintain the status quo, particularly of long-term decline of soil fertility which affects directly yields and profits and the benefits of providing ecosystem services.

Lastly, some concerns raised around regenerative agriculture point to the promotion of highly localized systems and the potential impact of reducing import or exports. This binary thinking that regenerative agriculture is an all or nothing (native crops or non-native commercial crops) is not aligned with the practice of a system approach where the use of native plants may be within a continuum from use of native grasses, bushes, or trees as live barriers to production of native crops for a profitable market. Moreover, use of native crops is one of 15-20 potential practices and farmers do not need to adopt all the practices to bring the benefits of regenerative agriculture.

Figure 9: Environmental Risks to Food Production



Source: Davis, K. F., Downs, S., & Gephart, J. A. (2021)

H. TOOLS FOR POLICY AND REGULATORY ANALYSIS

As mentioned before, MCC uses the [Agribusiness Commercial, Legal, and Institutional Reform \(AgCLIR\) diagnostic tool](#) to examine the legal, institutional, and social environment for doing business in a country's agricultural sector. This diagnostic should be conducted as early as possible in the compact development process.

Another useful tool for assessing the impact of policy is the [Nominal Rate of Protection \(NRP\)](#), which measures the extent to which “a set of agricultural policies affects the market price of a commodity. It is computed as the price difference, expressed as a percentage, between the farmgate price received by producers and an undistorted reference price at the farmgate level”.

This measure is not only useful for understanding the effects of policy on farmgate prices, but also gives insight into the underlying economics of producing a specific commodity. Expressed as a percentage of price, a positive NRP indicates policy support (protection) for the commodity—but could overstate the benefits of producing it because the real economic value of the commodity is lower than the farmgate price. Conversely, a negative NRP shows that the government is taxing the sector—and attempts to boost it will likely need accompanying policy reform.

For example, in Malawi the tool reveals high taxes on grains and tea with 2018 NRPs of 28 percent and 21 percent, respectively. This indicates that taxation policy is significantly reducing farm income—which points to the need to reduce policies that tax agriculture. In Malawi, the largest “tax” probably comes from export restrictions that reduce farm prices both by limiting markets and increasing uncertainty (which also cuts prices). In contrast, the NRP for sugar in the United States is +98 percent.

One limitation of the NRP is that it does not consider policies that distort the price of inputs used in producing the commodities. The effective rate of protection takes these distortions into account but is more difficult to calculate. The [Nominal Rate of Assistance](#) also includes other forms of support than market price support (Valenzuela, 2008).

There are other tools available that can be considered for assessing the enabling environment for agriculture including USAID's which uses a set of indicators to measure the time and cost associated with the regulations and administrative procedures that affect the startup and growth of agribusinesses. [Agribusiness Regulations and Institutions Index \(AGRI\)](#). The World Bank has developed the [Enabling Business of Agriculture Indicators](#) which looks at access to seed, fertilizer, machinery, finance, markets, and transport—which are often major constraints to agricultural transformation.

Applying the Tools III: Lesotho

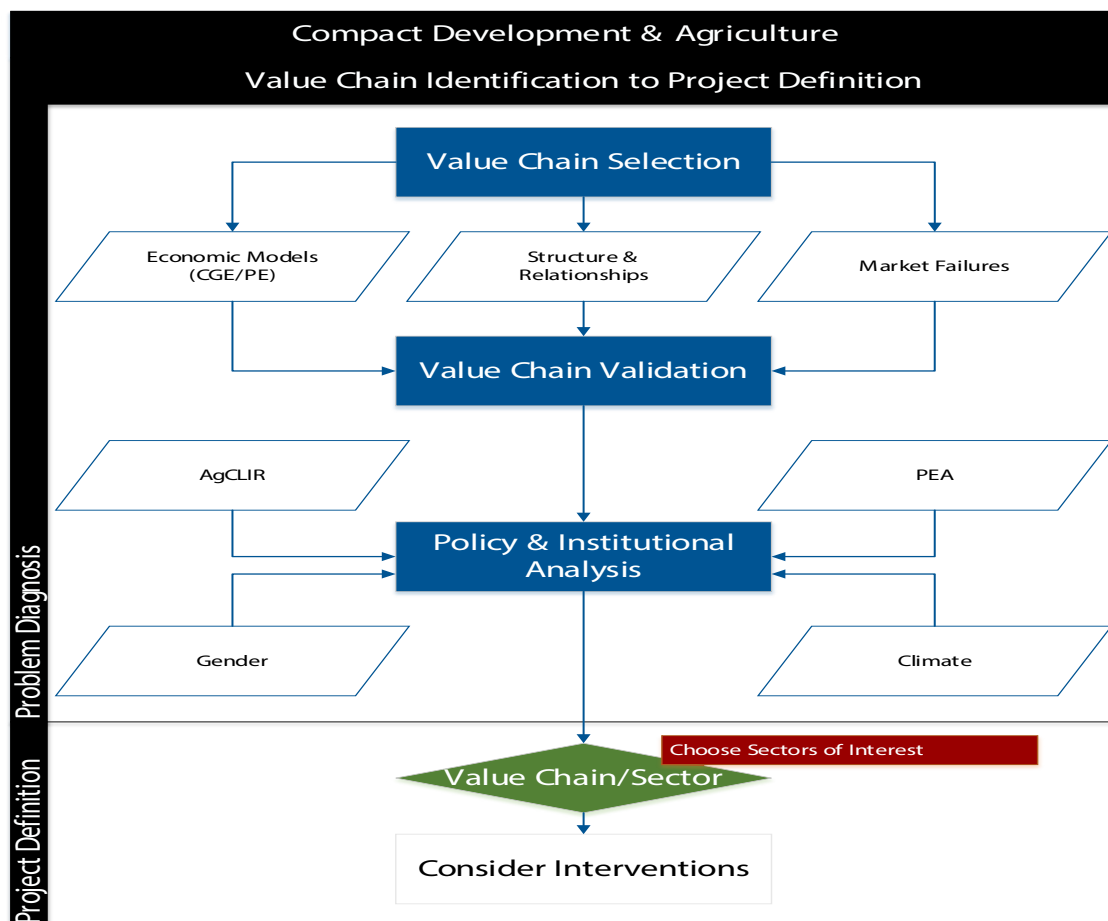
In Lesotho, the country team examined existing and potential value chains for horticultural products and found that formal markets were mostly limited, except for periodic purchases by supermarkets. Since no specific commodity was dominant in understanding the economics of the horticultural sector, the team did not model the markets for these products either PE or CGE approaches. However, a detailed market study was conducted to ensure there were strong potential markets for these products. In addition to local outlets,

there were potential markets inside Lesotho for import substitution, and possibly export markets to South Africa and beyond.

The policy and institutional analysis revealed issues that could impede the ability of the irrigated horticulture product to benefit women, youth, and the rural poor—which resulted this being added as a conditions precedent to implementation of the project.

The figure below summarizes the compact development process from value chain selection and validation to policy and institutional analysis. Understanding the economics, politics, gender, climate, natural resources aspects of a sector are critical to considering possible interventions that could facilitate agricultural transformation.

Figure 10: Compact Development—Value Chain Selection to Project Definition



Glossary for Items

CGE/PE = Computable General Equilibrium/Partial Equilibrium economic models

AgCLIR = Agribusiness, Commercial, Legal and Institutional Reform study to understand policy and institutions affecting agriculture

PEA = Political Economy Analysis looks at politics, history, social organization, and formal and informal institutions

Source: Authors/MCC Agriculture Team

V. PROJECT DEFINITION

The third phase of the compact development consists of further defining a specific project to address the issues identified earlier in the process. The goal is to have a compact co-created by MCC and its partner countries remove these barriers to growth by catalyzing investments with high social/economic returns when the private sector has not been able to overcome the costs of transition.

In this way, a compact can encourage investment where there are market failures and possibilities to generate positive externalities/joint impact. This “nudging” to higher system performance can come about by bringing in technical expertise, facilitating access to technology, addressing regulatory barriers, and providing a proof of concept that can reduce the perceived risk of investing.

A. KEY QUESTIONS: PROJECT DEFINITION

As MCC considers possible interventions for support, it applies a comprehensive list of due diligence questions to assess agriculture project proposals during the compact development process. While some of these questions will provide clear “go-no go” signals, others need to be considered considering how they will affect program risk and possible impact and sustainability. If a question does not yield a fatal flaw, the team should consider a sensitivity analysis of how performance could change depending on changes in these variables.

The list of questions below is based on earlier work in learning about the partner country’s agricultural economy and enabling environment ([MCC, 2021](#)):

How will the program resolve any market failures? This could be determined by looking at the market failures identified earlier in the process and asking whether/how these could be addressed. For example, if there is a market power asymmetry because of an oligopsony, will the project increase competition for farm offtake? If there is low investment because of low perceived land tenure security, will a program address this?

Is there a real problem with existing policies and laws? Will the proposed institutional or policy change tackle it? Is there a real demand on behalf of constituents to have that problem solved and will they “invest” in the solution, either in terms of continuing to use a system or paying for a service? For example, in Niger the old fertilizer sector was dominated by a parastatal, resulting in poor access to this input. As a result of an MCC-supported reform, this sector was moved to the private sector. As a result of government, private sector, and constituent support, fertilizer imports are expected to be considerably higher than in the base period.³

What is the political economy behind the current situation—and who are the major stakeholders, including constituents, investors, the public sector, and other partners? This will build on the PEA started earlier in the compact development process. Most critically, who are the winners and losers from the current system? This will be a critical consideration when looking at any potential change to a system. Stakehold-

³ The word “constituent” is used instead of “beneficiary” in this paper.

er engagement should begin quickly as project development advances, so that the team can understand what policies may be changeable—and which need to be accepted as given. If a problematic policy is not changeable, does it undermine the chance of an MCC program being effective in that space? If so, it may be necessary to abandon work there.

What are the downstream/market prospects for agricultural production (local, national, regional, and international)? What are the obstacles to market access (e.g., infrastructure, policy constraints, politically powerful groups, rent-seeking, literacy levels, etc.) and business efficiency, and how does the proposed design address those obstacles? Projects should begin with the market in mind focusing on supporting markets and economic sustainability. Will the project flood the market and/or is it dependent on too few value chains so that it will be vulnerable to market volatility? What are the shapes of the demand and supply curves? The work in commodity analysis will be particularly important to answering this question, as will an in-depth understanding of markets.

Do project participants have access on a timely basis to the necessary improved upstream inputs: seeds; fertilizer; crop protection products; breeding stock; machinery and equipment, including after-sales service; research and extension; and financial services? The ACA and other analyses will inform understanding of the input access issue.

Does the proposed project investment offer the reasonable potential for income generation and job creation, including multiplier effects, and to what degree are they focused on women, the poor, and other disadvantaged populations? Are the proposed interventions enough to make sustainable change possible?

What are the gender risks/opportunities? The rights of women and their role in household decision-making could have a decisive effect on impact and implementation. As an example, where women are employed as unpaid laborers on their husbands' plots, they may not have sufficient incentives to produce at the quantity or quality required for commercial buyers. A strong gender dimension is not just about avoiding poor outcomes but is also an opportunity to improve them (Otsuka, 2021). For example, Udry (1996) found that in Africa “total household crop yields could have been increased by shifting fertilizer from men's fields to women's fields.” A critical question to ask is: what is already working in the country to integrate women into commercial agriculture, either in the private sector or in donor interventions?

How will the rights of women and other vulnerable groups, including ethnic minorities, youth, and the elderly, be affected by the activities that are proposed? What are the anticipated benefits of the proposed approaches for women and other vulnerable groups? What is their capacity to effectively undertake project activities and share fully in the proposed benefits? As an example, when land shifts to higher-value production, men often take it over, leaving women worse off.

What are the climate and environmental challenges faced by the sectors under consideration? What are the possible interventions to boost long-term income and sustainability? What factors promote institutional and environmental sustainability, technological suitability, and financial self-sufficiency of the project? Are constituents willing to pay to keep up improvements and is there a market to support this investment over time?

Have the approach and methods described in the proposal been used in previous projects or programs in the country or elsewhere? Are they consistent with international best practices and relevant national sector strategies and plans? Does the proposal incorporate “lessons learned” from the earlier experiences? For example, in Lesotho, an irrigated horticulture project began with a strong focus on potential markets for off-take—because this was a major issue in some earlier compacts.

Are land rights sufficiently secure and do land markets function in a way that will support private sector investment and assure sustainability of the public sector investment?

What reform processes are underway? What programs are other donors currently funding, or planning to fund, and what is their timeline? How will MCA funds leverage, complement, or reinforce other donor interventions?

Is there enough data to support a business case for the project—or is there a plan to obtain/proxy it? How expensive is data accumulation relative to project size? The amount should be a reasonable share to support a strong project rate of return and make the project feasible.

Does the intervention build on private sector capacity to implement commercially viable solutions to the identified production and market constraints?

B. INVESTMENT PRINCIPLES

When deciding about an investment in agricultural transformation, MCC and its partners could consider both public and private sector points of view—and how they may overlap.

Even if there is a public interest in change, to succeed it must mobilize the private sector. For this reason, these principles can apply to both donors and the private sector. However, in practice, public investment may be best targeted at public goods (basic and social services, infrastructure, research, education, and extension services), while most value chain investments may be nudged by donors but will be driven by market actors after receiving the right incentives. Incentives can be financial or through improvements in the policy and regulatory environment and removal of barriers to the private sector. These can be identified by the ACA and other steps in compact development.

To capture the opportunity cost of scarce donor funds and ensure that programs add value to the economy of the partner country, MCC uses a Cost-Benefit Analysis (CBA), which is the basis of the Economic Rate of Return (ERR). The ERR includes all the costs of a project and measures the benefits of a project to a partner country's economy. This is discussed further below. MCC usually requires an ERR of at least 10 percent to decide if a project can proceed. The ex-ante ERR is used to inform a yes/no decision on a project, while the closeout ERR is used to determine its relative success.

To ensure that the proposed activities are based on measurable and actionable market opportunities, due diligence normally begins with an assessment of market conditions and is based on these principles:

Investments should address binding constraints to higher performance in the agricultural economy, including challenges with: Financial instruments such as concessionary loans, insurance, or negotiable warehouse receipts; extension services, both private and public as well as increased availability of inputs; producer and consumer support services, such as quarantine, weather, and disease surveillance; and marketing capacity, such as buyer-seller linkages, storage and cold chain, traceability, certifications, cooperatives, and marketing boards.

Investments should be market-driven and designed to include and attract private sector investment from the start. This can be done through three planning components. First, public investments should complement likely private-sector investment where private returns are low, or risks are high. Second, public sector investments should identify addressing market failures that the private sector cannot or will not solve on its own. Lastly, plans should anticipate changes in the environment that will be necessary as the plan progresses to support increased private-sector engagement (Boettiger, 2017). This is central to ensuring long-term project sustainability and impact.

Investments should be aligned with the agricultural sector strategic plans of the partner country, consider lessons learned from past projects, be based on international best practices, address key drivers of gender gaps, be adapted to local resource constraints (e.g., land, water, and power), and incorporate mechanisms to ensure post-project sustainability.

Behavior change of project participants and constituents can be expected to occur only if there are strong market incentives and functional value chains. This must also align with political, social, cultural, and other norms and relationships.

