



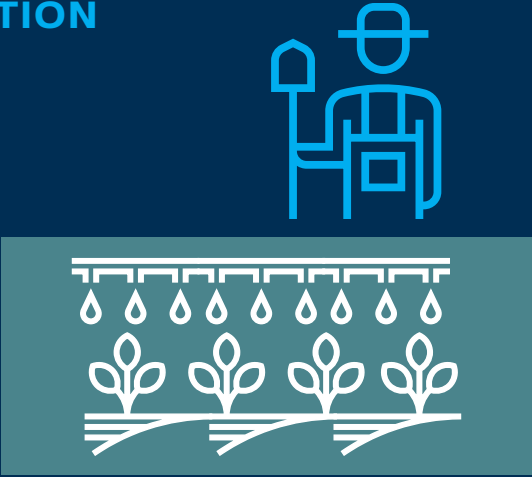
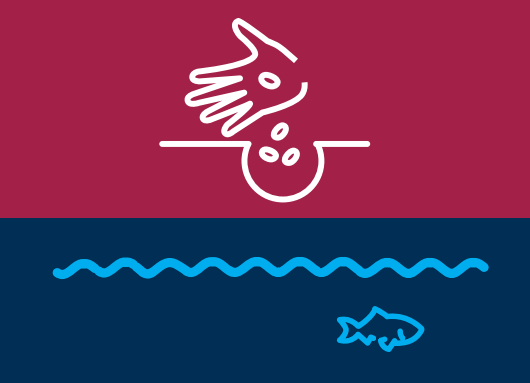
OVERVIEW

WORKING WITH SMALLHOLDERS

THIRD EDITION

A handbook for firms building
sustainable supply chains

INTERNATIONAL FINANCE CORPORATION



OVERVIEW

WORKING WITH SMALLHOLDERS

**A HANDBOOK FOR FIRMS
BUILDING SUSTAINABLE
SUPPLY CHAINS
(THIRD EDITION)**

International Finance Corporation

This booklet contains the overview, as well as a list of contents, from *Working with Smallholders: A Handbook for Firms Building Sustainable Supply Chains* (Third Edition), doi:10.1596/978-1-4648-1962-9. A PDF of the final book, once published, will be available at <https://openknowledge.worldbank.org/> and <http://documents.worldbank.org/>, and print copies can be ordered at www.amazon.com. Please use the final version of the book for citation, reproduction, and adaptation purposes.

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FOREWORD



Smallholder farmers—cultivating less than two hectares—are the stewards of over 80 percent of the world’s farms. According to the Food and Agriculture Organization of the United Nations (FAO) estimates, these small family businesses produce around one-third of the world’s food. In International Finance Corporation’s (IFC’s) key markets in Africa and Asia, smallholders dominate the production of food crops, as well as export commodities like cocoa, coffee, and cotton. Yet smallholders and farm workers remain among the poorest segments of the population and are on the frontline of climate change. The past few years have been particularly challenging; the multiple crises of the COVID-19 pandemic, Russia’s invasion of Ukraine, and extreme weather caused market disruptions and price volatility for food crops, fuel, and agricultural inputs.

One of the great development challenges is meeting the food needs of 9.7 billion people by 2050 while simultaneously reducing agriculture’s environmental footprint. Achieving this requires the sustainable intensification of agriculture: producing more food on less land, with less water, while building resilience to external shocks and climate change.

Given the dominance of smallholders in the food systems of low- and lower-middle-income countries, raising farm-level productivity is

a key priority. The overwhelming majority of smallholder farmers face constraints in accessing inputs, finance, knowledge, technology, labor, and markets. And all farming must contend with a changing and unpredictable climate.

The market for food is also changing, which can have a positive impact on smallholders. Economic growth and urbanization in emerging markets are increasing the demand for higher-quality food products. Consumer concerns about sustainability and the provenance of food products are opening new business possibilities for private firms along the entire value chain. In parallel, emerging technologies (“agtech”) can lower costs, increase efficiencies, build resilience, and dramatically reduce the environmental impact of agriculture. Ingenuity, innovation, and considerable investments will be needed for decades to come. The future of agriculture requires new and pioneering partnerships among different stakeholders in the food system.

Since the first edition of this handbook was published in 2014, IFC has almost doubled its agribusiness investment portfolio from around US\$2 billion to US\$3.9 billion at the end of fiscal year 2022. In September 2022, IFC launched a new US\$6 billion Global Food Security financing facility to strengthen the private sector’s ability to respond to the crisis and help support food production.

Firms increasingly need to establish and expand ways of working with consumer groups, governments, research institutes, civil society organizations, and the millions of smallholder farmers—especially in emerging markets—who are critical to the future supply of many agricultural products, including livestock, coffee, cocoa, vegetables, dairy, and palm oil. New and emerging legislation in the European Union and United States requires firms to be more accountable for their supply chains and demonstrate that they are sustainable, do not contribute to deforestation, and are free of child labor. Based on our experience, we believe firms can build traceable and transparent supply chains while significantly contributing to better economic outcomes for all.

This new edition of the handbook—produced with the support of Global Agriculture and Food Security Program—is a practical guide for firms that wish to expand their supply chains in emerging markets by working with smallholder farmers. The purpose is to enable more productive interactions between private firms and smallholders, creating value in all parts of the supply chain. The handbook is action-oriented

and offers practical solutions as part of our contribution to the development of sustainable agribusiness. Our vision is a food system in which sustainable production is the norm, and food and nutritional security is secured for future generations.

Wagner Albuquerque de Almeida

Director

Global Manufacturing, Agribusiness, and Services
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PREFACE

Smallholder farmers are becoming more important players in global food chains as agribusiness companies seek to secure future food supplies for the world's growing population. For some crops, smallholders are already an important source of production, but their role is expanding as land constraints limit the potential for growth in plantation agriculture and as the locus of future food market growth shifts to emerging markets. Those markets face increasing demand for affordable, nutritious foods for low-income urban populations.