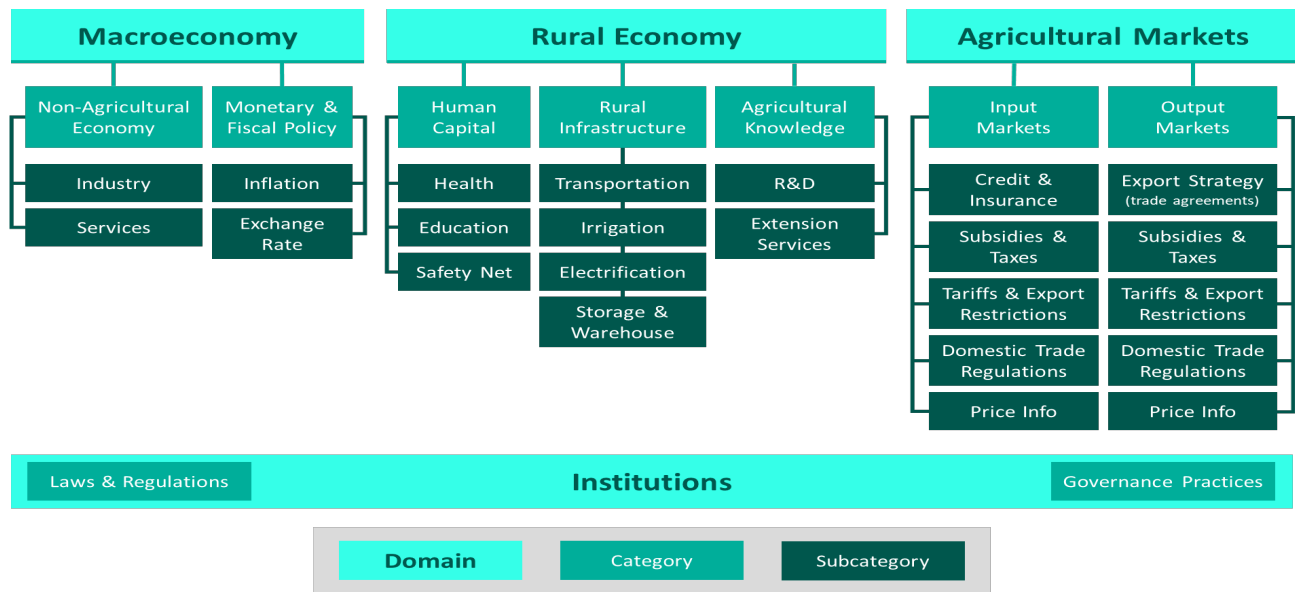
Investments should deliver high impact for the money. To ensure significant economic impact, MCC usually requires that that compact investments must exceed a 10 percent Economic Rate of Return (ERR). The ERR provides a single metric showing how a project's economic benefits compare to its costs and reflect the opportunity cost of the project compared to other ways to spend scarce donor resources. While other benefits may sometimes justify a sub-10 percent ERR, these should be clearly spelled out and compelling.

Investments should promote localization through long-term capacity building by supporting local entities if possible. To improve long-term project impact and sustainability, MCC should focus on leaving beyond people more highly trained to build upon agency investments. This capacity building can include policy makers, regulators, government entities, national universities, constituents, and associated businesses. The measure of success is a demonstrated ability to run new systems after MCC's projects end.

C. INTERVENTION TYPES

In considering future investments, country teams will consider these idea types to improve the performance of the agricultural economy in economically, socially, politically, and environmentally sustainable ways. In their paper "Prioritization of Types of Investments," Laborde et al. (2021) created a typology for work in the agricultural economy:

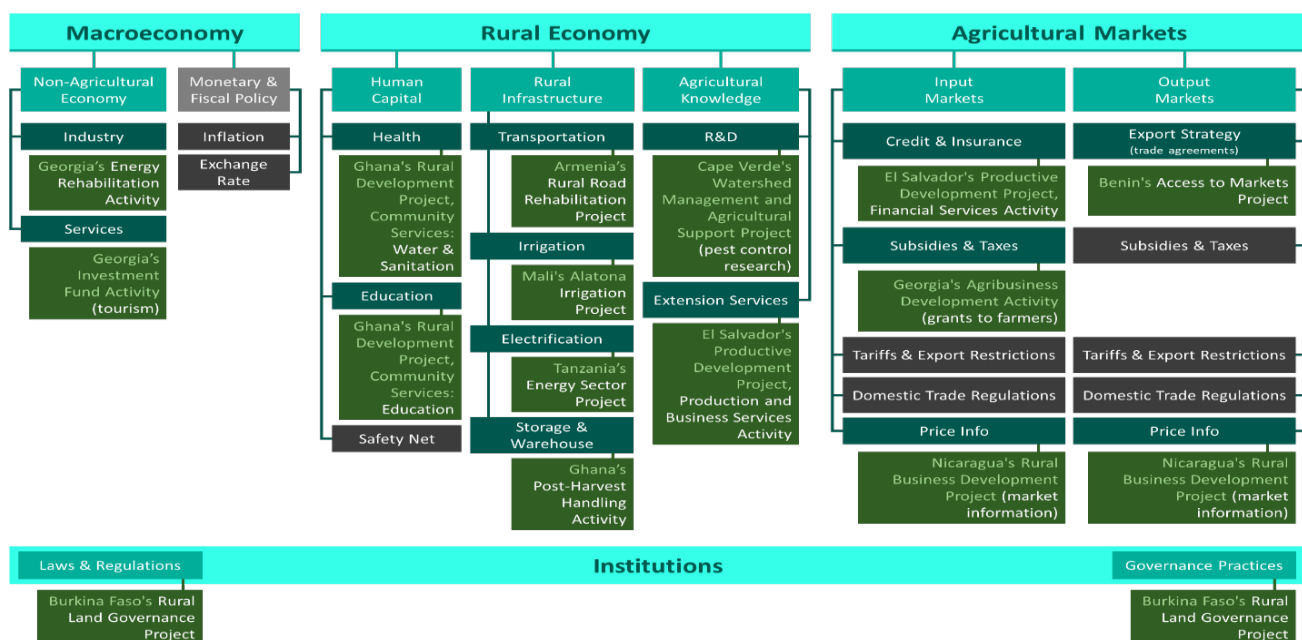
Figure 11: An Agricultural Public Policy and Investment Typology



Source: *Prioritization of Types of Investments*, Laborde et al. (2021)

This approach breaks down potential work within the agricultural economy into three buckets focused on: the macroeconomy, the rural economy, and agricultural markets. MCC past investments can be categorized within this scheme. Some of the outcomes of these projects are discussed later in the evaluation section:

Figure 12: Examples of MCC Investments in the Agricultural Public Policy and Investment Typology



Source: *Prioritization of Types of Investments*, Laborde et al. (2021)

D. SPECIFIC INTERVENTIONS MENU

Based on the above typology, it is possible to generate a specific menu of possible interventions to consider. Although the scaling and replicability of each type of investment depends on local factors, investment modalities could be considered and weighed against each other. Above all, it is important to remember the five-year implementation limit that can greatly increase completion risks for overly complex and time-consuming projects.

In most cases, these interventions will be highlighted by earlier compact development, especially during the ACA process. This menu of specific possible interventions will draw upon the IFPRI typology above, but will *exclude* interventions that lie outside the agricultural economy and/or MCC's remit. For example, this menu will *not* include Inflation and the Exchange Rate under Macroeconomy or Safety Net under Human Capital. This list is not meant to be exhaustive, but to add detail to the investment typology outlined above.

These interventions should be prioritized based on constraints identified earlier and whether multiple interventions are needed. If so, they could be “bundled” to change the constraint and address the identified market failure. For example, improved inputs may not help improve profitability if other hurdles exist to bringing this greater production to market because of storage or other infrastructural bottlenecks. Note that this list is not exhaustive but is intended to suggest possible ways to improve performance of the agricultural economy in MCC partner countries.

Macroeconomy

Non-Agricultural Economy, including Industry and Services:

1. Agriculture Economy and Rural Transformation: Agriculture is more than just the farm. Performance of the system is limited by constraints ranging from upstream input markets and services to the farm—and then downstream to food processing, logistics, marketing, and even retail. This food systems approach will enable compacts to focus on the places in the value chain that are most responsible for slowing economic growth in the agricultural economy. It will also enable compacts to consider off-farm investments that may have a higher economic return. For example, McKinsey (2015) notes that from 2012–2014, returns on invested capital were 28 percent in agri-food processing and retail, and 20 percent for inputs, but only 12 percent for primary production and 7 percent for primary processing. Since off-farm employment plays a central role in generating both rural and even urban economic growth, interventions outside the farm could present new opportunities. Concretely, this could inform regulatory interventions in input markets, financial or tariff incentives for cold chain investments, or even an effort to attract private sector investments into food processing. ACA: Output Markets, Inputs & Technology
2. Processing and agribusiness landscape: When production reaches a critical level and there are policies in place to support agribusiness and processing facilities, the creation of processing facilities can go a long way to increasing farmer incomes and reducing market variability, while also providing employment opportunities. This can include sorting, cleaning, and packaging, as well as processing, branding, and retailing, through activities such as canning, drying fruit, cooling milk, packaging, and even label-

ing (World Bank, 2013). Typically, the lack of supporting policies and adapted finance are most often cited for the private sector's unwillingness to crowd into this space. ACA: Policy Distortions & Capacity, Quality Issues, Trade Policy, Roads, Electricity, Storage, Payments Systems, Input Credit, Human Capital

3. Post-harvest loss-focused investments are a subset of the above and can include cold chain and packing industries and schemes where supermarkets or ancillary processors are able to use low-grade products (small avocados into guacamole, as an example). Examples of interventions of this kind have included contract farming at the onset to ensure prices and quantities so that producers face less risk in trying something new. This type of integration between processors and producers usually includes private extension services, often provided by firms or commercially oriented anchor farmers. ACA: Quality Issues, Trade Policy, Roads, Electricity, Storage

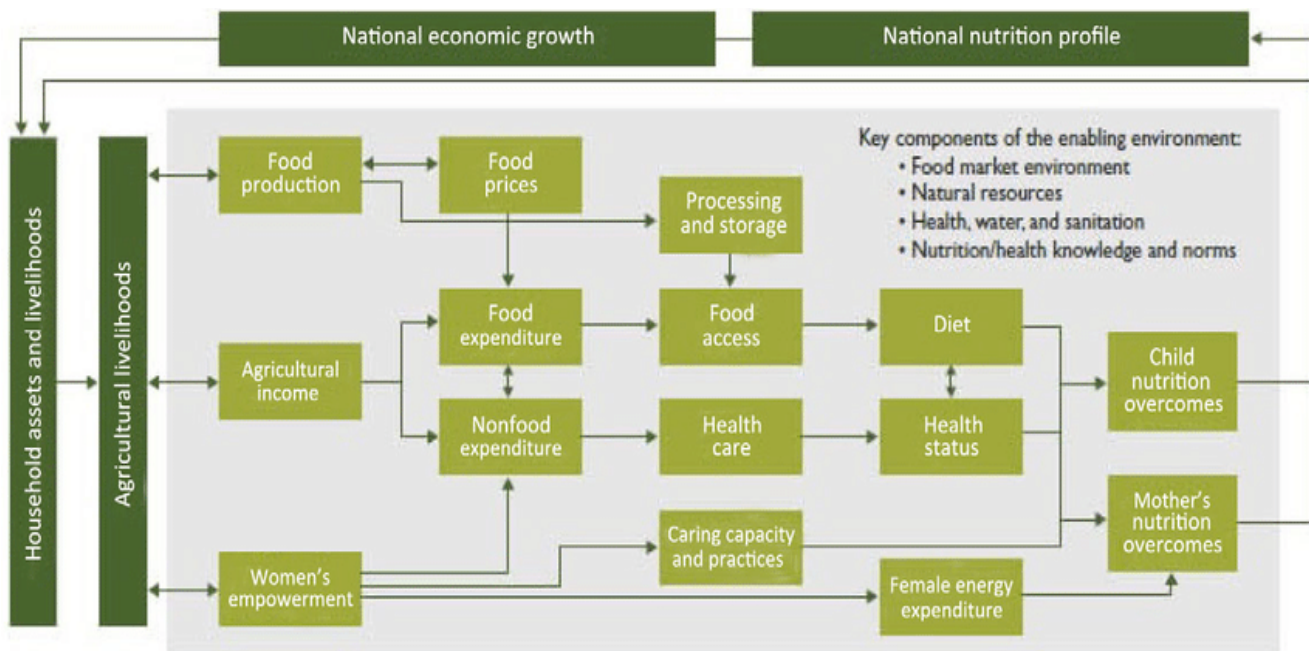
Rural Economy

Human Capital, including Health and Education:

1. Nutrition Specific, Smart, & Sensitive: Depending on the nature of the constraint, improving nutritional outcomes may be needed to enable long-term economic growth and poverty reduction. For example, this could be considered as a potential binding constraint to growth if learning, educational outcomes, and worker productivity is measurably and sufficiently negatively affected by nutrition-related deficits. According to the World Bank, nutrition is one of the world's most serious but least-addressed development challenges. Its human and economic costs are enormous, falling hardest on the poor, women, and children. In 2020 alone, 149 million children were stunted. Stunting early in a child's life can cause irreversible damage to cognitive development and has educational, income and productivity consequences that reach far into adulthood. The economic cost of undernutrition, in terms of lost national productivity and economic growth are significant, amounting to \$3 trillion a year in productivity loss of 3%-16% of GDP loss in low-income countries. Although MCC has worked in nutrition (most notably in Indonesia), this is an area of under-investment with significant opportunities to learn and deliver effective interventions that focused on nutrition sensitive agriculture, behavior change, food biofortification, and building adequate infrastructures to change costs.

USAID has supported advanced thinking on Nutrition Sensitive Agriculture programming. <https://www.spring-nutrition.org/publications/series/improving-nutrition-through-agriculture-technical-brief-series>. The 3 key pillars or pathways for improving Nutrition through Agriculture are: Food Production, Agricultural Income, and Women's Empowerment. ACA: Safety Issues, Water, Human Capital (See Figure 16.)

Figure 13: Conceptual Pathways Between Agriculture and Nutrition



Source: Conceptual framework for the primary pathways between agriculture and nutrition. Reprinted from Ref. 24. Adapted for Feed the Future by Anna Herforth, Jody Harris, and SPRING, from Gillespie, Harris, and Kadiyala (2012) and Headey, Chiu, and Kadiyala (2011).

Rural Infrastructure, including Transportation, Irrigation, Electrification/Power, and Storage & Warehouse

1. **Public agricultural supporting infrastructure:** Given the large value of MCC's compacts, public infrastructure has represented the largest share of its investments. This includes transport infrastructure vital to create and facilitate market linkages and irrigation infrastructure to support producers in transitioning to higher value products and could even include rural electrification for development of agribusiness and processing. These investments are not likely to alleviate constraints in and of themselves as they will require additional transformations in production or marketing practices. It is also essential to remember that sustainability for operations and maintenance of this infrastructure is a must yet is often quite difficult to achieve. This issue has been particularly challenging for MCC's irrigation projects, where construction and other costs have raised questions about whether they can be economically viable. ACA: Roads, Electricity, Water, Storage
2. **Investments to reduce post-harvest loss and strengthen buyer-seller linkages:** Post-harvest investments can be made to aggregate volume and sales, increase traceability of quality products, or shorten the value chain between producers and their markets. These can include ICT, storage and cold-chain, traceability and farmgate marketing tools, aggregation sites, multi-modal transport infrastructure, and other tools to create and sustain buyer-seller linkages. The biggest challenge in post-harvest investments relates to areas of ownership structure, management, contractual, power and trust relations between farmers and the private operators, payments, and financial sustainability, particularly when it comes to

engaging smallholder farmers. This can include finding the appropriate solution and the right scale of investment can be a challenge. USAID's Partnering for Innovation program that ran from 2012-2020 provides several good examples of success in this space (Agrilinks, 2022). ACA: Policy Distortions, Quality Issues, Price Risk, Trade Policy, Roads, Electricity, Storage

3. Public Goods: Markets do not generally exist for these goods. These include infrastructure such as roads, bridges, and ports, as well as legal and regulatory systems governing contracts, companies, domestic and international trade, food safety, labeling, and quality standards. These types of investments—which are akin to hard infrastructure improvements—are designed to allow for improved production, safety, quality, and marketing of food/agricultural products. This category also includes the conservation and protection of environmental public goods, such as biodiversity, agricultural landscapes, flood control, landslide prevention, water quality/availability, and forests. ACA: Roads, Electricity, Storage, Policy Distortions & Capacity

Agricultural Knowledge, including Research/Development and Extension Services:

1. Farmer Training: Although training alone is not going to help farmers overcome barriers to market access (for inputs, outputs, and credit), it is a critical input to transfer to farmers knowledge and technology and build their skills to improve their productivity. The most commonly use forms of training are:
 - a) **On farm training with donor funded agents with specific technology packets**: This type of intervention tends to be personnel intensive and costly. It can be effective when introducing a new technology and it can be done at a smaller scale to create a demonstration effect. If the donor is providing the package the connections to a commercial provider are not created and sustainability may be a challenge.
 - b) **Cascade training (or training of trainers)**: Allows to tap on a lead-farmer's social connections to other farmers in the area and tap into local knowledge and expertise to reach a larger number of farmers at a lower cost. The lead farmer generally has a demonstration plot, and it can be combined with the concept of farmer field schools.
2. Agricultural research and extension service capacity building: This type of investment reinforces the capacity of public systems and public extension agents to deliver on a more regular basis training to farmers on areas such as soil and water management, pest management, use of improved seeds or transfer of other new technology. The challenge of this type of investment is that unless governments make the fiscal space on their annual budgets to support extension services, the number of extension agents per farmers in an area do not allow for adequate coverage, sometimes leaving over 80% of farmers without extension services. Moreover, extension agents need to have transport and mobilization budget and budgets for training materials. One cost effective area that can be explored with governments is the use of ICT for delivery of public extension services. ACA: Technology Access, Human Capital
3. Producer organization (PO) support to include associations, cooperatives, and unions: Producer Organizations can act as service providers, credit enablers, aggregation centers, and marketing institutions, creating additional employment opportunities. They can also play a key role in establishing equitable

contract farming arrangements with off-takers and support compliance with standards and serve as platforms for further innovation (Otsuka, 2021). Understanding the different needs and abilities of POs is key to a successful intervention. For instance, dairy cooperatives will have different priorities, such as cold chain infrastructure and disease management, than an association of coffee growers that may be seeking marketing support. In addition to identifying the specific needs related to their value chain, it is critical to pay particularly close attention to entities led by women, youth, or other marginalized groups to maximize poverty reduction. POs may have an array of capacity building needs including institutional governance, financial management, recruitment and retention of members, service provision (input provision, credit facilitation, training), and commercialization, among others. The challenges and opportunities and the readiness of organizations for further development should be assessed. Building new organizations is a bigger and longer-term effort, and MCC and other donors should try to avoid developing organizations solely with the purpose of distributing a given benefit. ACA: Technology Access, Human Capital, Policy Distortions & Capacity

Agricultural Markets

Input Markets, including Credit & Insurance, Subsidies & Taxes, Tariffs & Export Restrictions, Domestic Trade Restrictions, and Price Information:

1. Input supplies and development of the private sector to support improved agricultural techniques. It is clear from prior investments that there must be a critical mass of need for services for the private sector to sustain this essential role in the value chain. Typically, in developing countries, inputs are often subsidized, distorting the market and eliminating any chance for the private sector to compete on input provision and ensure results-based innovation of technologies. Private sector suppliers can also educate their customers on the benefits of their products and provide guidance them with information on how to best use their products. ACA: Inputs & Technology
2. Financial services and insurance mechanisms: Financial inclusion and access to insurance can provide major channels for producers to increase their productivity. This includes credit, savings, payments, and insurance (Otsuka 2021). When these elements are not available, producers practice intrinsic forms of financing and insurance by making the decision to invest less in their production. In Africa, less than 1 percent of commercial lending goes to the agriculture sector (Otsuka, 2021). At the same time, agriculture is both very risky and poorly served by insurance given weather risks, price fluctuations. Working in finance and insurance often requires adapting conventional products to become concessional to allow for payment deferral until harvest, or tailoring to the sale of agricultural product, as happens in dairy or livestock. Enabling the use of movable assets, such as farm machinery, contracts, warehouse receipts can open up credit opportunities to producers (World Bank, 2013). While some programs may start as concessionary or originate from impact sources, the goal is to graduate recipients to commercial loans. ACA: Finance

The range of potential investments for financing is practically endless; however, the following types are most typical: provision of principal for microfinance; small and medium enterprise financing; provision of a guarantees fund; financing with the private sector for varying grant to loan shares; offering capacity building to financial institutions to tailor loans to the agriculture sector; training of loan officers; and

providing modified leasing mechanisms. Newer models for programs have included the development or normalizing of ICT to facilitate lending and working to create credit profiles for smallholder farmers. Crop index insurance has not yet been considered under MCC funding but IFC has a [Global Index Insurance Facility](#) that serves 23 million people in Sub-Saharan Africa, Asia, Latin America and the Caribbean which could be explored as a partnership in partner countries not served by it.

Output Markets, including Export Strategy (Trade Agreements), Subsidies & Taxes, Tariffs & Export Restrictions, Domestic Trade Restrictions, Private Sector Standards, and Price Information:

3. Trade & food quality and safety systems investments: To access global markets governments need to develop well-functioning food safety systems that can help producers and agribusinesses meet stringent SPS and market standards in markets such as the EU, Canada, and the United States. A [2014 UNCTAD paper](#) analyzed the effects of SPS measures on low income countries' agricultural exports and found a reduction of lower income countries' agricultural exports of about 3 billion \$US (equivalent to about 14 percent of the agricultural trade from lower income countries to the European Union). This finding highlights the need of well targeted technical assistance to governments to overcome the cost of compliance related to SPS measures. This will likely require investment in the laboratories, equipment, testing staff, traceability systems, digital technology among others.

The same UNCTAD paper suggests that membership in trade agreements seems to reduce the difficulties related to compliance with SPS measures. This highlights the value of investing in Trade Capacity Building (TCB), which includes assistance in entering international markets and complying with import requirements and private standards, which can present considerable barriers to agricultural exports (Jaffe, 2004). These can include the improved development and administration of SPS and Technical Barriers to Trade (TBT) rules, the promotion of regional legal integration and harmonization, improving customs systems and procedures, facilitating compliance with private standards, and the provision of other services to facilitate agricultural trade (GHI, 2013a). Past USAID TCB projects have been largely effective (USAID, 2010). This includes work focused on improving the efficiency and transparency of trade across national borders. The World Trade Organization's Trade Facilitation Agreement (TFA) is focused on increasing trade capacity and facilitating trade and the Standards and Trade Development Facility (STDF) helps developing countries overcome SPS barriers to exports (Durkin, 2017).

Lastly, there is an opportunity at the firm or producer level to support entrance in niche markets that require differentiation of production through certifications, such as Global GAP and others, organic, fair trade, rainforest conservation, among others. Donors can play a critical role in supporting the business partnership between smallholder producers, their organizations and the exporters or buyers of their products to develop the capacity of producers to obtain third party globally recognized certifications. Finally, Each MCC compact project and activity must be analyzed to determine whether there is a potential effect on U.S. jobs or production, and the scale of that effect. No project or activity should receive MCC funding unless this potential impact has been analyzed and approved. [ACA: Quality Issues, Safety Issues, Trade Policy, Infrastructure, Agriculture-Specific Human Capital](#)

Gender Inclusion

Absent intervention, commercialization schemes should be expected to primarily benefit men. As an example, a 2014 World Bank/UNCTAD study of 24 commercial agriculture investments found that only 1.5 percent of outgrowers were women (Mirza, 2014). Case studies of commercial farming schemes across a range of crops and Sub-Saharan African contexts have found similarly low levels of female participation (Schneider, 2010). The following approaches ought to be considered to advance women's inclusion:

- Collective action and organization: to the extent that MCC interventions implicate cooperatives, supporting capacity building for majority-female cooperatives may improve their ability to sign and meet the targets for commercial contracts.
- Gender-sensitive outreach and extension services: separate outreach to women, and extension services targeted to women, can reduce barriers to entry and success.
- Contract features: Off-taker firms can set targets for the percent of female producers on their contracts with coops to incentivize recruitment and retention of female farmers. They should also contract with individuals rather than families, to deter men from utilizing women as unpaid laborers on their own contracts.
- Land rights: where commercial schemes involve aggregating and /or redistributing land, approaches should seek to maximize women's land access. For instance, redistribution can set targets for women's inclusion, and aggregation should include protections against expropriation by spouses and traditional authorities. It may also be possible to support women's cooperatives to pool or acquire land collectively.
- Financing: any intervention with a smallholder finance component should take a gender-sensitive approach, as women smallholders face steeper barriers to accessing adequate loans in most contexts.
- Gender-transformative approaches: emerging evidence suggests that this body of workshop-based approaches (GALS is the best known) on joint planning and budgeting can have substantial impacts on women's access to resources (like land), men's willingness to take on domestic burdens, and women's uptake of commercial contracts.

VI. PRIVATE SECTOR ENGAGEMENT

Since MCC is focused on poverty reduction through economic growth, early private sector engagement is critical. Ideally, this would start during the CA and RCA stage and inform compact development through the PSA/PSOA process as problems and opportunities are being discovered and discussed. As the compact develops, the focus will shift from information-gathering to considering partners for compact co-creation around private sector investment. The goal is to co-create market-focused, impactful, and sustainable programs by leveraging compact resources to maximum effect.

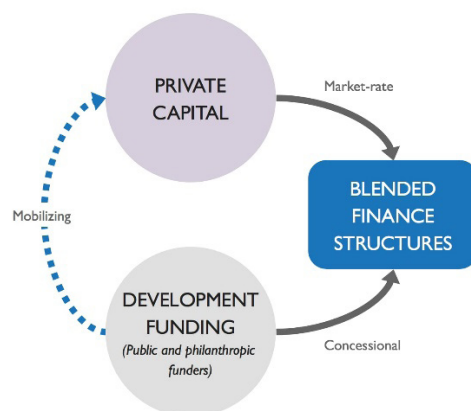
A. TRADITIONAL MODELS

Most often, this collaboration with the private sector happens during compact development, feasibility studies, and in implementing projects either through contracts or via partnerships. These are conducted through MCA or MCC procurements, most often through open competition. These vehicles are described on MCC's home page under "Work with us": <https://www.mcc.gov/work-with-us>.

B. BLENDED FINANCE

MCC also seeks to collaborate with companies and investors to boost economic growth through impactful and sustainable projects anchored in the private sector. To this end, MCC is focused on using blended finance which, according to Convergence, uses "capital from public or philanthropic sources to increase private sector investment in sustainable development" (Convergence, 2021). (See Figure 17.)

Figure 14: Blended Finance Model



Source: <https://www.convergence.finance/blended-finance>

The approach is for the public sector and donors, including MCC, to mobilize private capital toward achieving positive social impact by reducing risk. Blended finance can “nudge” private sector investment into investments that offer considerable and measurable economic value but are impeded by market failures that often impose high costs of change. The focus will be on reducing barriers to further private sector investments, especially from the impact investing community that seeks both return on capital and demonstrated social impact. Blended finance differs from traditional development assistance because it is designed to generate both profits for partners along with social impact. This mandate closely aligns it with social impact investors and can incorporate market discipline to advance socially desirable goals.

The key is to ensure that the economic rate of return is high enough to justify the project or activity as advancing MCC’s mission of poverty reduction, while offering attractive levels of impact and social returns to investors. According to [Dalberg](#), donors can play a critical role in crowding in investment by helping farmers and others be “bankable” and by catalyzing both local investment and improving farmer access to credit, especially through catalytic investments and by improving the enabling environment.

While at MCC the use of these tools is nascent, there is interest in seeing how they can help solve problems in agriculture. To date, the largest use of MCC funds in an agriculture-related blended finance project was during the Indonesia Compact (2013-2018) that involved collaboration with eleven major industry players to invest in sustainable cocoa active in Indonesia, including multinational companies such as Cargill, Mars, Mondalez, Nestle, Olam, and others. They co-financed projects and partnerships with cocoa producers that continued after the end of the compact (MCC, 2019).

Given the immense complexity of the blended finance space, this Toolkit will focus only on general issues as a guide to investor engagement, which will be highly interactive and will necessitate the bespoke solutions built around general principles. Since each investment will have its own risk/reward profile, different pools of potential investors and stakeholders, and unique intervention set, the mix of donor and private capital will vary greatly between projects. In designing these structures, MCC's agriculture practice will work closely with our Finance, Investment, and Trade (FIT) practice group and other entities, such as the US Development Finance Corporation (USDFC) to engage with stakeholders to find the best design fit.

Convergence highlights several model “archetypes” to consider that can guide design thinking in blended finance (Convergence):

- Design/Preparation Funding: Supports costs and activities that lead to investment through grants that most often reduce due diligence costs. Example: MCC pays for expenses under compact development, such as the costs of feasibility studies.
- Technical Assistance: Funding to supplement the capacity of investees and lower transaction costs that help them become more investible. Example: MCC underwrites the costs of training constituents or supporting transaction advisors.
- Results Based Financing (RBF): Ties payment to outcomes where donors pay for outputs around social and economic impacts instead of inputs. Example: MCC only pays for measurable results around farm income or other outcomes such as jobs created. This is discussed in more detail at MCC, 2017: <https://www.mcc.gov/initiatives/initiative/initiative-results-based-financing>
- Guarantee: Protects investors against capital losses or provides credit enhancement to reduce risk. Example: MCC generally does not work in this space but may work with other entities such as USDFC that do.
- Concessional Debt or Equity: Subordinate and/or junior terms compared to co-investors to enable investors to reduce risk and boost returns. Example: MCC generally does not work in this space.

To align with these archetypes, MCC's FIT team has identified four approaches to blended finance that are best suited to MCC's model and provide the greatest potential to maximize private sector involvement. MCC has a significant track record employing leveraged grant facilities and public-private partnerships across its portfolio, but guarantees, hedging, and impact incentives are new areas for MCC to further develop and deploy.

- Leveraged Grant Facilities (LGFs): As the highest potential area for MCC, the FIT team plans to finalize and launch new guidance and a toolkit to refine MCC's approach to this type of grant facility. The approach will ensure that future Leveraged Grant Facilities are designed to catalyze at least \$2 in private financing for every \$1 MCC invests. Given the potential opportunities at present, the FIT team estimates roughly 40 percent of its portfolio will consist of Leveraged Facilities. While LGFs can be attractive, they need to focus on addressing clearly defined market failures while articulating what specific problems they are designed to solve.
- Public-Private Partnerships: PPPs provide MCC with an opportunity to reach a high average leverage target by crowding in private sector investment. What each partner contributes will be determined by the problems identified earlier in the compact development process.
- Guarantees and Hedging: This is a high-value emerging area for MCC, with work still required to identify and overcome legal and operational challenges so that MCC could employ these tools across up to 15 percent of our portfolio. These financial instruments, which may be implemented with the US Development Finance Corporation, have the potential to allow MCC to leverage up to 10 times the amount of our investment.
- Impact Incentives: The FIT team is working to develop MCC's approach to employing a variety of other tools, like Performance-based Debt Buy Downs, Performance-based Loans and Grants, and Social and Development Impact Bonds. These approaches are expected to make up a smaller 10 percent share of MCC's portfolio, providing an average leverage ratio of 3:1. This work also provides linkages with other MCC technical groups, such as GSI, LAE, and HCD, who have and are integrating results-based financing approaches in programs where appropriate. MCC's business model provides it with a unique opportunity to pay a catalytic role in the impact sector, driven by MCC's ability to create scalable investments driven by rigorous development impact measurement.

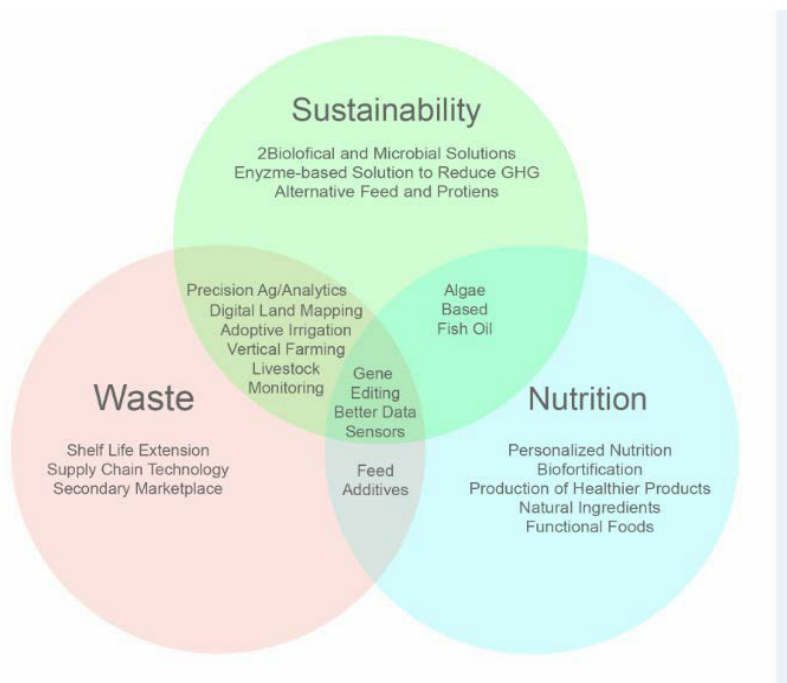
According to Convergence, the main foci (by shares) of blended finance are Agricultural Inputs / Farm Productivity (31 percent of total), Agriculture Finance (33 percent), Climate Resilient / Sustainable Agriculture (20 percent), and Agro-Forestry (9 percent). Reflecting the risk in agriculture, 56 percent of investments came through funds while 21 percent came via company investments. Facilities (10 percent), project investments (10 percent), bonds/notes (3 percent), and impact bonds (2 percent) were much less prevalent in agriculture. Most investments also come lower in the value chain, especially in growing and processing crops.