These shifts offer opportunities—particularly for economic growth and poverty alleviation in rural areas—but also pose challenges to upgrade and integrate smallholder agriculture against a backdrop of climate change and increasing water scarcity. Moreover, agribusiness companies, under increasing pressure from consumers, shareholders, governments, and other stakeholders, are making important public commitments on sustainability, including the adoption of environmental and labor standards. Meeting these competing demands will require new ways of working and new partnerships to deliver change, including with the integration of agricultural technologies that can enhance operational efficiencies and reduce costs.

The *Working with Smallholders* handbook encourages agribusinesses to work with smallholders whenever possible, and it highlights the key opportunities in doing so, as well as details how to overcome the major challenges. This overview serves as a precursor to the full handbook

and highlights the critical points covered by the thematic areas in each chapter. It contains a checklist of practical steps to be taken by agribusiness firms to work effectively with smallholder farmers.

Mainstreaming the concepts addressed in this book can help agribusinesses to modernize their supply chains and operations, working more effectively with smallholders and other players in a profitable and sustainable way.

The handbook is written for the operational managers in agribusiness companies responsible for integrating smallholder farmers into value chains as suppliers, clients, or customers. These managers include the following:

- Product and sales managers for input manufacturers, distributors, wholesalers, and retailers
- Field managers for financial institutions and their small business clients
- Service providers who train smallholders
- Supply chain and sustainability managers for off-takers
- Sustainability managers for processors and food companies
- Company managers responsible for engagement via public-private partnerships.

Although written principally to outline training and assistance needs and opportunities for the private sector—whether in high-income, frontier, or low- and middle-income markets—the handbook may also be useful to the staffs of governmental or nongovernmental agricultural development programs working with smallholders, as well as to academic and research institutions.

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- Chapter 3.** Aggregation and Working Cost-Effectively at Scale: Martin Albani
- Chapter 4.** Agricultural Technology: Ashley Elliot
- Chapter 5.** Financing Needs and Solutions for an Agribusiness Supply Chain: Adam Gross, Panos Varangis, and Margarete Biallas
- Chapter 6.** Training and Communication: Amy Warren and Yemesrach Fisseha Gebremikael
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- Chapter 13.** Multistakeholder Roundtables and Voluntary Standards: Kate Bottriell
- Chapter 14.** Future Outlook: Ashley Elliot

ABBREVIATIONS

AVCF	agricultural value chain finance
E&S	environmental and social
ESG	environmental, social, and governance
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	Food and Agriculture Organization of the United Nations database
GAFSP	Global Agriculture and Food Security Program
GHG	greenhouse gas
IFC	International Finance Corporation
ISEAL	International Social and Environmental Accreditation and Labeling Alliance
ISO	International Organization for Standardization
IT	information technology
ITC	International Trade Center
IVR	interactive voice response
Kg CO ₂ eq	kilograms of carbon dioxide equivalent
MFI	microfinance institution
MSMEs	micro, small, and medium enterprises
MSP	multistakeholder partnership
NASA	United States National Aeronautics and Space Administration
NGO	nongovernmental organization
PESTLE	political, economic, social, technological, legal, and environmental

PO	producer organization
PrSW	Private Sector Window
ROI	return on investment
SHF	smallholder farmer
SMEs	small and medium enterprises
SMS	short message service
SWIFT	Survey of Well-Being via Instant and Frequent Tracking
USSD	unstructured supplementary service data
WHO	World Health Organization



CHAPTER 1

THE IMPERATIVE FOR CHANGE

The global food system is in crisis. The compounding effects of the COVID-19 pandemic, Russia's invasion of Ukraine, and climate change have led to supply disruptions and price rises in fuel, fertilizers, and staple foods such as wheat. In the long term, one of our greatest challenges will be meeting the food needs of 9.7 billion people by 2050 while simultaneously reducing agriculture's environmental footprint. This will require the sustainable intensification of agriculture: producing more food on less land, with less water, while building resilience to external shocks and climate change.

Smallholders face an unprecedented moment of transition. Long-standing challenges to livelihood include overreliance on traditional cultivation methods, weak access to markets, low levels of organization, land insecurity, lack of access to credit, low literacy and numeracy, and inefficient intercropping techniques. More recent threats to traditional farming methods include demographic pressures, urbanization, supply chain volatility, and—above all—climate change.

Yet this challenging landscape also presents opportunities for smallholders to join global and regional supply chains and contribute to food security, poverty reduction, and growth. In the context of scarce arable land and increasing food demand, small farms are set to attract increased investment, while business-model innovations and advances in scale-neutral technologies are expanding the spectrum of opportunities through which farmers and large-scale firms can benefit from

closer engagement. Global stakeholders also increasingly recognize the central role smallholders have to play as stewards of environmental sustainability and conservation.

Firm-Level Incentives for Investing in Smallholder Supply Chains

For agribusinesses, the key drivers for working closely with smallholder farmers are to secure the supply of produce (improved supply volume and diversification), capitalize on smallholder advantages in producing certain crops, enhance food quality and safety, and/or generate income by selling inputs and services to farmers. Often, these factors create firm-level incentives to prioritize investment into smallholder sourcing even where plantation-based farming is available. The reasons for this include the following:

- Access to land for commodity production (via the smallholders' farms)
- Lower costs of labor supervision (That is, smallholders are their own supervisors and generally rely on highly motivated family labor.)
- Greater ability of smallholders to bring a differentiated product to market, which improves sale prices (for example, higher-quality or niche-market products destined for fair trade or organic markets)
- Production efficiencies in crops with high seasonality and/or optimized processing economics
- Lower fixed costs in crops that lack any preexisting medium- or large-scale supply base
- Smallholder access to resources subsidized by government or nongovernmental organizations and not available to large-scale farms, and better terms of capital (for example, in the form of blended finance)
- Intensive local, often hyperlocal, knowledge about soil and growing conditions
- Greater resilience in the face of weather and other external shocks that may induce crop failure, given the risk-reducing effect of smallholders' geographic dispersion
- Improved social and political license to operate

Driven by these incentives, an ever wider range of firms are developing models of direct engagement with smallholders—not only specialist agribusinesses, consumer-facing brands, and listed companies, but also entities often typecast in the past as “intermediaries,” such as commodity and trading companies. Indeed, several global commodity houses are today at the vanguard of efforts to build mutually beneficial on-the-ground smallholder relationships in developing countries.