C. INVESTING IN INNOVATION

Lack of access to appropriate technology can generate and aggravate a binding constraint to growth of the agricultural sector and undermine long-term transformation. Part of the challenge comes from the fact that technology and innovation can be risky for value chain actors—and that investments in new tech increase when risks are mitigated or diminished. Blended finance approaches can enable innovation by reducing risk. However, in the end, all technology needs to have the right balance of total risk-adjusted costs and payoff in prices, quality, and quantity—otherwise the business case isn't there.

Some promising farming technologies include drip irrigation, low till and precision agriculture; the use of improved varieties (more resilient to water and heat stresses and higher productivity). Other innovations include renewable energy-powered “clean cold,” and Peer2Peer finance. Citibank has a well-developed typology of these types of innovations, as seen in the figure below:

Figure 15: Mapping the Opportunities According to Challenges



Source: Citibank, “Feeding the Future”, 2018

If looking to make transformational change, the choice of technology is critical (USAID, 2017). A Hystra study found “that interventions built on productivity-enhancing technologies (quality fertilizers, better seeds, improved livestock, and micro-irrigation) yielded 80-140 percent income gains whereas those focusing on value chain inefficiencies registered in the 20-60 percent range” (Anderson, 2016).

According to the Food and Land Use Coalition (FOLU), “The most important characteristic is that the innovation be easy to adopt. This has several dimensions, beginning with the fact that in general, the fewer the components of the innovation package, the better. The innovation should not require a major departure from existing agricultural practices or need extensive, ongoing training. Technology adoption is often facilitated when the innovation is either a replacement or an upgrade for an older technology or makes use of existing technology or infrastructure.” Technology investments that complement traditional techniques, “such as crop rotation, controlled livestock grazing systems and agroforestry, with advanced precision farming technologies,” can be highly impactful and sustainable (FOLU, 2019).⁴

⁴ The Food and Land Use Coalition (FOLU) is a self-governed community of more than 60 organizations and individuals committed to transforming food and land use for people, nature, and climate.

By contrast, technologies that require technical sophistication on the part of the adopter, or greater management, surveillance, and oversight, can often be more challenging to deploy. Perhaps equally important, the innovation must have strong and obvious financial benefits and address a need perceived by constituents. Farmers prefer to adopt innovation packages that require minimal financial investments, have short repayment periods, and will cover their costs even when yields are below average. USAID recommends that innovation be integral to project design, avoid mandates with specific partners, include soft interventions such as training, occur within a supporting regulatory environment, and focus on reducing risk for early adopters rather than buying participants. User-centered design, which involves co-design of technologies with the user, or testing with the user all aspects of the technological solution are likely to address adoption challenges as they will be designed to fit the user's financial and technical preferences and capacities.

Acumen's Growing Prosperity report (Acumen, 2014) discusses the adoption of technology as about the "four A's": awareness, advantage, affordability, and access. Farmers need to be aware of the product or service, be motivated to adopt the innovation because it will give them a new advantage, be able to afford the product or service, and have access to innovation. According to Growing Prosperity, the four A's could be a central focus of "pioneer firms" looking to offer market-based innovations to serve the poor, especially as these firms grow larger. These four A's can be greatly impacted by the system; for example, a weak media environment impacts awareness and weak infrastructure impacts access. Foundations and development organizations can help enable innovation firms through tackling system constraints.

There have been several examples of successful US Government investments in agricultural innovation, most notably USAID's Partnering for Innovation program, which builds partnerships with agri-business and technology partners to create a base for further growth. This works through a competitive process driven by pay-for-performance agreements (Partnering for Innovation). As a result of its strong business orientation, results have been highly impactful and sustainable. USAID also has invested in a network of Innovation Labs that could contribute to MCC's work, especially Food Processing and Post-Harvest Handling (at Purdue University and Kansas State University), Food Security Policy (Michigan State University), Horticulture (University of California, Davis), Livestock Systems (University of Florida), Small-Scale Irrigation (University of Texas), and Nutrition (Tufts University). MCC is also considering working with the US International Trade Program of the US Small Business Administration (SBA) to promote the use of US technology and is considering creating technology challenges built around solving specific problems. As of early 2021, the two initiatives were water savings for agriculture in the Tunisia compact and cold chain technology in the proposed Lesotho II compact.

In terms of partners, possible technology providers could range from early-stage firms who just received significant funding to much larger entities.⁵ Given the limited capital of these companies, compacts can encourage the deployment of new technology to enable partner countries to deploy leapfrog technologies. Equally, compacts can foster the collaborative space between the private sector and governments to

⁵ In terms of firm size, post-angel investor firms are possible, but most will likely be firms in the post-Series A or B space or larger. An angel investor is usually an affluent individual(s) who provides capital for a business start-up, usually in exchange for convertible debt or ownership equity. Series A and B refer to the first and second significant round of venture capital financing. The term refers to the class of preferred stock sold to investors in exchange for their investment. While levels of investment vary greatly, Series A usually raises millions of US dollars while Series B is usually in the tens of millions.

create harmonious data-driven recommendations to expand the use of new technologies. The effects of appropriate technology on total factor productivity (TFP) (which is the inverse ratio of crop and livestock outputs to all inputs used, such as land, labor, fertilizer, machinery, etc.) can be especially marked with new technology. As TFP rises, more output can be produced from a fixed quantity of inputs. In fact, most increases in global agricultural output since 1991 have come from rising TFP (GHI, 2013). One emerging area within technology is the role of information and communications technology (ICT) and agriculture.

Digital Technology & Agriculture

Within the innovation space, ICT can promote data-driven farming “to augment decision-making...improve food system outcomes such as crop yields, profits, environmental sustainability, and food security. The potential for data-driven farming to improve food systems has recently expanded due to advances in three key areas: data generation (for example, in mobile devices, field sensors, satellites and ‘farmers as sensors’), data processing and predictive analytics (for example, by using big data stacks, machine learning and deep learning), and human–computer interactions (that is, human-centric approaches to create experiences that improve the ease and use of insights through voice, text and images)” (Otsuka, 2021). Digitalization in agriculture can speed transformation, boost trade, expand access to women and youth, and boost farm income (Dalberg, 2019).

Data-driven farming can be highly effective in applications such as climate information services, digital extension, precision agriculture, market information systems, and agricultural insurance, such as weather index-based insurance to payout farmers with a payout during poor weather (IFPRI, 2016). ICT can also improve access to markets by reducing search and transaction costs. This can weaken oligopsonies and monopsonies on the sell-side to enable farmers to get better prices for their products while boosting access to inputs (Otsuka, 2021). Donors can play a major role in boosting access to ICT. A typology of these impacts is outlined in the table below:

Table 6: Potential D4Ag impacts on African smallholder agriculture ecosystem (Dalberg, 2019)

Actor	• Potential D4Ag impacts (non-exhaustive)
All smallholder farmers and pastoralists	<ul style="list-style-type: none"> • Greater productivity via the dissemination of agricultural advice and real-time information, better financial access, and improved linkages to quality agricultural input and reliable off-take markets • More sustainable farming practices that help maintain productivity over the long term and reduce costs (e.g., water and input use) in the near term • Increased chances to obtain formal land titles thanks to digital mapping of farm boundaries • Increased farmer incomes as farmers produce greater quantities, face lower crop losses and access fairer input and off-take prices • Improved nutritional outcomes of SHFs as they grow, purchase, and consume more nutritious food • Inclusion of SHFs in more commercial value chains due to reduced transaction cost and risks

Actor	• Potential D4Ag impacts (non-exhaustive)
Climate-vulnerable small holder farmers (SHFs)	<ul style="list-style-type: none"> • Better climate resilience through improved weather forecasts, advice on climate-smart agricultural practices, improved access to weather-adaptation inputs and weather index-based insurance
Women SHFs	<ul style="list-style-type: none"> • Better understanding of women farmers' unique needs and tailored design of solutions due to the capture of large volumes of high-quality gender-disaggregated data Greater access of women farmers to relevant advice, finance, agri-inputs • Role of women in retail and other off-farm businesses—both as entrepreneurs and workers
Rural youth	<ul style="list-style-type: none"> • Greater youth interest in agriculture and off-farm activities as digitalization increases attractiveness of the agri-food sector for the young • More jobs and improvement in the quality of existing jobs in the agri-food sector as digitalization generates new opportunities in farming and farming-adjacent sectors (e.g., farm agents, processing jobs, extension services, trading and logistics) • New high tech employment opportunities (e.g., D4Ag software development, data analytics)
Input providers (e.g., agro-dealers, input producers)	<ul style="list-style-type: none"> • Expanded farmer demand for input products (increasing revenue) • Improved cost-efficiency of input distribution due to digitally linked value chains and digital tools for input supply chain management and logistics optimization • Greater input value chain transparency, traceability and thus input quality (e.g., widespread use of quality assurance and anti-counterfeiting tools to protect brand owners and farmers)
Processors and traders (e.g., assemblers, millers, wholesalers, retailers)	<ul style="list-style-type: none"> • Increased volume of high-quality produce from SHFs due to better practices and input use • Enhanced market efficiency and interconnectedness with more integrated and transparent value chains and less wasteful production and post-harvest stages all contributing to growth and profits • Improved quality and safety of food products coming out of smallholder value chains due to digital traceability and tracking tools and digitalized supply chain logistics • Lower costs to identify, acquire, and service smallholder farmers due to digital channels and tools that directly improve FSP profitability and expand potential universe of economically viable clients • Improved ability to assess, monitor and manage financial product risks via innovative analytics of digitalized farmer, field (e.g., soil), weather and remote sensing data • Lower risks of serving farmers due to digitally enabled delivery of better advice and market linkages
Agriculture ministries, national extension agencies	<ul style="list-style-type: none"> • Support for national macro-objectives such as sustainable agricultural transformation, food and nutrition security, job creation and improved climate resilience • Improved cost-efficiency and more targeted impact of government investment into agriculture (e.g., less leakage from agricultural subsidies, more accountable and cost-efficient agronomy and extension) • Much better macro intelligence on agriculture sector trends, opportunities, and risks at national and sub-national levels allowing for improved planning, resource-allocation and crisis management

Actor	• Potential D4Ag impacts (non-exhaustive)
CGIAR, National Agriculture Research Centers (NARS), private agronomy actors	<ul style="list-style-type: none"> • Improved linkages between upstream agronomy R&D and on-the-ground agricultural product development and agronomic advice due to richer and more intensive digital data feedback loops • Lower costs of collecting field data (e.g., digital tools for data collection and field trial management) • Improved insights for agronomists into farmers' wants and needs due to large-scale farmer data • Methodological innovation (geospatial agronomy) due to the availability of much greater volumes of remote sensing (satellite/drone) and ground truth (e.g., digitalized field trials and yield measurement) • Improved food security due to the much wider availability of lower-cost and more nutritious food • Improved food quality and safety and faster resolution of food safety issues (i.e., due to traceability) • New jobs and entrepreneurship opportunities outside of rural areas but linked to agriculture sector (e.g., D4Ag software development, analytics, derivative financial services, and trading jobs)

In addition, the presence of complementary services is essential, along with downstream market linkages, organizational capacity, and well-defined private sector partners. Well-functioning farm groups can also be helpful, but often face capacity and governance challenges. However, a negative policy environment or gaps in the value chain can be fatal. Above all, technology must demonstrate an ability to improve value chain economics, which is often derived from an improvement in market access. Some technology can increase returns on current resources.

The issue of finance is particularly salient for agriculture because of the high potential, enormous investment needs, high risks, a critical lack of capital access, and the critical importance of food security. Given the high weather/pest/price risks, high social impact, small investment sizes relative to due diligence costs, and the often lower-than-commercial returns, most agricultural investments may be best suited to impact investors who can accept these conditions most easily. Most returns will be concessional instead of commercial market-rate.

Applying the Tools IV: Lesotho

In Lesotho, main interventions were focused on reducing the barriers to improved system performance based on the ACA and other subsequent analysis. These mostly focused on providing irrigation and supported training, business services for emerging commercial farmers, secure land tenure, a focus on gender and social inclusion to reduce the high risk of elite capture and strengthened water resource management.

To boost sustainability, the project will work closely with the private sector, especially potential customers and anchor farmers who will facilitate smallholder access to markets. These investments will likely be a blend of donor funds and private capital—most likely from impact investors and anchor farmers.

Finally, in addition, the project is expected to include a post-harvest intervention to reduce post-harvest losses for horticultural products that could undermine the economics of the project and make it less attractive to constituents. Given the specific challenges of Lesotho's value chains, it will focus on climate friendly post-harvest interventions focused on the first mile after harvest. To crowd in the best technology, the country team will likely use a challenge grant approach.

In Lesotho, the next steps will depth to the steps so far to add important details on policy and institutions, and guide development of a program logic, calculation of the Economic Rate of Return (ERR), outlining project benefits, and a sustainability plan after the compact ends.

As MCC and its country partners engage with the private sector, it is necessary to account for potential legal and institutional impediments to agricultural markets prior to designing interventions. These are discussed next.

VII. POLICY & INSTITUTIONS

As MCC and its partners consider any interventions, it is important to review and address key policies that enable or undermine advancements in competitiveness, the inclusion of smallholder producers, and the attractiveness of the agricultural economy to investors. The compact development team should assess if the legal framework appropriately incentivizes and allows the private sector to function, starting with the PEA process mentioned earlier.

If the policy set is unsupportive, it will be difficult to improve performance of the agricultural economy. For example, African agriculture in the 1970's and 1980's suffered because of a policy bias against the sector. According to Otsuka (2021), "agriculture was neglected, taxed heavily, or tightly regulated, or all of these, such that farmers were barred from selling their output to buyers and at prices of their own choosing. During much of this time, agricultural policymaking was completely delinked from scientific evidence, with policies dictated by still-forming development theory and uninformed by empirical knowledge of outcomes."

In contrast, the World Bank notes that, "with sound country management, 1 percent of GDP in assistance translates into a 1 percent decline in poverty and a similar decline in infant mortality. In a weak environment, however, money has much less impact...[With an enabling environment] aid acts as a magnet and 'crowds in' private investment by a ratio of almost \$2 to every \$1 of aid" (Dollar, 1998). As noted by Dollar, "in countries committed to reform, aid increases the confidence of the private sector and supports important public services. In highly distorted environments, aid 'crowds out' private investment, which helps explain the small impact of aid in such cases."

Policy priorities are often most clearly reflected in spending. Most public sector agricultural outlays worldwide have often been inefficient, poorly targeted, and ineffective in advancing either agricultural development or positive nutrition outcomes. These subsidies for private interests related to agriculture are often biased toward subsidizing private goods (fertilizer, water, and credit), resulting in socially regressive or poorly targeted transfers (Otsuka, 2021). Fertilizer subsidies tend to displace non-targeted crops, crowd out the private sector, and reduce diversification. They can also result in input shortages if fertilizer

is artificially cheap and is smuggled out to neighboring countries. The opportunity cost for input subsidies is also high: They are substantially less productive than investments in core public goods such as agricultural research, rural infrastructure, education, and health that can boost the agricultural economy (World Bank, 2008). Since many of these programs appeal to politically powerful vested interests, they can be very difficult to unwind. The PEA process could identify many of these issues.