Sustainability as a Key Driver of Smallholder Engagement

Beyond the commercial incentives, supply chain sustainability and equity represent an increasingly central motivation for smallholder engagement. Many interviewees for the *Working with Smallholders Handbook* described sustainability issues as “mission critical” for farmer-facing firms in today’s world, as supply chains are transformed by consumer demand for responsible sourcing, more differentiated end markets emerge, new technologies and regulations are developed, and the importance of climate and deforestation goals grows. With the spotlight on sustainability, a growing proportion of firms with smallholder suppliers are taking active steps to ensure the following:

- More complete traceability of supply to safeguard and build brand equity
- Demonstration of positive social impact in smallholder supply chains—including actions that support farmers to achieve stable living wages and close gender gaps in agricultural value chains
- Implementation of voluntary certification requirements to unlock access to premium markets and/or to meet ambitious environmental, social, and governance (ESG) objectives

Pressures to increase sustainability have in the past often been confined to the back pages of company annual reports—bracketed under a “Corporate Social Responsibility” heading. Today, by contrast, the global food system stands at a tipping point. Firms with a leadership position on sustainability can unlock material commercial opportunities (from premium market access to enhanced positioning in the competition to secure scarce supply), whereas companies that are slow to prioritize sustainability in their supply chains increasingly face reduced market access, lower stability of raw material sourcing, and even curtailed long-term financing options.

Smallholder Farmers as Change Agents on the Climate Frontline

To the priorities and benefits noted must be added the opportunity for companies to partner with smallholders on carbon projects, that is, projects designed to achieve quantified and documented reduction or sequestration of atmospheric carbon. This is perhaps the most recent and transformational benefit. As the World Economic Forum has stated, “Smallholder farms are central to restoring the health of our planet and stemming climate change. . . . [S]ome of the best investments we can make to combat climate change are in sustainable agriculture and small farms [in Africa]” (WEF 2021).



CHAPTER 2

YIELD GAPS

Although global cropland grew from 1.22 billion hectares in 1950 to 1.51 billion hectares in 2000, the growth in yield was the primary reason that the food supply increased faster than demand during the last 50 years of the previous century. According to the Organisation for Economic Co-operation and Development, productivity improvements will continue to be key to sustainably feeding the growing global population. Up to 87 percent of the necessary increased production is projected to come from yield growth, while 6 percent will come from expanded land use and 7 percent from increases in crop intensity. “By closing yield gaps in the current irrigated and rain-fed cultivated land, about 24 percent and 80 percent more crop calories can, respectively, be produced compared to 2000. Most countries will reach food self-sufficiency . . . if potential crop production levels are achieved” (Pradhan et al. 2015).

Efforts to boost yield growth must, however, contend with the effects of climate change. Both temperature increases and higher rainfall variability are projected to significantly lower the yields of staple crops. A warming climate may require the selection of alternative crops or the introduction of varieties better able to adapt to the new conditions. Shifting staple crop production into currently colder climatic zones in northern latitudes or higher elevations may be possible, although at the risk of changes to natural habitats. A United States National Aeronautics and Space Administration (NASA) study (Jägermeyr et al. 2021) on climate change and agricultural production models projected that crop-specific yields will be impacted unevenly, with the greatest potential declines coming

in key crops such as maize and increases in wheat. Globally, maize could decline by 24 percent while wheat could increase by 17 percent by 2030.

Despite the challenges, global progress toward greater yields per unit area of land and in absolute volume of crop production continues, with cropland expansion and improved access to inputs such as fertilizer and higher-yielding seeds helping gross production increase by 11 percent between 2010 and 2016 (OCP 2023). However, these gains are not shared in all regions, with poorer countries typically facing a broader range of challenges while also offering the greatest potential yield improvement from a lower baseline.

Factors Affecting Yield Gaps

The key factors affecting yield gaps are listed in table O.1.

TABLE O.1 Factors That Affect Yield Gaps

Land rights
Technology
<ul style="list-style-type: none"> • Mechanization • Irrigation
Inputs
<ul style="list-style-type: none"> • Seeds and planting materials • Fertilizers • Crop protection • Storage
Natural resources
<ul style="list-style-type: none"> • Soil • Water
Climate
<ul style="list-style-type: none"> • Climate-smart agriculture <ul style="list-style-type: none"> ◦ On-farm carbon sequestration ◦ Regenerative agriculture
Financial
<ul style="list-style-type: none"> • Cost of inputs • Equipment
Opportunity costs
Technical capacity
External factors
<ul style="list-style-type: none"> • Conflict and fragility • Land management practices • Traditional crop practices

Source: IFC.

Checklist

The following checklist offers a guide to planning activities that will close yield gaps:

- *Set appropriate yield baseline.* Compare observed yields in nearby provinces or countries, or in locations with similar agroclimatic conditions, to the observed yields in the location you are considering. The Food and Agriculture Organization of the United Nations (FAO) maintains an excellent free database, FAOSTAT,¹ that provides food and agriculture data for over 245 countries and territories from 1961 onward. Another useful resource is the European Commission's World Atlas of Desertification.²
- *Set suitable yield targets.* Consider how much a farming family needs to increase yields in order to address a variety of targets. Targets should be feasible given the context.
 - Target operational yield: Increase yield to remain or become profitable given additional operational costs (that is, seeds, inputs, and seasonal costs).
 - Target investment yield: Increase yields and profits to enable capital investment of a predetermined level on the farm (that is, pumps, equipment, and infrastructure).
 - Target commercialization yield: Serve as a reliable producer for an off-taker (that is, yield above the level of household needs for food security).
- *Identify key yield impact factors.* Identify which factors—for example, gender, technology, access to inputs, natural resource factors, climate, access to finance, technical capacity, and external factors—have most relevance and influence on yields in your location. Consider the extent to which each factor may affect yield and make an informed estimate of the percentage to reduce your comparator from the first step. Use the resulting number to compare to the current observed yield to estimate the impacts of changes due to the proposed interventions.
- *Determine the improvement pathway.* Compare the current yield and the yield target to determine the yield gap and key influencing factors that must be addressed.



CHAPTER 3

AGGREGATION AND WORKING COST-EFFECTIVELY AT SCALE

To secure a sustainable supply from smallholder farmers (SHFs), some form of aggregation is required to achieve economies of scale. Sourcing agreements with producer organizations (POs) that amount to contract farming should be explored and concluded if the interests of all parties align. Contract farming, under inclusive business modalities, is the mode of choice for agreements that integrate upstream production and sourcing into a controlled supply chain.

Under any agreement with a buyer or off-taker, POs generally need capacity building to address skill and performance gaps, to scale up needs and options, and to develop opportunities for value addition. Tailored capacity building requires up-front investment of time and funds, as well as a deep understanding of the market context and specific PO needs and incentives, but the reward can be a strengthened buyer-supplier bond, secure collaboration, and a shared commitment to contract compliance. The following is a snapshot of the necessities, requirements, and opportunities of successful sourcing from SHFs.

Aggregation Fundamentals: Relationships, Agreements, Transparency, Comprehension, Mutual Benefits, Perceptions, and Trust

Successful and sustainable sourcing from smallholders and their aggregators (producer organizations, or POs) must be based on establishing

and maintaining good relationships with true mutual understanding and agreements predicated on underlying trust. The term *contract farming*, with an emphasis on *contract*, is reserved by some market participants for only one particular option of aggregation and sourcing. This may be formally correct, but the emphasis on contracts is misleading from an operational point of view. Upstream integration requires building a tight supply chain with controlled and responsible sourcing under firm agreements. To avoid any possible misunderstanding, contracting is important, but reliance on a formal contract without the foundation of relationship, true understanding, mutual agreement, and trust would be a recipe for failure. Furthermore, contracting per se is not the only means of aggregation and may not be the first step. All aggregation follows a series of discussions and agreements, and only after these may it be followed by formal contracts.

Under this interpretation, all aggregation of SHFs is, in fact, a kind of contract farming: namely, sourcing based on various agreements that cover promises and expectations. For instance, the lead farmer of an informal farmer group may suggest to the members several practical and economic benefits deriving from working together. If accepted, the shared idea becomes an agreement, a form of contract. For their part, the aggregator (off-taker or intermediary) may suggest to smallholders and their PO that they join in an agreement whereby the suppliers promise to produce and deliver crops as specified, under the condition that the aggregator provides certain kinds and amounts of support as specified and promised or committed to in a contract.

Verbal agreements and written contracts should be treated as having the same validity. The differences between the seemingly informal agreement and the written, witnessed, and signed contract are mainly legalistic but also emotive, with different pros and cons. On one hand, the verbal version leaves more room for dispute over how something was meant and understood. On the other hand, there may be cultural and social norms that cause profound discomfort and aversion against the “shackling” sensation of very formal contracts. Perceptions matter!

Checklist

Agribusinesses can realize the following opportunities while managing the challenges mentioned for effective sourcing from SHFs.

- Smallholders have comparative advantages in terms of better margins, premium quality, access to land and other factors. Ensure that they are compliant with agreed terms of quantity, quality, consistency, and uniformity of crop varietal and packaging. There may also be additional efforts and costs for capacity building.
- Secure the supply of produce in volatile markets, spread the portfolio geographically, and reduce the risk of under supply. Beware of food safety requirements and risks.
- Hedge risks associated with localized pest and disease problems by setting up effective traceability systems.
- Build new business opportunities by finding clients for other products and services (at the base of the pyramid.) These new business relationships should be compliant with rising standards.
- Take advantage of new technologies that are becoming available, such as efficient, low-scale processing equipment; information for coordination; and lower-cost traceability. The logistics of such technologies may present a challenge to be overcome.
- Establish contract farming relationships that enable the business to ramp production up or down without incurring fixed costs. Clear understanding of contract terms and enforcement mechanisms can help secure loyalty and fulfilment of commitments.
- Leverage donor assistance if possible, while ensuring that food safety requirements are met.
- Take advantage of the agribusiness's brand, image, and political capital, while also ensuring compliance with rising environmental and social standards and SHFs' loyalty and fulfilment of commitments.



CHAPTER 4

AGRICULTURAL TECHNOLOGY

Thanks to improved connectivity infrastructure, the falling costs of computing power and data storage, and the rapid spread of smartphones, the availability of digital technologies that strengthen smallholder supply chains is expanding every year. Emerging solutions encompass how farmers receive payments, obtain financing, protect against risks, access markets, optimize production, and manage data and supply chains. These technologies focus not just on boosting incomes and yields but also on supply chain traceability and certification—a response to growing consumer demand.

However, the agricultural technology (agtech) “revolution” remains in the early test-and-learn phase. The landscape is both *fragmented*—due to low interoperability and accessibility—and *overcrowded*, due to a lack of consolidation among subscale start-ups. Agtech winners with products that are multiuse and scalable will gradually emerge in the coming years, boosted by the falling costs of mobile data, handsets, and cloud storage, but as with the earlier “financial technology revolution,” it is hard to predict which models will succeed. Above all, cost and complexity will determine scale and engagement: Unless agtech tools are compatible with low-resource or low-digital-literacy contexts and address critical farmer needs at ultralow cost, adoption will be low. Overengineering is, therefore, a key risk: agtech solutions should focus only on the key pain points in the smallholder supply chain—keeping user interfaces simple, minimizing external dependencies, and ensuring financial viability at a realistic targeted threshold.