Policy was driven in the past by the taxation of agriculture, but on average developing countries have shifted from negative to positive protection/support to agriculture over the past decades. Most of the support has been in the form of production subsidies, especially of staples, which are often protected from imports. These often resulted in heavily distorted markets and can undermine agricultural development and deepen poverty. Trade policies that increase openness could have large impacts on the agricultural economy and food security, but some immediate impacts could be ambiguous. For example, an export restriction may reduce prices for consumers but cut them for producers as food prices would fall.

For trade policies to be effective, there should be a focus on the pace and sequencing of reforms as well as the use of flanking policies to contain adverse impacts on groups that can include the poor. Policies that increase prices can benefit farmers but hurt consumers—and the opposite is true of reforms that lower prices (Brooks, 2015). MCC aims to help countries reorient their agricultural production and trade policies to maximize comparative advantages, but also understands that reforms to these policies can be unpopular and politically difficult to achieve.

Changes to institutions and policies should consider taking a sustainable food systems approach that examines food systems in their entirety. The UN Environment Program (UNEP) has created a collaborative framework food-systems transformation that outlines how to engage stakeholders and systematically approach policies and strategies to achieve sustainable food systems (Bortoletti, 2019).

A. POLICY INSTRUMENTS TO CONSIDER

Some essential agriculture and food policy instruments to examine could include (this list is not exhaustive):

- National development plan: A top-line vision such as an agricultural strategic plan can be a useful place to start, but only if it has strong high-level support. Under the African Union's Comprehensive Development Program for African Agriculture (CAADP) pledge, governments committed in 2003 to spend a minimum of 10 percent of their national budgets on the sector. Although most have not met this commitment, progress was noticeable in countries that spent effectively, such as Morocco, Ethiopia, Rwanda, and Burkina Faso. For example, Morocco's Plan Vert and planning in Ethiopia through the Agricultural Transformation Authority (ATA) are compelling examples of how a well thought out transformation strategy can have an impact on a national scale by setting priorities for line ministries, while driving budgets and changes in policy and regulation (McKinsey, 2017).
- Tax policy can significantly alter the economics of agriculture and related production systems. Measures that tax agricultural production or inputs, change exchange rates, or impose export

taxes can significantly change farm income and may affect consumer prices. In some cases, such as export taxes, prices can fall both at the farmgate and for consumers. The effects of these measures on efficiency and income can be significant, especially if high taxes result in the development of informal markets that can further undermine formal ones.

- Price regulation can occur either through compulsory purchasing by parastatals at below- or above-global market prices or by mandating prices or margin caps in markets. While regulating prices obviously changes farm incomes, it could also benefit consumers. It may also introduce an element of political uncertainty into markets and could weaken the attractiveness of agriculture as a business. However, high fixed prices can also reduce price volatility and encourage production of goods, especially if maintained over time.
- Subsidy policy can boost production and lower prices of targeted goods, which are often considered as essential staples for food security. However, this can undermine economic efficiency, resource sustainability, and the production of more profitable, sustainable, and nutrient-dense products. To achieve self-sufficiency, many governments tend to encourage staples over other products, particularly horticulture. For example, in much of Asia, rice subsidies artificially boost gross production at the cost of nutrient density, and artificially low prices for irrigation water may encourage its over-use. However, these policies may ensure ample supplies of locally produced rice. Subsidies for production inputs may stymie the introduction of new technologies and farmers' willingness to turn to the private sector for solutions but may boost utilization.
- Food product regulation can either facilitate or undermine value-chain development. If policy boosts food safety and consumer confidence in markets, effective regulation can boost agriculture and related economies. However, overly prescriptive regulation not grounded in sound science can increase costs without adding significant benefits. These food product measures generally include locally mandated food labeling, ingredient approvals, and food safety standards.
- Technology regulation and taxation can be significant barriers to transformation in the agriculture and land sectors, if improperly executed. Examples include regulations on inputs, biotechnology, and other new technology that can either facilitate or undermine agricultural transformation. While many of these measures are designed to set a floor on quality and to fight fraud, they can also undermine development. For example, in many countries current seed laws can greatly stifle innovation and prevent agricultural transformation.
- Trade policy often plays a major role in agricultural economies. On the one hand, liberalized market access across a region can boost farm incomes for competitive products while improving access to inputs and technology. On the other hand, liberalization may also increase competition for local producers while frequent changes in trade policy itself are a potential source of uncertainty. Heavily export-oriented value chains can be particularly vulnerable to importer trade disruptions or sudden market changes. Considering the threat of changes in import trade policies and markets needs to be part of any export project evaluation.

- Financial regulation can either aid or undermine access to capital for investment by either facilitating or impeding access to finance. Given the great need for financial services and the uncertainty endemic to agriculture and the great costs of reaching smallholder farmers, this sector is particularly sensitive to positive or negative regulatory changes. Access to land rights is a particularly important issue in this area, but other policies such as exchange control can either encourage or discourage domestic and international investment.
- Cooperatives and other farmer organizations are often recognized as public-sector institutions rather than private-sector enterprises. The laws that govern them often can be overly prescriptive and fail to address critical factors for their sustainability and growth. To promote private sector development, cooperative law could ensure a certain autonomy from governments and not establish barriers to cooperative enterprises.
- Agricultural statistics play a key role in developing an effective feedback loop for policy formulation. Statistics enable both the public and private sectors to better understand what is happening in the field, which is critical to making effective policy. To examine if government expenditures are being effectively spent in the agricultural sector, the collection and analysis of agricultural data is an essential tool in policymaking.
- Other agriculture and food-related policies also have a major role in the agricultural economy. These include land tenure policies, water pricing and management, environmental/natural resource management, competition policies, labor market policies, social insurance, and nutrition policies.
- Macroeconomic and social policy issues also affect the viability of the agricultural economy and include infrastructure, the enabling environment for entrepreneurship, energy access, education, and other challenges. MCC invests in these sectors, which can greatly facilitate development of the agricultural economy—but as noted above these are likely to be more effective in increasing economic growth if done in tandem with investments in the agricultural economy.

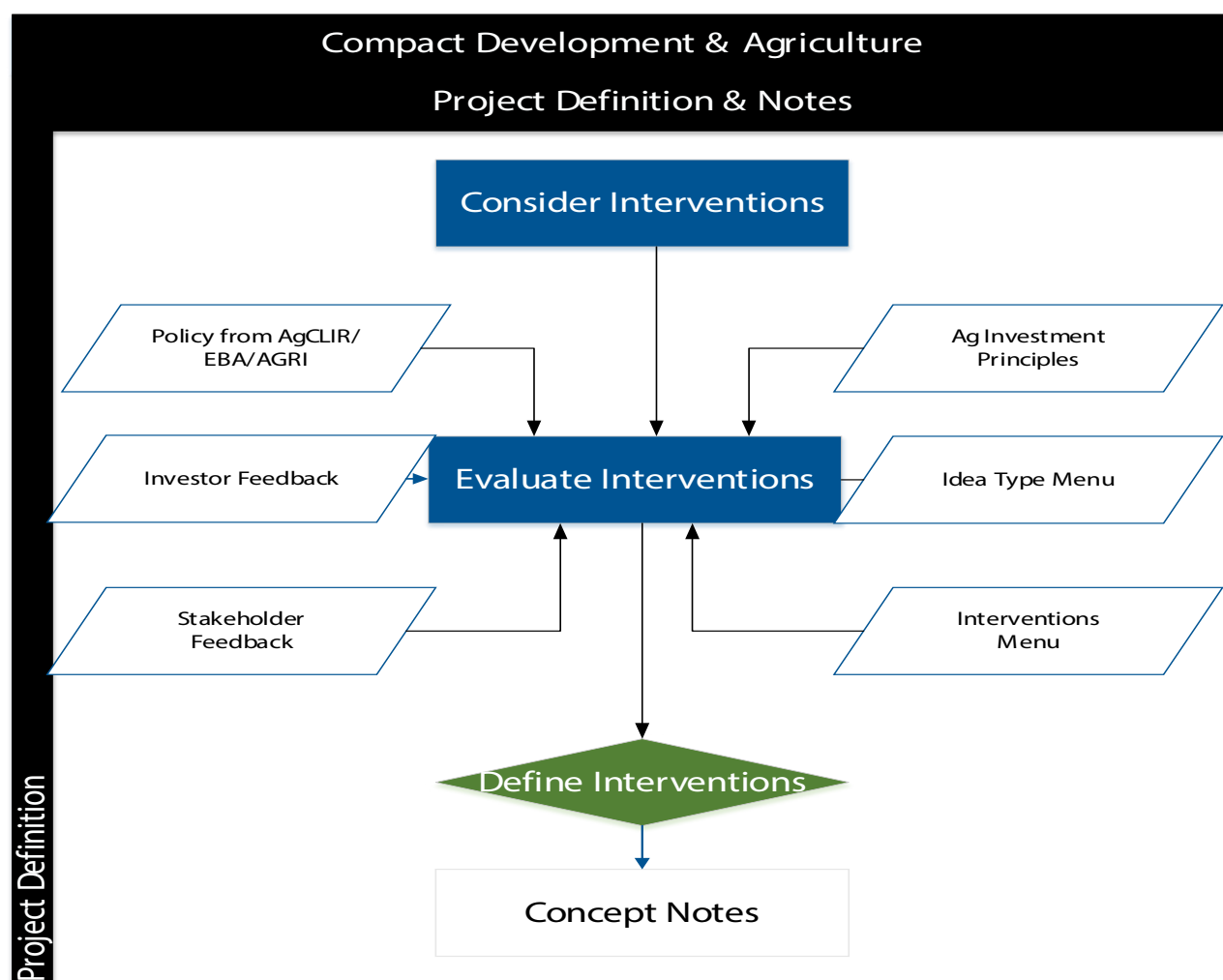
Before investing in any part of the agricultural economy, MCC will continue to address these issues either through Policy and Institutional Reform (PIR), a threshold program or by making needed changes a Conditions Precedent (CP). Given the pressure CPs put on the project implementation timeline and the overall bilateral relationship, it is the least desirable PIR intervention.

After considering the CA, Problem Diagnosis, the sector competitiveness and economics, market failures, constraints to agriculture, possible intervention types, and policy and institutional issues, the next step is to define projects designed for maximum impact and sustainability.

This stage ends in the creation of Concept Notes, which are submitted to the Investment Management Committee to start the next step. Under MCC's model, these are suggested by the partner country in line with MCC's value of country ownership—and developed in collaboration with MCC.

This can be summarized as in the figure below:

Figure 15: Compact Development - Interventions to Concept Notes



Source: Authors/MCC Agriculture Team

VIII. PROJECT DEVELOPMENT

During the Project Development phase (the fourth phase of Compact development), the partner country and MCC fully co-create the plans for the agreed-upon projects, including assessment of implementing institutions and structures and plans for their establishment and capacity building. The co-creation is based on partner country priorities but backed by MCC due diligence and analytical support.

Full compact development generally involves undertaking detailed design and due diligence. Agriculture-related designs also undergo environmental and social impact assessments, gender and social integration assessments and, where applicable, and once implementation has started, resettlement action plans. If infrastructure is part of the project, specific works feasibility and large design studies will be completed. LAE supports MCC's host country counterparts in the development of these preparatory analyses and assessments to ensure that all proposed agriculture and land projects meet key standards essential to productive and sustainable development.

Regarding resettlement, consistent with IFC Performance Standard 5, MCC aims to avoid or minimize the need to resettle local populations due to project activities. When resettlement is deemed unavoidable, the LAE team is often called upon to collaborate with the ESP team, which is charged with designing and monitoring resettlement activities and ensuring consistency with IFC Performance Standard 5.

In addition, the partner country will work closely in the project development phase with LAE and other MCC practice groups to gain a deeper understanding of the expected constituents, a full understanding of the costs and expected benefits, project risks, and mitigation measures, and a detailed plan for the monitoring and evaluation (M&E) of the progress, including the assumptions, outputs, and outcomes associated with each project.

Concurrent with the partner country's project development activities, MCC conducts its due diligence, or appraisal, of the proposed project(s) and framework for implementation. As project development moves forward, MCC may advise the partner country that modifications in project scope, approach, or design are needed to improve focus, maximize impact, improve quality, enhance implementation, lower costs, increase or modify the distribution of benefits, and ensure sustainability. Projects should be designed with "checkpoints" that allow for systematic lesson-sharing and options to pivot if results are not being achieved as planned. At this stage, there should be agreement on a baseline definition of what sustainability looks like in the context of the project.

This stage ends in the creation of the Investment Memo, which is submitted to the Investment Management Committee to begin the process of negotiation and implementation.

A. KEY QUESTIONS: PROJECT DEVELOPMENT

Do the government agencies and other organizations that are expected to implement the proposed activities have sufficient capacity? What additional personnel and resources, new equipment or improved technologies, staff training, and up-grading of management skills will they need to improve their performance? What measures and actions are proposed for each of these elements?

Is there government and public support for the proposed activities? If not, what measures are proposed to solicit and gain support? What are the behavior change assumptions? What is the evidence that anyone would change their practices?

Have investors, constituents and other stakeholders been consulted enough? While this could happen starting at an early stage, this could be a major focus throughout the project development cycle. True buy-in means all parties have an active interest and are incentivized to make sure the program is successful.

What is the capacity of the small and marginal constituents to be involved? What is the capacity of small and marginal farmers? For example, are there too many technological leaps for smallholder producers or are certifications too difficult to maintain?

Would constituents be able to conduct their livelihood at or above the level prior to the program if a project were to abruptly end? This is important because of the potential for a compact to end abruptly due

to exogenous reasons. Can coping mechanisms be included into a project that foster this type of independence from the project?

Who are winners and losers and who may be opposed to the project—and might be able to undermine execution? Who wins and who loses versus the *status quo ante*? This is especially important for resource allocation, such as water use. We want to ensure that we are not creating more inequality or poverty, or negatively affecting those already living in poverty.

Can the proposed activities be implemented consistently within applicable MCC guidelines, including relevant IFC Performance Standards, consistent with the MCC gender policy, and completed within the five-year period of an MCC compact?

Are we ready to adapt? Cost-benefit considerations and completion risks often require project scope changes during implementation. It is best to plan and run feasibility and design studies before signing.

Is the project scalable? Well-designed and well-executed projects can catalyze positive change at a wider local or national level, flowing to indirect constituents. Can the chosen intervention be spread in a way that maximizes this uptake and enables MCC programs to be truly transformational?

What can be done before Entry into Force (EIF)? Compacts often face completion and other risks because they run out of time in the five-year limit. Getting a head start on projects is highly desirable when possible. At the very least the period just prior to EIF provides a final opportunity to consider potential sources of completion risk and to adopt safeguards to the extent possible.

B. AGRICULTURE PROJECT LOGIC

As teams design projects, they will develop a detailed project logic underlying the proposed interventions and begin identifying project constituents. This process should be done early in the compact development process based on an earlier identification of the problem. Logic development is led by the partner country, but MCC contributes to the development of the project logic. While this is generally a collaboration between the agriculture lead, team economists, and the evaluation team, the process could start with the agriculture lead as they consider possible projects.