Because agtech is the fastest evolving arena in global agriculture, with the potential to unlock step-change advances in smallholder supply chain integration, agribusinesses should review their operating model regularly to identify whether new digital solutions can add value to their specific business needs. For operational managers applying digital solutions to their smallholder supply base, key opportunity areas include agronomic advice, field data collection, agent field-force management, and software that enhances traceability, certification, and procurement.

Agtech Use Cases

From a smallholder perspective, the beneficial impacts of agtech solutions include the following:

- Enhanced productivity and reduced crop losses achieved through real-time agronomic or market data, associated analytics, and digitized advice
- Greater access to appropriate financial products via the digitalization of investment readiness, credit screening, and loan decision-making processes
- Reduced bottlenecks around collateralization thanks to digital and satellite-based farm mapping that enhances security of land title
- Strengthened links to quality input markets and structured off-taker markets, thanks to participation on e-platforms and mobile-enabled “value chain integrator” platforms
- Better nutritional outcomes, because the crops produced and consumed benefit from agtech solutions that deliver more nutritious food, including through more precise crop nutrition and protection (Tsan et al. 2019; Valverde 2020)

Meanwhile, for large-scale input suppliers and off-takers engaging with smallholder farmers (SHFs), the benefits of agtech solutions include the following:

- Greater capacity to incorporate smallholders into commercial supply chains due to reduced field agent costs, increased aggregation capability, and improved operational efficiencies

- Improved market links leading to increased demand for input products, reduced crop losses, higher production volumes, and higher overall profitability
- Less volatile supply volumes because of real-time tracking and predictive analytics
- Augmented visibility across the value chain, enabling off-takers to understand farmer needs and incentives in detail and tailor products and services to them
- More efficient use of energy and resources, boosting environmental sustainability
- Improved safety and brand integrity, thanks to improved traceability and standards compliance and reduced counterfeiting (which in turn can unlock higher-value end markets, for example, for organically certified foods) (Valverde 2020)

However, it is not enough to simply match farmer challenges to tech solutions: it is important to understand whether new technology is “nice to have” for smallholders or “essential to have,” with an immediate impact on incomes. This distinction matters because agtech solutions will be widely used only if they directly address farmers’ highest priorities.

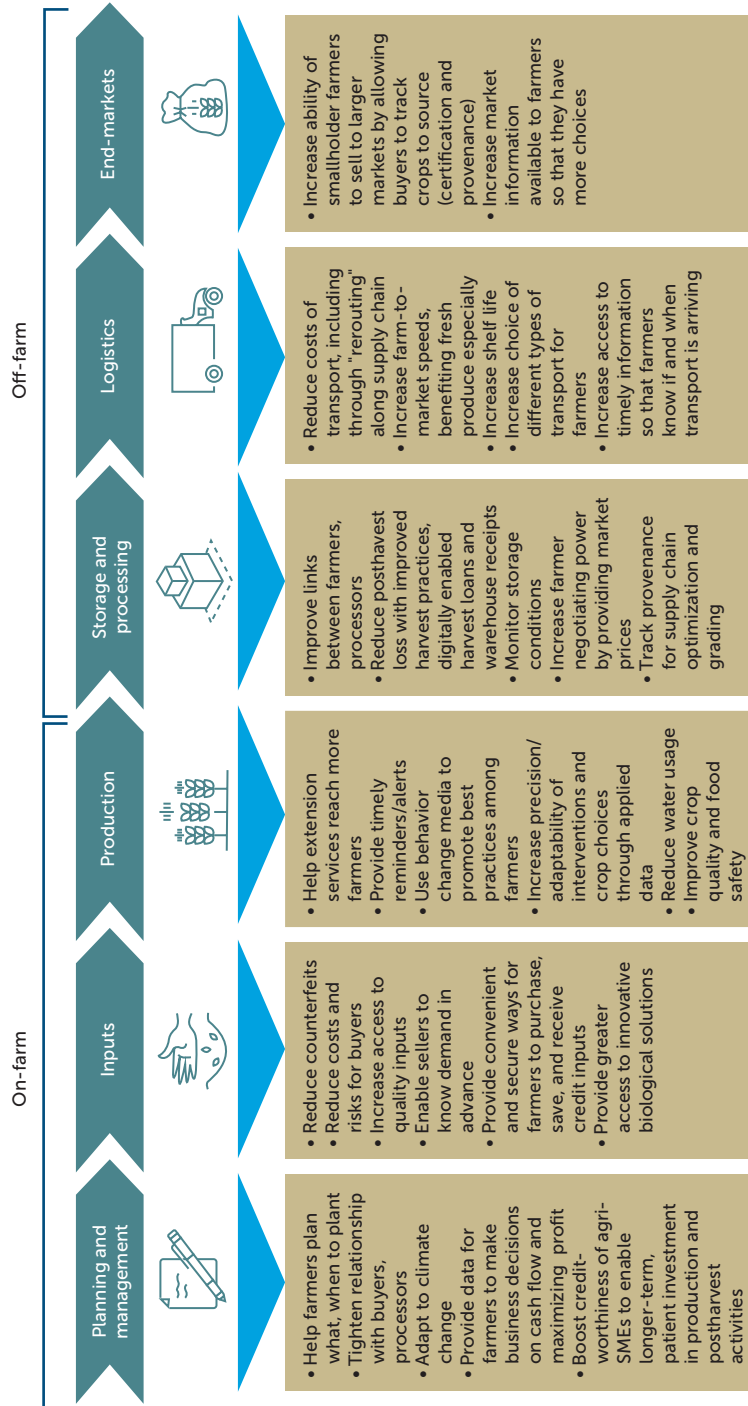
Market Infrastructure

Understanding the level of market development is key to determining the appropriateness of new technologies. For every agtech application, there is a minimum necessary level of infrastructure and supportive regulation for scale to become feasible. This can be unpacked into four building blocks:

1. Structural fundamentals of the agricultural system
2. Maturity of digital connectivity infrastructure
3. Readiness of physical marketing, storage, and logistics infrastructure
4. Conduciveness of the regulatory environment

Two of the above requirements stand out as game changers: first, the scale of the digital payments ecosystem, without which many agtech solutions become nonviable,³ and second, the quality of agriculture data systems.

FIGURE O.1 Impact of Agtech Solutions across the Smallholder Value Chain



Source: Adapted and expanded from USAID 2018.
 Note: SMEs = small and medium enterprises.

E-Platforms

Digitized marketplace business models that create links across the agri-business value chain have risen to prominence over the past five years—models that deliver compelling value for users by unlocking access to finance and larger markets. Four main categories of e-platforms have so far emerged:

1. Integrated market-linking platforms that connect farmers directly with wholesalers, retailers, or consumers, enabling farmers to retain higher revenue
2. Business-to-consumer models for agro-inputs and/or online input marketplaces
3. Digitized agricommodity exchanges
4. Sharing-economy platforms for farming equipment and other non-food assets

Virtually all e-platforms use mobile and mobile-money systems to reach large numbers of smallholders disbursed across rural landscapes, aggregating and formalizing previously fragmented supply and demand. Participation in digital marketplaces reduces the costs and risks to farmers of locating and transacting with suppliers or buyers, ultimately improving their incomes through a virtuous circle in which more structured market access encourages higher investment by farmers in quality inputs, equipment, and other assets.

From Market Links to Super-Platforms

The initial wave of e-platform solutions has also paved the way for end-to-end super-platforms to emerge that combine agricultural market links to a broader ecosystem of integrated products and services—from market pricing data, agronomic advice, and farm and supply chain management tools to mobile credit and insurance, distributed energy solutions, household consumables, and other nonagricultural services (for example, mobile health). This model is complex and involves a daunting level of up-front investment, but its advantages are manifold.

Service-bundling enables platform owners to monetize user activity when individual farmer willingness to pay is negligible by creating instant value that farmers are willing to pay for, in contrast to the longer-term results associated with yield-improving advisory-only solutions. Additionally, by creating attractive economies of scale for

intermediaries and platform partners, the platform owner can take a share of the value created for each customer segment—for example, through business-to-business advertising revenues or platform access fees—rather than relying solely on farmer subscriptions or farmer data monetization.

Agtech as a Tool for Strengthening Smallholder Engagement

To maximize the impact of agtech, solutions must be designed and operationalized with their limitations in mind, and with sensitivity to the constraints of uneven connectivity infrastructure, weak market links, or low digital skills. Agtech solutions with the best prospects of success will be those designed with mitigation strategies for known risk factors:

- The inability of digital solutions to substitute for physical infrastructure investments that enable agricultural trade (for example, roads, energy, irrigation, processing, and storage)
- The risk that digitalization of agricultural systems may trigger a decline in the number of farming jobs due to consolidation, even as the number of high-quality jobs increases
- The data privacy and information security risks that accompany digitalization
- Lack of interoperability with other digital platforms and bank or telecoms systems in poorly coordinated and highly fragmented agtech ecosystems
- The danger that the complexity of agtech solutions runs ahead of the short-term ability and willingness of governments and smallholders to adopt them
- Disintermediation risk: that is, the risk that platform users become reliant for their market access on digital solutions that may abruptly fail

Strengthening Smallholder Supply Chains through Agtech: Guidelines for Decision-Making

The following guidelines can help operational managers who are responsible for integrating SHFs into supply chains to make informed

decisions about whether—and how—to invest in agtech. Although the issues may vary by value chain, these six guiding principles are universally applicable:

1. Focus only on solving for the most critical pain points.
2. Prioritize multiuse over single-use solutions, as this will increase adoption.
3. Keep user interfaces simple and avoid customizations.
4. Minimize dependencies on external tech firms and consultancies, and on pending regulatory changes; instead, retain in-house control over the technology.
5. Avoid reliance on subsidies—ensure the solution can be financially viable at a realistic targeted scale threshold.
6. Design to ensure “operational gearing,” that is, the ability to increase revenues or impact as user numbers grow, without increases in costs or complexity.⁴

Checklist

Part 1: Objective Setting

- Identify pain points for the proposed agtech solution to address.
- Fix and align priorities about which partners to engage beyond farmers.
- Measure the commercial and social or environmental impact and define success.
- Ensure that the solution is inclusive or modify it to ensure a net positive outcome for all

Part 2: Resource Mobilization and Budgeting

- Determine whether the solution can be funded in-house or whether the objectives of multiple funders could be aligned.
- Set a realistic budget and stress test it, allowing for delays.

Part 3: Market Sizing

- Identify the target user base or total addressable market size for closed-loop solutions and scalable solutions.

Part 4: Farmer-Centered Product Design

- Determine the business case for developing the capability in-house versus a joint venture with a technology partner, a build-operate-transfer model, or full outsourcing.
- Decide whether the solution is a single-use or multiuse case.
- Build trust among users by designing a solution to be participatory, simple, and sensitive to differences in language, literacy, and skills.
- Identify the technology's key dependencies and aim to minimize these.

Part 5: Delivery and Revenue Model

- Ensure that the revenue model is based on relevant real-world evidence and that the pricing model is flexible.
- If data are to be monetized, consider regulation compliance, onshore housing of data, and costs.

Part 6: Stakeholder and Partner Engagement

- Conduct stakeholder mapping and determine stakeholders' likely level of support. Sign a memorandum of understanding.

Part 7: Course Correction in the Run Phase

- Consider which pilot phase milestones will trigger a decision on whether to scale up and how internal resource requirements will shift from design phase to pilot phase to scale up.