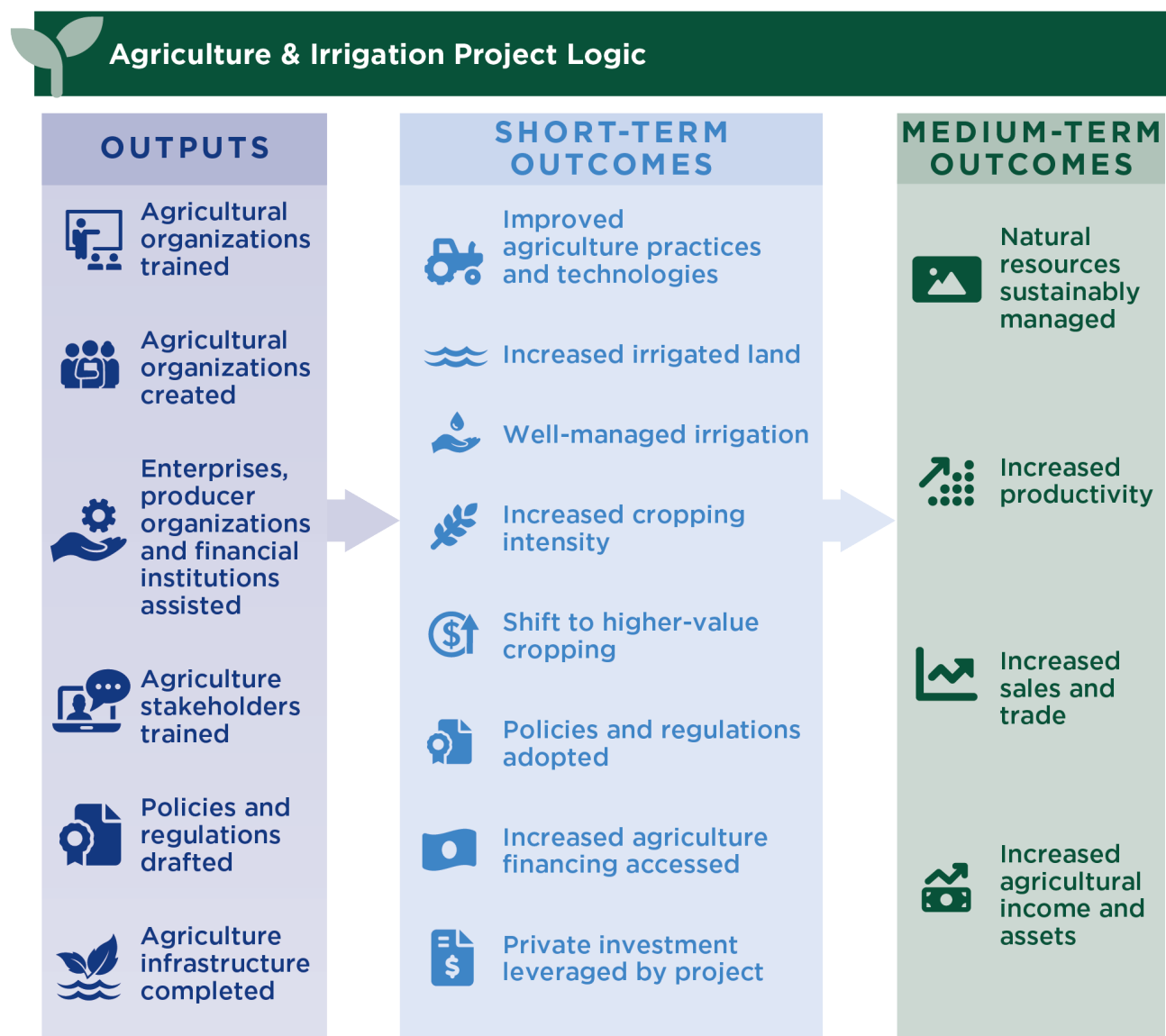
The goal is to ensure that proposed project interventions are clearly linked to resolving root causes and will generate the anticipated project outputs and outcomes. Ideally, all activity logics would populate project logics, which in turn would populate overall program logics. USAID (2017a) has a useful tool for developing logic models at the strategic, project, and activity levels: *Program Cycle How-To Note: Developing a Project Logic Model*.

The program logics may be developed at the project and activity levels and evolve over the compact development process. Agriculture projects or activities will have their own logics, which all ultimately feed into the compact's goals of increased incomes and economic growth. In developing project logics and defining outputs and outcomes, country teams should consult the applicable Consistent Design Framework and

take into consideration MCC's common indicators, which can provide useful guidance on indicators that can be established and tracked to assess project results.

To address the constraints, proposed interventions into the agricultural economy can be summarized by a project logic diagram to illustrate the connectivity between constraints, activities, and impacts. It also helps define success—which can come in many forms, including improved natural resource management, increased investment, increased productivity, and increased agricultural income and assets. (See Figure 20. below.)

Figure 17: Sample Agriculture Project Logic



Source: MCC Monitoring & Evaluation Team

In the end, the quality of the model can be determined by asking several questions. According to MCC's Monitoring and Evaluation team, to conduct high quality monitoring and evaluation, the project logic diagram should ideally have the following characteristics:

- A statement of the problem the project is designed to improve.
- A results chain with sufficient detail about the mechanism through which the project objective will be achieved, i.e., how planned outputs will lead to desired outcomes and ultimately result in the project objective.
- A plausible theory based on existing evidence and literature.
- Key risks to and assumptions about achieving results.
- A timeline for achievement of the project objective, which matches the timeline in the CBA, if one exists.
- All results chains lead to the project objective.
- The diagram stops at the project objective.
- Matches the fundamental logic of the CBA, if one exists.
- Agreed on by all relevant project team members, including cross-cutting sectors.
- Each result stated separately in the diagram.
- Only one project logic diagram (for M&E purposes) for each project clearly marked in the diagram.
- The result that reflects the project objective, stated verbatim from the program agreement results linked to the CBA, if one exists.
- The relevant project/activity/sub-activity nomenclature, as written in the official project documentation, with arrows showing the causal chain leading to the project objective.

Once a project logic has been developed, the partner country compact development team assisted by the MCC country team will begin the process of identifying project constituents. The Beneficiary Analysis⁶ is conducted together with the Economic Rate of Return (ERR) Analysis, both made publicly available, and are trademarks of MCC's commitments to transparency and results-based aid. The ERR Analysis is used to inform estimates of the total increase in incomes attributable to a proposed activity or project relative to the costs.

⁶ The term Beneficiary Analysis is used to avoid confusion but should ideally be replaced by "Constituent Analysis."

C. THE ECONOMIC RATE OF RETURN

The ERR is a central part of MCC’s model because it is meant to focus investments on projects that have the best prospects of reducing poverty through economic growth. As noted earlier, the ERR is produced from a cost-benefit analysis that compares the economic costs and benefits of a program.

The ERR includes all economic costs, such as financial expenses covered by MCC and others and any opportunity costs of non-financial resources expended. One of the challenges to obtaining a satisfactory ERR at MCC is keeping costs manageable. While costs are usually manageable relative to benefits for projects with national-level effects such as a major policy reform, this can be a significant challenge for cost-intensive programs such as irrigation that have a relatively small number of users compared to program cost and scope. This cost relative to benefits issue tends to push agriculture to less expensive interventions, especially compared to major infrastructure projects, such as roads.

Benefits include the increased income of the population that benefits from the investment or the increased value-added generated by producers (firms and households) that can be attributed to the proposed project. As noted on the MCC home page, in the case of the typical ag project, MCC’s cost-benefit analysis is focused on expected increases in local incomes. [*The methodology description for calculating the ERR indicates*](#), “This analysis includes income or value-added that is expected to be generated through environmental and social improvements, such as the effect of clean water on health outcomes or improved female educational attainment on incomes.”

While the ERR does not incorporate the non-income related value of environmental and social improvements, economists generally make every attempt to monetize benefits such as reduced illness/improved health, reduced risk of mortality, and avoided losses. The challenge to accomplishing this may arise from gaps in the literature on specific benefit streams where these benefits are qualitatively described but not quantified.

While MCC’s ERR requirement is designed to focus agency resources on the highest-returning projects, the rate is relatively high compared to those used by other donors. The ERR also tends to add in MCC-imposed expenses, such as compact administration overhead, that can push otherwise impactful and sustainable projects below the hurdle rate. While the hurdle rate has clear merits and is a legislative mandate, this approach has created several issues:

- It may severely discount programs with high long-term transformational potential, such as nutrition and research.
- It does not address potential trade-offs of economic returns with other benefits such as poverty reduction, more sustainable production, or the improvement of labor conditions. However, there are other tools than can complement the ERR. Some of these are discussed later.
- It may penalize working in countries or regions with higher costs to administer and implement projects. However, it may also rationalize investments by encouraging less capital-intensive projects

in remote locations where they may be more likely to fail. In this way, the ERR may be doing a good job of telling where and where not to invest.

One way to reduce the impact is to find new and measurable benefit streams to measure the effects of MCC projects more accurately, while not double counting benefits.

D. IDENTIFYING NEW BENEFIT STREAMS & COSTS

To better describe project results, the next step is to consider what benefit streams may arise from a project. For example, an agricultural project may improve the nutrition profile of a local population—which could have measurable and positive economic effects. If there are negative effects, these should also be included. The goal of including any benefit stream is not to make a project “look better,” but to ensure that all benefits that are supported by the literature, evidence, and data are included in the ERR.

For example, an agricultural project may deliver higher farm incomes (which can be measured), but any attempt to add a nutrition benefit stream will need further support. To address this, MCC is considering further work to better model economic returns from nutrition investments. Further, the addition of new benefits must be done carefully to prevent double counting. In the nutrition space and agriculture, the challenge will be to determine specific benefits that are not already counted by other existing measures, such as increased farm income, reduced healthcare costs, or higher salaries due to improved educational achievement. This work on identifying new benefit streams is also continuing in other areas, especially climate change.

There may be other ways to measure benefits from agricultural economy projects. For example, IFPRI has the Local Economy-wide Impact Evaluation (LEWIE) model designed to “represent how the different actors of a local economy (for instance, different types of households in a village) interact with each other through commodity and factor markets. The models are used to understand how these interactions shape the outcomes of programs and policies, and to identify the impact channels which affect various households directly or indirectly...” (IFPRI 2019).

“The LEWIE methodology is designed to understand the full impact of policies like cash transfers, input and output price supports for agriculture, and other agricultural and non-agricultural policies on local economies, including on the production activities of both target and non-target groups; how these effects change when programs are scaled up to larger regions; and why these effects happen. The LEWIE simulation model is built directly from household data. An advantage of LEWIE over traditional GE models is that by using data to directly parameterize the model, it also allows for the construction of confidence bands based on the distribution of the econometrically estimated parameters” (IFPRI 2019).

If backed by data, based on sound assumptions, and shown to be applicable, LEWIE could add new benefit streams to MCC compacts (IFPRI 2019) if there is a way to ensure benefits calculated don’t result in double counting of benefits already measured elsewhere.

E. COMPLEMENTING THE ERR

However, the connection between growth and poverty reduction can be tenuous, which means compacts need to heavily target inclusion of key disadvantaged groups such as women, youth, and others to ensure MCC programs effectively fight poverty. Within agriculture, in most cases this entails a focus on benefiting smallholder farmers and the rural poor—but sometimes there can be a tension between targeting the poor and reaching a 10 percent rate of return.

Even with more accurate benefit streams, there will likely be a need to measure impacts that cannot be folded into the ERR measure. Laborde et al. (2021) note that ERR analyses face the challenge that they do not directly address the target outcome of reducing poverty. Their paper notes that “While the ERR is philosophically not too far removed from the outcome of economic growth, the ERR by nature is not designed to provide information on poverty. This outcome requires a bit more complexity in analysis, often relating to distributional impacts of investments. Clearly, a project could have an excellent ERR, but if it benefits farmers that are somewhat poor while leaving out the poorest, leaving them even further behind than before the project, it may not serve MCC’s mission well.”

IFPRI also notes that the ERR analyses may provide a one-dimensional view of outcomes. It adds that, “In reality, MCC considers more than the ERR in evaluating a project, and it may want to include some of this information quantitatively at this point in its process without lumping it directly into the ERR.” Accounting for this may require the compact development process to consider new ways to blend social impact and ERR-driven investing while considering long-term investments that can result in long-term transformational change (Laborde et al, 2021).

IFPRI describes several tools that can inform work in the agricultural economy by IFPRI by using multi-dimensional analysis. Laborde et al. (2021) notes that “analysis can include social and environmental indicators to shed light on other important impacts of MCC projects, which can be useful to avoid projects with large unwanted impacts, to communicate to partner countries and communities how they could expect a project to affect them, and potentially to improve upon existing project plans or make a marginal decision on whether to greenlight a project.”

While some of these tools are highly quantitative and include Household-level microsimulation, Household-level behavioral model, Agricultural Typology with SFA, Multimarket PE, Village CGE with nested households, Single-region CGE with nested households, and Global CGE with nested households (Laborde et al., 2021), their complexity will probably be most appropriate for large and complex projects. The selection and use of these models is described in Laborde et al. (2021).

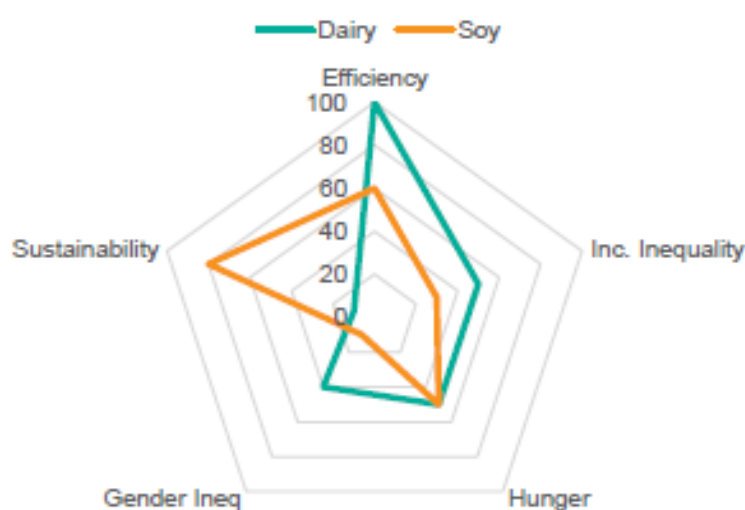
However, other tools may capture this complexity for project evaluation and decision-making easily and effectively by capturing potential trade-offs and synergies, since no single investment may be able to achieve all desirable goals at once.

Laborde et al. (2021) uses a radar diagram to compare projects in multiple dimensions. “The example compares a dairy development project with one that introduces production of soybeans. In this purely hypothetical example, the dairy project has a higher economic rate of return and generates better gender

and income inequality outcomes, perhaps because caring for dairy cows is a female-dominated activity. By contrast, the soy project has better outcomes on the sustainability dimension because of the high greenhouse gas emissions associated with dairy production.” The information could provide important information for policy makers to decide between alternative investments.

The report adds that “Presenting information on alternative projects in this way is helpful where none of the projects involve negative impacts. This information—or equivalent information presented in tabular form—may turn out to provide the information that policy makers need to make informed decisions.” (See Figure 21.)

Figure 18: Illustrating Multidimensional Outcomes: Dairy vs. Soy Project Example



Source: IFPRI, *Tools for Measuring the Full Impacts of Agricultural Interventions* (Laborde et al. 2021)

E. BENEFICIARY ANALYSIS

Beyond considering projects through a multidimensional lens, the Beneficiary Analysis considers how the benefits are distributed among different poverty categories and describes which segments of the society will realize the increase in incomes. A deeper dive into these issues is usually led by GSI and ESP colleagues, who also have a large part in the design process by which inclusion vs. returns are weighed across alternatives. It is primarily intended to estimate the impacts of the project on the poor, as well as on vulnerable populations including women, youth, and ethnic minorities. In selecting among several potential investment options, Beneficiary Analysis may provide important information to help identify preferred alternatives. It also recognizes the reality that not all growth can be pro-poor. Please see [MCC, 2020](#) for a fuller description of this process.

F. LOCATING PROJECTS FOR MAXIMUM IMPACT

Another critical consideration is project location. While this is heavily guided by the target value chains and local interest in a project, MCC should consider using more rigorous tools to ensure maximum effectiveness. With support from MCC, IFPRI has developed tools to support this process that are outlined in its working paper, “Geographic prioritization of agricultural investments” (Maruyama and Scollard, 2021).

IFPRI’s approach is designed to help MCC’s investments target areas where “farm efficiency gaps create opportunities for significant gains in crop revenues through agricultural production-oriented programs.” This approach is important because countries usually have a high geographic clustering and heterogeneity of constraints and opportunities in smallholder agriculture because of different endowments of labor, rainfall/water, soils, access to inputs, market accessibility, and other factors of production. This heterogeneity could significantly affect the effectiveness and sustainability of MCC-funded projects. IFPRI notes that combining the agricultural potential and efficiency can enable us to identify regions where closing efficiency gaps would yield the highest economic returns.