CHAPTER 5

FINANCING NEEDS AND SOLUTIONS FOR AN AGRIBUSINESS SUPPLY CHAIN

Smallholder Farmer Financing Needs

Given the severe constraints on formalization and productivity growth that smallholders face when they lack access to investment capital, there is a strong degree of correlation between smallholder farmers' (SHFs) access to flexible and affordable finance, on the one hand, and the ability of agribusinesses to develop deep, structured, and mutually beneficial smallholder supply chains, on the other.

The overall financial needs of small-scale producers in developing countries are estimated at about US\$240 billion annually (Dalberg Advisors/KfW 2018). Of this amount, smallholders require US\$188 billion globally for agricultural inputs or mechanization and US\$50 billion to cover nonagricultural household related expenses, including health care, school fees, home improvements, and life events. (Shakhovskoy, Colina, and Höök 2019). Importantly, these estimates may not take into account the climate-specific capital required, currently estimated at US\$70 billion a year (IFAD 2020). Additionally, estimates suggest that at least US\$80 billion in additional annual investment will be required to meet growing global food demand, most of which must come from the private sector due to limited public resources.

Important challenges for financial institutions considering agricultural lending include (1) management of unique risks in agriculture;

(2) high transaction costs in dealing with large numbers of small farmers, as well as micro, small, and medium-size enterprises (MSMEs), along agriculture value chains; (3) limited effective demand for finance; and (4) lack of expertise in managing agricultural loan portfolios. Financial systems are even less prepared to finance the shift to sustainable agriculture and sustainable agrifood industries.

Financing Tools and Enablers

Several tools are available that help financial services providers de-risk agricultural lending. For example, the past two decades have seen the emergence of risk mitigants such as index-based crop insurance and agroclimatic risk assessment tools. Leveraging relationships within value chains can also de-risk agricultural finance.

In addition, technology innovations have a game-changing impact on agrifinance. Increased computing power allows real-time analysis of vast amounts of data from a variety of sources, such as payments within value chains. These data can in turn be used to enhance customer profiles, providing additional insights into financial behavior and financial strength. The use of mobile payment and agent networks can significantly reduce the cost to serve customers, while digitalization of payment streams can form the basis for data analytics as invisible transactions become visible.

Within the past 10 or more years, a relatively small but growing stream of investment has led to a proliferation of digital financial services and related information services aimed at the agriculture sector. These have been launched by incumbents from the finance and payments sectors as well as new entrants, such as mobile network operators and financial technology providers, which rely on digital solutions for their business operations. Offerings can range in financial and digital complexity, with associated requirements from the agribusiness and farmer.

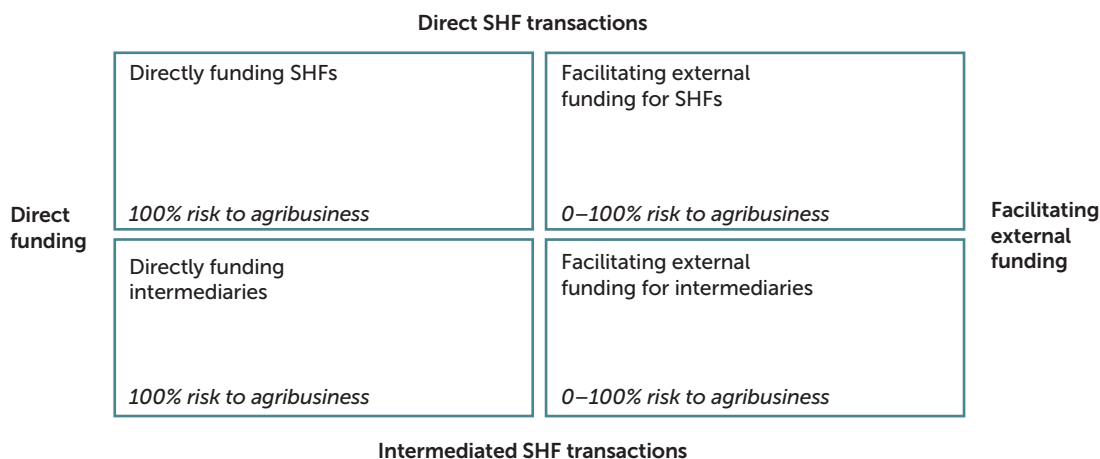
Technology can also be used to help bundle financing and insurance more efficiently and at a lower cost per farmer. Financing farmers through agricultural technology (agtech) platforms can reduce investment risks by increasing diversification and enhancing transparency. Data analytics is a further critical factor to de-risking agrifinance, as is embedding finance in specific value chains where payments are digitized—as participants and flows become transparent.

The Role of Agribusinesses

The most prevalent model for SHFs and rural MSMEs to access finance though is through larger agribusinesses (anchors) who directly or indirectly finance SHFs. Such financing can be provided from the agribusinesses' own balance-sheet, the agribusinesses may borrow from banks to on-lend to farmers, or they partner with banks and microfinance institutions (MFIs) for the latter to do the lending to SHFs based on guarantees from the larger agribusiness. There are pros and cons with each of these arrangements, and the options can be combined. The options for an agribusiness to finance its suppliers and distributors are summarized in figure O.2.

Larger agribusiness have access to capital markets and may raise funds at lower rates, compared with local banks. Their knowledge of SHFs, along with their focus on using finance to secure volumes of business, could lead to competitive credit costs for SHFs. Meanwhile, small and medium enterprises (SMEs) may not be able to secure lower-cost funding; their funding through local commercial banks could be limited by their balance sheet and assets, and thus credit could be more expensive.

FIGURE O.2 Matrix: Smallholder Farmer (SHF) Funding Choices



Source: IFC.

Bringing in banks and MFIs to lend to farmers could be advantageous to an agribusiness, because the agribusiness would not need to use its own balance sheet to raise funding to on-lend, while it would still be able to facilitate funding to its suppliers. SHFs can also find additional financial products beyond those for crop production. However, banks and MFIs may be more risk averse than agribusinesses, and farmers may not have the risk profile these financial institutions seek, limiting the availability of credit to SHFs.