IFPRI suggests using a stochastic frontier analysis (SFA) to estimate smallholders’ agricultural potential under optimal conditions and compare it with their current performance to assess their efficiency levels. Inefficiency is defined as the loss incurred by operating away from an ideal production frontier, and by estimating where this frontier lies. The SFA is an economic model that can combine household survey data with Geographic Information System (GIS) data to estimate the otherwise unobserved agricultural potential in a region and contrast it against its current performance. The result is a rigorous assessment of efficiency gaps that can highlight ways to boost production and profits by comparing “estimated agricultural potential and efficiency levels under current conditions and hypothetical investment scenarios (improved access to irrigation and markets) and calculate what are the agricultural profit gains linked to each case.” (Maruyama, 2021)

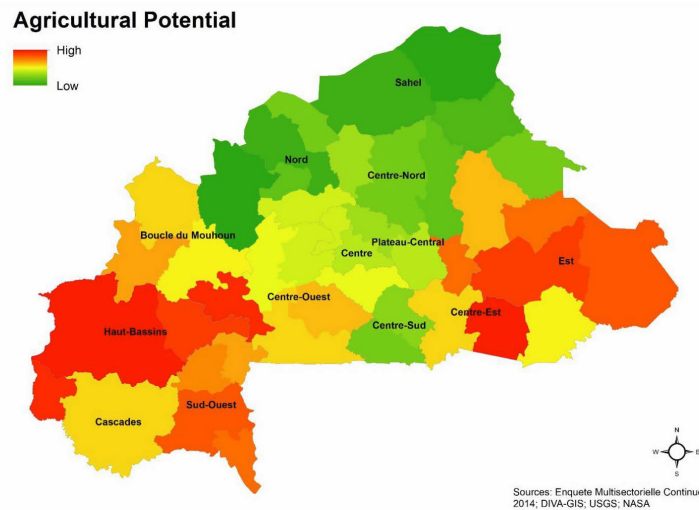
As seen from this example from Burkina Faso, the results can be helpful in siting interventions:

Burkina Faso Result I: Agricultural Potential

The map below depicts the maximum level of crop revenue attainable by the average smallholder producer in each province under ideal conditions.

It shows that regions in the north have lower potential, consistent with rainfall and water access patterns, as well as other biophysical constraints such as rocky soils, which are more predominant in the north. However, there is high potential in the Est, Centre-Est, Haut-Bassins, and Sud-Ouest regions due to opportunities for irrigated production of rice, maize, and horticulture. (See Figures 22 and 23 below.)

Figure 19: Agricultural Potential

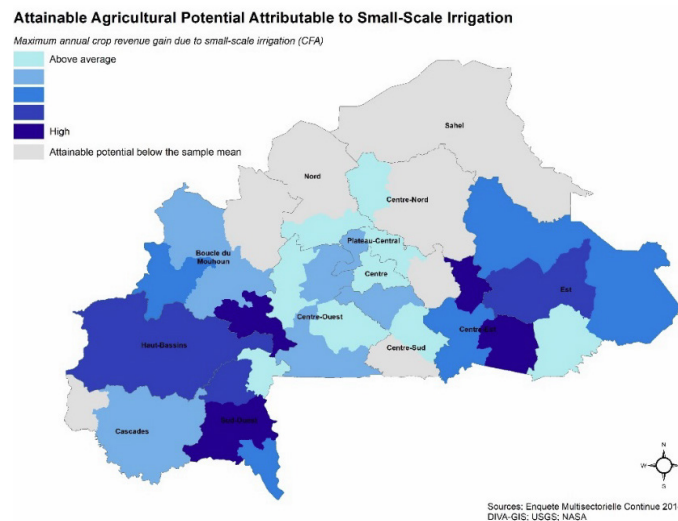


Source: Maruyama, Eduardo and Phoebe Scollard. *Geographic prioritization of agricultural investments*, International Food Policy Research Institute (IFPRI), 2021.

These maps can be refined and applied to specific projects in specific areas.

For example, in Burkina Faso, certain regions could be more attractive for a small-scale irrigation intervention. Focusing on these best prospects could significantly improve the ERR and the prospects for long-term project success:

Figure 20: Attainable Agricultural Potential Attributable to Small-Scale Irrigation



Source: Maruyama, Eduardo and Phoebe Scollard. *Geographic prioritization of agricultural investments*, International Food Policy Research Institute (IFPRI), 2021.

MCC has started using these IFPRI-developed tools in the development of the Malawi II compact—and plans to expand this approach to other future agriculture-related compacts in development.

Based on this information and extensive consultation, the partner country, assisted by the country team, will develop a “well-organized, well-articulated Project Proposal that offers a set of specific investments and other activities that will effectively address the core problem and its underlying issues and achieve the objective of the agreed concept. In doing so, the project proposals should include a strong project logic supported by data, empirical evidence and lessons from similar projects and developmental contexts.”

<https://www.mcc.gov/resources/story/story-cdg-chapter-8-guidelines-for-developing-project-proposals>

IX. SUSTAINABILITY

Starting during the design process, the country team should pay special attention to sustainability risks, that is, the risk that the project will not continue to generate benefits after it ends. This should include developing a *sustainability plan* during the Project Development phase. MCC takes sustainability seriously and aims to ensure that every investment is sustainable and continues to generate economic growth that leads to poverty reduction beyond the life of the Compact. MCC has seen in its evaluation of programs that there are tradeoffs between ensuring a Compact is robust enough to be sustainable but straightforward enough to be implemented in five years. Every compact should include an exit strategy since this is inevitable in MCC’s processes. It is particularly important to have milestones at which to transfer management, power, and resources to local entities.

A key issue is giving time for programs to get traction. The development of a sector takes time until it reaches maturity. In many agricultural projects the issue is often supporting transitions from low-value crops to high-value perennial crops and/or creating new institutions and policies to accelerate development of the agricultural economy. If it takes three years for a new variety to bear fruit, a project must find ways not only of ensuring an intermediate income but also creating a structure that will be present irrespective of issues that could mean early project termination (e.g., due to conflict, natural disaster). Can coping mechanisms be included into a project that foster this type of independence from the project?

The question of sustainability also needs to consider resilience to shocks: What about planning with constituents for shocks or ensuring their investments (i.e., for heat waves, droughts, or other climate shocks)? What should our approach be to support and ensure farmers who took the risk to transition do not fail due to external shocks? Some of the risks are listed in the table below.

Table 7: Types of Sustainability Agriculture Project Risks

Financial	The ability of an organization to generate revenue and/or cover its costs. This category should also drive fit-for-purpose design of physical assets (e.g., assets that can be maintained with available revenue or budget) as well as ability to purchase equipment necessary for maintenance.
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Institutional	The establishment of new or improved organizations that perform new functions, which may include budgeting and/or technical performance.
Environmental	The ability to benefit from ecosystem services and natural resources today without environmental degradation or natural resource depletion for the enjoyment of future generations.
Social/ Behavioral	The ability and willingness of people to change their behavior or habits while avoiding conflict based on, for example, the introduction of new infrastructure, new processes, new products, or new people, in contrast to traditional norms. This often starts with an understanding of a need to change.
Policy/Legal	The implementation of a policy to guide change and/or a legal reform to implement it. This may relate to financial and institutional issues to the extent where it could be necessary to establish new governmental institutions, provide a new incentive, ring fence revenue, or impose a new penalty.

Source: MCC, *Compact Development Guidance*, 2021

Ways to address the risks with a sustainability plan for an agriculture intervention include:

- Right-size the investment for the risk and 5-year time horizon, potentially through a pilot to test new approaches or phased implementation. This should include plans to change project scale if unexpected challenges arise.
- Define early on local champions or potential private sector partners, particularly if there is risk that the intervention may not reach full sustainability by Compact end. Because it can be difficult to retrofit a partnership model to a signed Compact, PPPs should be envisioned early in project design and partners engaged from the start.
- Start policy interventions as early as possible and design them with a formal feedback loop to allow time to monitor benefits and course correct.
- Ensure host government commitment at the national *and local* levels and consider supporting capacity building of local institutions. Conduct a political economy analysis (PEA) to understand what relevant actors and institutions may stand to gain or lose from any resulting shift in power or influence from the investment. Appoint a clear institutional champion. Even if the program touches various institutional entities, it often is appropriate to designate a principal institution responsible for coordinating the other interests. This is critical for success and sustainability, particularly of policy and institutional interventions.
- Consider integrating a policy research dimension into project design which monitors activity results throughout the five years and leads to recommendations at Compact close.

Sustainability Measures in Agriculture Projects

The LAE practice group is highly focused on the issue of sustainability of its investments and has addressed the issue through the development and implementation of Agriculture Sustainability Plans for each agriculture project. This practice began with the 2012 MCC Agriculture College and has led to Agriculture Sustainability efforts and plans for Moldova, Senegal, Mozambique, Burkina Faso, Morocco, and Namibia.

While earlier plans were developed with two years remaining in the Compact to identify ways for MCC and MCAs to incorporate additional sustainability measures into Compact implementation and close-out, the plans are now required at every stage in new agriculture project development. For example, the requirement for these plans was significantly tightened for later agriculture-related compacts under development in Lesotho and Malawi.

These sustainability plans explore the mechanisms and capacities of stakeholders who are (or will be) in place to ensure sustainability of the MCC agriculture investments and the continued impact of the projects on the economic growth of the country and the increased incomes of the constituents. For example, a well-functioning and profitable agriculture sector requires more than operational irrigation systems or farmers who have been trained on new technologies; the sector will not be profitable without an enabling environment that includes access to agricultural credit, inputs, and markets; physical infrastructure that allows for storage, processing, and transportation of agricultural goods; and business-friendly policies that allow for secure property rights and encourage investment.

Agriculture Sustainability Plans also examine each of the necessary components of a healthy agricultural sector and assess whether the areas targeted by a Compact's agriculture projects are well poised to benefit fully from the project as anticipated during Compact development. Where there are identified gaps or weak links in the target value chains that would prevent full realization of these potential benefits, sustainability plans make recommendations for how and by whom these gaps could be filled, and these links strengthened. Agriculture Sustainability Plans serve as a resource for a variety of stakeholders: the host country governments, MCC and MCAs, other donors, non-governmental organizations (NGOs) operating in the region, and private investors interested in the country's agriculture sector.

There are also social sustainability risks. It is important to consider gender-differentiated value chain analysis, production system analysis, risk assessment, design and implementation of programs, household resource allocation, use, and control, etc. Critical in our assumptions for poverty reduction and improved nutritional outcomes is a full contextual understanding of gender relations, especially at the intra-household level. For example, in West Africa, men and women earn incomes separately. Men engage in high-value cash crops, while women engage in subsistence crops. Women are responsible for feeding the children generally, while men are responsible for larger expenses. The World Bank (2017a) has a publication called "[*A Gendered Approach to Agricultural Risk Assessments and Management Strategies*](#)"

There are often areas in which the host government could make targeted investments that would help to support the sustainability of MCC's investments. Other donors or NGOs may be able to build upon the achievements of the Compact and advance the Compact's objectives in planning new interventions.

Finally, private sector investors may be interested in finding value chain gaps that could be filled in a way that not only strengthens the value chain but also yields a healthy profit for the investor. In short, the sustainability plan guides efforts to realize post-compact opportunities that support and expand economic growth and poverty reduction momentum created by MCC's five-year implementation limit.

X. NEGOTIATION & IMPLEMENTATION

After projects are defined, the next steps include negotiation and Entry into Force (EIF). The fifth phase of compact development is Negotiation. It is during this phase that MCC will notify Congress of the intent to negotiate and commit funding and obtain the approval of MCC's Board. LAE involvement in the negotiation phase is not particularly different from that of other sectors or project leads.

In the lead up to the signing of the Compact, the LAE team members will support the MCC Country Team to ensure the following:

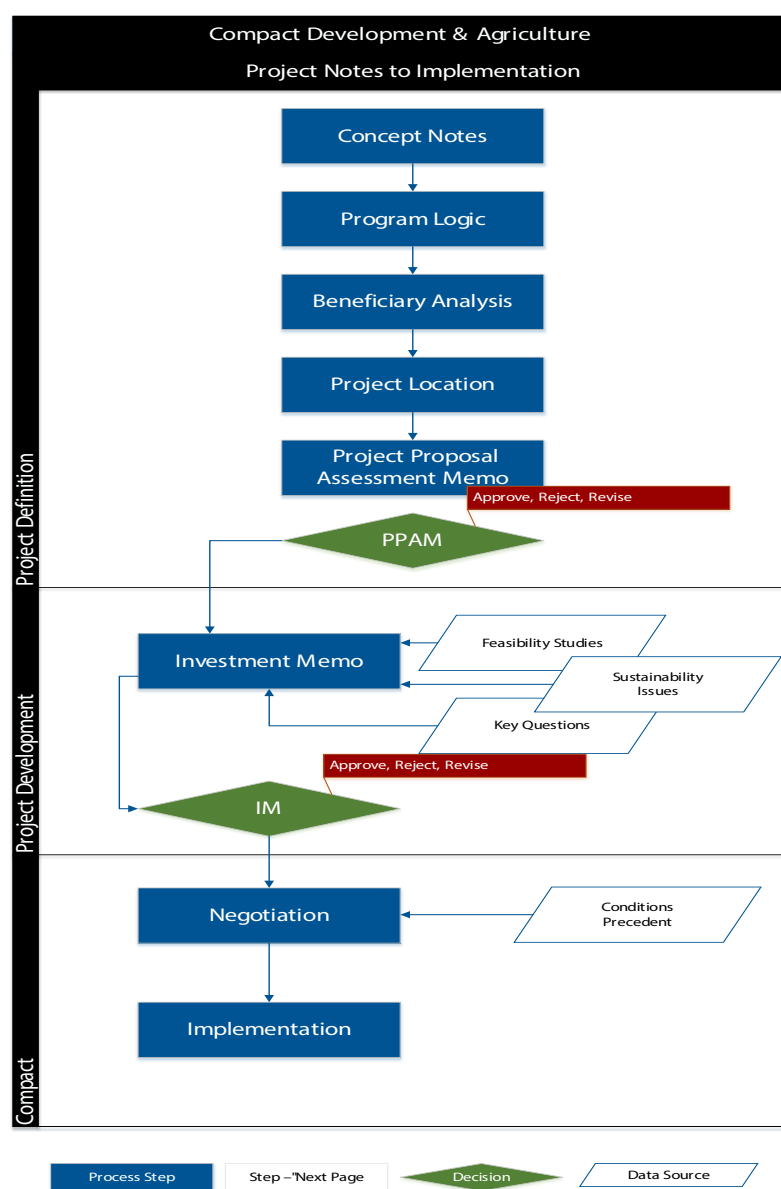
- Any Conditions Precedent, especially those requiring legal and policy reforms, are clearly documented and well-targeted to project needs. They condition the Compact or key disbursements based on a partner country taking specific and agreed-upon actions. Sometimes these are replaced by less stringent commitments call "covenants."
- Country contributions are agreed to, including necessary commitments to supply land if needed for key infrastructure, staff for the MCA or implementing entities that will not be financed through the project or administrative budgets, and office space or other in-kind contributions.
- Project implementation timelines and budgets are confirmed.
- Under MCC's principle of country ownership, compacts are implemented by locally led project teams, usually referred to as Millennium Challenge Accounts (MCAs). MCAs are accountable to domestic stakeholders for making decisions and achieving results. This ownership takes place within the framework of MCC's focused mandate; must be consistent with MCC's standards for accountability, transparency, and impact; and draw on MCC's support and guidance. This implementation is guided by the range of broader MCC-wide policies, guidelines, and procedures, which are updated at the agency level and not covered in detail here.

According to MCC's enabling legislation, no compact can last longer than five years. In addition, EIF marks a transition from MCC-led procurements focused on compact design to country-led MCA procurements in collaboration with MCC. This structure can present certain challenges, especially for projects that take time to implement. Risks to project completion and deployment sometimes arise because of limited country capacity (especially in the MCAs), difficulties funding capable/reliable contractors, changing local conditions, unexpected barriers to implementation, incomplete design, and other issues. For instance, this has manifested itself in MCC's large-scale irrigation programs that have, by and large, used the full five-year period for construction, leaving very little time for effective soft interventions to take place, such as farmer training or Water User Association (WUA) development. This problem is particularly important given the time it takes to set up new institutions.

Once compact implementation begins, it is often difficult to make significant changes to project design. However, changes in costs or unexpected problems frequently lead to the need to reduce the scope of the project or to go through a process of “value engineering.” Sometimes mid-stream reviews are built into project design, to identify areas needing redoubled attention or to gather lessons from early implementation. Due diligence and sometimes Compact Development Funding (CDF—formerly called 609(g)) funds are available for these types of studies or to address challenges on topics that need further detail.

The figure below summarizes the process from concept notes to implementation but these steps are covered in more detail at the MCC Compact Development Guidance Page: [MCC, 2021](#).

Figure 21: Project Notes to Implementation



Source: Authors/MCC Agriculture Team

XI. EVALUATION & LEARNING

MCC's culture of learning is an important part of MCC's evidence-based approach. It allows MCC to continuously improve its programs—in both current and future compacts—while also benefitting other US agencies and the international development community. As a member of the wider US Government development community, MCC also seeks to learn from the experience of other agencies.

A. USAID EVALUATIONS

In 2017, USAID did a review of its past agricultural projects—and found that these areas were the most impactful (USAID, 2016):

- Promoting land tenure, land markets, and property rights to secure access to land and unleash its productive potential. This included land titling and registration, moves to market ownership, and the development of local tools for land and natural resource management. Since land rights play such a critical role in agricultural and economic transformation, MCC is one of the world's largest donors in this space. Reflecting this, both land and agriculture are part of the same practice group at MCC, the Land and Agricultural Economy (LAE) group.
- Intensifying agricultural productivity by mobilizing science and technology to raise yields, increase supplies, and lower the cost of food. This included enlisting US technology and boosting agricultural research capacity. Technology can overcome production constraints, accelerate economic growth, and lower poverty, but must complement other investments in institutions, markets, and other stakeholders, including the private sector.
- Building agricultural education institutions through applied technical assistance and mentoring, in partnership with US universities and foundations, to strengthen human capacity and extension services for technology adaptation, training, and diffusion. This includes training for agricultural experts, building ag universities, often along the US land-grant model, and boosting extension and advisory services. These investments take time but can deliver results as long as they respond to the changing needs of partner countries.
- Improving market institutions, infrastructure, services, and performance to increase production and productivity incentives, as well as food availability and access. This includes understanding markets, facilitating the private sector through public sector investments to improve performance, promoting market-led growth, and boosting smallholder market access. Success requires an in-depth understanding of market structures, identifying constraints that distort incentives or impede progress, a focus on the private sector, and an understanding of how market failures can block progress.
- Linking rural people and organizations to financial services to stimulate savings and investments. In boosting access, USAID and MCC are considering new approaches that can promote sustainable impact, the introduction of appropriate technology, risk reduction, and public-private partnerships. There have been many lessons learned, including a focus on the risk of subsidized credit, the need

to have competitive interest rates, the possibilities arising from new technology, and the need to see credit as part of overall financial system strengthening.

- Investing in small and medium rural agricultural enterprises, along value chains, to create jobs, reduce waste, and add value. These firms can be important engines of growth. This includes promoting agribusiness and value chain development and building public-private alliances. Value chain work has shown that farmers are willing to expand their markets and firms are willing to invest if these activities can be de-risked enough to make them feasible. These firms can expand both local food supplies and exports.
- Developing agricultural and food policy research and analysis capacity to inform policy decisions and enable commercial environments. This includes building internal capacity for agricultural policy research to support better policy, which should be balanced and inclusive. This can provide the basis for further Policy and Institutional Reform (PIR).
- Expanding global and regional agricultural trade opportunities through trade liberalization and regional trading organizations and food quality and safety assurance. This Trade Capacity Building (TCB) includes developing an ability to trade opportunities, boost capacity to negotiate, and comply with trade agreements, improve compliance with international standards, reduce risks from disease threats, and promote trade-led growth. This can include investments in trade-supporting infrastructure.
- Integrating environment and natural resources management into agricultural practices and livelihoods, including watershed management, incorporating environmental standards, and empowering local populations. The key is to make these investments sustainable by bringing clear benefits to local decision-makers.

MCC has invested in many of these areas, but some may not fit into the agency's model, especially given the ERR hurdle rate and the strict five-year implementation rule. However, some of these themes could provide guidance for further MCC compact development.

B. MCC EVALUATIONS

Since its inception, the Millennium Challenge Corporation (MCC) has invested \$1.7 billion in agriculture and irrigation infrastructure projects, including some of MCC's earliest investments. MCC's Monitoring and Evaluation (M&E) practice is predicated on the core principles of accountability, transparency, and learning. Per [MCC's M&E Policy](#), (1) **Accountability** refers to the obligation to report on and accept responsibility for all funded activities and attributable outcomes; (2) **Transparency** refers to MCC's obligation to disclose these findings in a public and transparent manner and share the information (microdata and reports) generated in the implementation and evaluation of its compacts and threshold programs; and (3) **Learning** refers to MCC's commitment to improving the understanding of the causal relationships and effects of its interventions, particularly in terms of poverty reduction and growth, and to facilitating the integration of monitoring and evaluation findings in the design, implementation, analysis, and measurement of current and future interventions.

MCC uses common indicators for agriculture and has an evidence platform that houses all evaluations, plus the Evaluation Briefs for each project, along with sector results and a learning page for agriculture. The common indicators can be found at <https://www.mcc.gov/resources/doc/guidance-on-common-indicators#agriculture-and-irrigation>, while the Evaluation Briefs are at: <https://www.mcc.gov/our-impact/evaluation-briefs>. The sector results and learning page on MCC’s website for agriculture are at <https://www.mcc.gov/sectors/sector/results-agriculture>.

Monitoring and evaluation of a project are defined by the project objective and the associated program logic. MCC defines the *project objective* as the result that the project intends to achieve, and every project’s objective is laid out in the Compact document between MCC and the partner country. The program logic outlines the expected pathways for benefits to accrue to achieve the project objective. Defining these pathways allows for more precise measurement of results.

There are two sources of MCC-specific lessons that inform agency work. The first source of lessons is the findings from MCC’s independent evaluation process. These evaluations are conducted by third-party experts to produce high-quality credible analysis that is made public. These evaluations hold MCC and country partners accountable for results and contribute directly to learning for future programs. These are led by the Department of Policy and Evaluation (DPE). As part of every MCC evaluation, M&E convenes a Learning Meeting to discuss and document lessons motivated by the findings of the evaluation. These lessons are documented in the MCC Learning Document and publicly posted on the [MCC Evidence Platform](#) along with all the materials from the evaluation. MCC also creates 4-page [Evaluation Briefs](#) to communicate the findings and lessons of every evaluation in a digestible format.

The second source of lessons comes from the work of implementation by the country team over MCC’s lifetime. Each project yields new lessons that influence approaches on future projects. Since it has been several years since the last land or agriculture compact closing, we will depend on our earlier studies.

MCC has publicly shared lessons learned from implementation of agriculture projects with partner countries, US Government agencies, and development stakeholders. For example, MCC has worked closely with USAID’s Feed the Future program and has contributed evaluation findings to the Food Security Learning Agenda. MCC will continue to work closely with MCA counterparts in current and future MCC compacts to share lessons and look for opportunities to apply them to current MCC investments.

The results of MCC’s independent third-party evaluations are shared openly at MCC, 2022a.

Independent Third-Party Evaluations & Learning

In 2012, MCC released its first set of independent impact evaluations, which were designed to use rigorous statistical methods to measure changes in participant income. These first five impact evaluations—for farmer training activities in Armenia, El Salvador, Ghana, Honduras, and Nicaragua—reflect a small portion of both MCC’s investments and evaluation portfolios. These activities total less than 13 percent of the total budget in these five compacts, and 2 percent of MCC’s global compact portfolio. However, they offer valuable lessons and a first look at how MCC uses evaluations for accountability, learning, and improving its work.

Results from this first set of evaluations are summarized below and are described in greater detail in [*Principles into Practice: Impact Evaluation of Agriculture Projects*](#).

Monitoring and evaluation data found that the LAE practice group has been largely successful in meeting or exceeding its output and outcome targets for agriculture activities. The average completion rate of output and outcome targets specific to the activities covered by these evaluations is: Ghana (103 percent), Armenia (103 percent), Nicaragua (112 percent), El Salvador (131 percent), and Honduras (158 percent). MCC is proud of these achievements, but because its mandate is to reduce poverty, MCC also tests whether and how these outcomes lead to changes in income—first, farm income and, ultimately, household income for program participants.

This is not an easy task and cannot be measured by monitoring data alone, so MCC uses independent impact evaluations to verify that output and outcome results measured by monitoring data are attributable to MCC’s investments. These five impact evaluations provided encouraging news about MCC program successes. For example, in El Salvador, the evaluators found that dairy farmers doubled their farm incomes and, in Nicaragua, project participants’ farm incomes increased by 15 percent to 30 percent after two to three years of project support.

In fact, these evaluations show increases in farm income in three out of the four countries where methodologically sound evaluations were possible. Yet, while MCC was successful in meeting or exceeding its output and outcome targets and saw increases in farm incomes in these three countries, none of the five evaluations were able to detect changes in household income⁷. This raises questions about the “theories of change” embedded in the program logic for these and other farmer training programs, traditional assumptions about how program interventions lead to increased household income (as opposed to farm income), and the challenges associated with producing and measuring changes in household income.

Subsequent evaluations in other countries have also highlighted the importance of bringing in sector experience early in the compact development process (Senegal); how high operating costs can cut utilization (Senegal & Burkina Faso); lack of understanding of market channels and incentives (Morocco); the need to build upon pre-existing institutions (Morocco); MCC investments should have a sound economic justification (Indonesia); MCC should carefully consider investments in sectors where others are active (Indonesia); and how the sequencing and the quality of the construction activities is key to soft-side investments (Cabo Verde & Burkina Faso).

The results of these impact evaluations offer substantial learning opportunities both for impact evaluations and implementation of MCC agriculture projects, and are summarized below:

- Test traditional assumptions about what works to increase incomes. The development community has been conducting farmer training activities for generations with the aim of reducing poverty through, for example, improved agricultural productivity, greater market access, and improved crop prices. Yet these evaluations suggest that some traditional methods may not necessarily work

⁷ Farm income refers to profits and losses incurred through the operation of a farm, whereas household income includes both farm income and non-farm income, such as wages, profits from family-owned businesses, rental income, and remittances from any member of the household.

as expected. We need to carefully consider the duration, size, and content of farmer training when designing for specific interventions to be sure they support assumptions about behavior change. For example, findings suggest that training fewer farmers over a longer period leads to more sustained behavior and increased farm income than training large numbers but with a shorter duration. Regarding content, results indicate that implementing a standard curriculum for the sake of efficiency is not always effective—highlighting the importance of customized training and technical assistance within the context of specific farmer needs. In some cases, it may make sense to implement a farm systems approach, which looks at a range of options throughout the year, rather than focusing on just a few crops. This also should be coupled with a gender/social analysis to take into consideration shocks like school fees that may undermine the ability of farmers to store or market because of immediate needs. With this lesson in mind, MCC is executing deeper analysis of the data from the first five evaluations to support greater learning on all these issues to inform current and future agriculture investments, training approaches, and curriculums in future compacts. Further, MCC will look for opportunities in its current compact portfolio to refine evaluation approaches to enable more learning about the circumstances under which starter kits work best.

- Use program logic to inform evaluation design and to course correct during implementation. The program logic lays out the chain of events a given program is expected to generate that leads to increased household income. It is the starting point for both program design and evaluation planning. It contains assumptions about how project components link together and what changes will occur over what timeline. We learned that when an infrastructure investment, such as irrigation, is directly linked to other activities, such as how a reliable source of water encourages trained farmers to shift to higher-value agriculture production, properly sequencing the interventions is key. Going forward, MCC will monitor the many moving pieces carefully and be prepared, for example, to delay training to stay aligned with other components that may be delayed but are essential to the program logic. In the compact in Moldova, for example, training in the irrigation systems targeted for rehabilitation was delayed to minimize the gap between training and completion of irrigation and allow for training and evaluation after water began flowing. The Burkina Faso farmer training and irrigation activities were also reviewed by MCC and MCA-Burkina Faso due to potential sequencing issues. As implementation delays impact sequencing, the timing of evaluation and data collection should also be reviewed and rescheduled as appropriate.
- Choose the evaluation methodology carefully and based on the program logic. The most rigorous method for measuring attributable project impacts, and for learning, is through the random assignment of participants in program interventions. Because random assignment identifies similar groups of individuals that will (treatment) and will not (control) be exposed to project interventions, evaluators can compare the groups to measure their impacts. However, there are cases when this is not feasible because of strong political resistance or programmatic considerations, so other methods must be explored. Randomized evaluation, like other evaluation methods, can have limitations in farmer training programs where there is not enough time for benefits to accrue for the first farmers before the comparison takes place. This can result in underestimating of the impact of project interventions because they are simply measured too soon. In addition, if the project will also eventually provide training to the control group, this can limit the ability of evaluators to go back later to gather additional data to further understand program impacts using rigorous analysis.

Given that most agriculture projects have a gestational period of multiple years before the primary benefits can be observed, it is important to maintain control groups and flexibility for timing the final evaluations and surveys. Understanding these lessons, for any future evaluations, MCC will be cautious about the use of randomized evaluations.

- Align incentives for implementers and evaluators. Effective impact evaluations require close integration between implementers and evaluators, starting from the creation of the program logic and throughout implementation. Changes in program implementation can have significant effects on the evaluation methodology. While farmer training implementers need to maintain some flexibility to respond to changing program conditions, these should be discussed early and often with evaluators, so changes do not undermine the ability to learn and measure impact. We learned that a lack of incentives for implementers and evaluators to coordinate can lead to compromised evaluations. With these lessons in mind, MCC is working to create incentives for both implementers and evaluators to coordinate closely during program planning and implementation, including through clear contract language and requirements.
- Household income change is difficult to measure, particularly in agriculture. None of the first five evaluations detected changes in household income. One challenge is that it can take several years to realize longer-term impacts. The other difficulties lie with what is to be measured. MCC is exploring alternative and improved approaches for measuring household well-being—such as per capita consumption—for ultimate impact and standardizing this measurement across evaluations. In addition, an asset index based on ownership of a range of consumer durables is a low-cost alternative as well. Given the limitations of farm surveys, MCC is also increasing investment in GIS systems that can use satellite data to better measure agricultural production before and after compact implementation.
- Design evaluations for learning, not just accountability. Impact evaluations can be used both for accountability (to measure whether planned activities led to increases in income) and learning (why they did or did not achieve impact). This first set of evaluations and others designed in the same period focus primarily on accountability and on filling gaps in the literature and were less focused on learning about the effectiveness of varied activity components or implementation modalities or on understanding why programs may or may not have worked. While these evaluations still offer rich opportunities for learning, the learning is not as targeted as MCC would have liked. To this end, MCC should design evaluations to foster more learning and should look for opportunities to increase the learning potential of its ongoing evaluation portfolio. This includes being selective in how and when we evaluate, focusing impact evaluations on areas where the learning potential is greatest, where rigorous evaluation (with a counterfactual) is feasible, and where there is significant commitment of the various stakeholders to the evaluation. It also entails engaging sector experts and partner countries in setting a learning agenda. This will lead to more useful learning to inform future programming and facilitate the buy-in that is essential for evaluation success.

The lessons from the first agriculture evaluations have been a valuable guide for both programming and evaluation of agriculture investments at MCC. In the last 10 years, MCC has learned a great deal more about what works in agriculture investments. In general, our evaluations have shown that agricultural in-

comes improve because of MCC programs. However, we have also found that our program costs are often higher than planned and that benefits take longer to accrue than anticipated.

The evaluations point out that our future programs need to focus on behavior change for both farmers and water user associations, and better operations and maintenance of infrastructure. Our evaluations have also helped us to think through and develop better analytical tools to understand the impacts of our programs as we experiment with better measurement techniques. This sets the stage for more impactful programs in the future.

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Reducing Poverty Through Growth