Financing by agribusinesses could rely on off-taker contracts or purchase orders to their suppliers (farmers), resulting in contract-farming arrangements. However, financing can also take place in a less formal environment, wherein agribusinesses could provide inputs on credit to SHFs, who in turn would be expected to pay back the loan in kind through crop delivery, covering at least a percentage of the crop to satisfy the cost of inputs provided.

A key risk is side selling, the extent of which depends on the structure of the value chain and the relationships between farmers and agribusinesses. Crops that require centralized collection and processing and have a well-structured value chain around an anchor buyer are better at controlling side selling. The creation of loyalty incentives, provision of nonfinancial services, field monitoring, use of digital technologies, and so forth can also lower the risk and incidence of side selling.

Agribusinesses can provide data and information on their SHF suppliers to financial institutions (to enable these institutions to assess financial needs, design financial products, and assess credit and other risks) and adopt some of the credit risks or provide guarantees to banks and MFIs. The repayment of such loans is often based on delivery of the crop to the agribusiness, although farmers could also be given the option of selling somewhere else if they repaid the loan to the bank or MFI. However, in such scenarios, the agribusinesses are not likely to be willing to share any of the risks.

Agricultural Value Chain Finance

Agricultural value chain finance (AVCF) is a common form of SHF prefinancing within a contracting relationship. AVCF involves prefinancing of goods or services, typically agri-inputs, to the producer during the production cycle in return for delivery of outputs to a designated off-taker after harvest. A contract establishes a financing relationship in which provision of pre-harvest credit (cash or in kind) is repaid using

proceeds from the smallholder's crop sales post-harvest, payable by the off-taker directly to the financier (table O.2).

AVCF schemes may be established by off-takers linked to a contract farming or out-grower scheme, and by input suppliers (or, much less commonly, equipment vendors) as part of a product-marketing strategy. In the latter case, the input supplier may itself off-take and then on-sell the produce to buyers, or it may partner with one or more off-takers, which directly off-take from the contracted producers and then provide the repayment for the input credit. The agribusiness's contractual relationship under AVCF may be directly with the producer or via an intermediary—for example, a producer organization (PO), a retailer/distributor, or a trader/aggregator—which would be given full or partial responsibility for provision of inputs and aggregation of outputs.

POs are often engaged by agribusinesses to reduce risk when lending to multiple SHFs. The involvement of the PO can reduce transaction costs through facilitation of last-mile logistics and distribution. The PO also takes on the repayment risk by an individual SHF member and is usually better positioned than an agribusiness or financier to mitigate

TABLE O.2 Typology of Common Agricultural Value Chain Finance (AVCF) Arrangements

AVCF type	Funding source / risk allocation	Description	Typical motivations
Off-taker prefinancing	Off-taker	Off-taker prefinances smallholder farmer (SHF) inputs, expecting delivery after harvest to repay input credit.	<ul style="list-style-type: none"> • Supply security • Quality assurance • Traceability • Corporate social responsibility
Input-supplier prefinancing	Input supplier	Input supplier prefinances SHF inputs and expects delivery after harvest to repay input credit.	<ul style="list-style-type: none"> • Product marketing • Demand stability • Up- and cross-selling
Tripartite arrangement	Off-taker, input supplier, or both, with risks allocated among them	Input supplier and/or off-taker prefinances SHF inputs, expecting delivery to off-taker after harvest to repay input credit.	<ul style="list-style-type: none"> • Mix of the above
Financier-led arrangement	Financier, which may take full risk or share risk with off-taker or input supplier	Financier prefinances SHF inputs and expects delivery to designated off-taker after harvest to repay input credit.	<ul style="list-style-type: none"> • Relationship building • New business opportunities • Portfolio diversification • Impact investment

Source: IFC.

that risk: preemptively by virtue of the close relationship with the member SHF, at time of default through offsetting the repayment obligations of the defaulter with produce provided by other members, and post facto through increased likelihood of recovery based on social and community-based, and financial and legal, interactions. The resulting debt can then be remedied within the PO rather than through foreclosure proceedings, which may impact the future borrowing capacity of the individual SHF or the PO.

The financier relies on the off-taker to make a loan repayment out of the SHF's sales proceeds rather than relying on the SHF making payments directly to the financier, as the latter would involve increased transaction costs and risks. However, AVCF based on off-taker or input-supplier prefinancing has inherent limitations in application for both commercial and structural reasons:

Commercial: Most agribusinesses do not have the administrative capacity or commercial appetite to prefinance a large SHF base, for which an agribusiness would have to seek external funding. The agribusiness may consider supporting the prefinancing by (1) providing pertinent information to assist the financier to appraise the SHF's credit worthiness, (2) committing to off-take so the financier is assured of a market, (3) sharing the repayment risk, and (4) providing full or partial guarantees.

Structural: AVCF tends to work best in "tight" value chains that have one or more constriction points that limit the choice of route for goods to market, thus reducing the possibilities for side selling.⁵ To prefinance SHFs in value chains not ordinarily supportive of AVCF, an agribusiness may consider products and techniques that can strengthen AVCF against side-selling risk or to look at alternative approaches for financing SHFs aside from prefinancing.

Improving the SHF Borrower's Eligibility for Finance

Beyond data-gathering, agribusinesses may consider (1) supporting SHFs to obtain relevant information to enhance loan eligibility and (2) building SHF or aggregator financial and business management capacity. This kind of support rewards high-performing producers and improves supplier loyalty while reducing side-selling risk. Areas to cover may include financial literacy, facilitation of financier links, assistance to open mobile money or traditional bank accounts, development of business management skills, navigation of loan application modalities, and introduction

to emergent financial technology opportunities, in particular, those that are most accessible to SHFs, such as short message service–delivered services. For POs and other farmer-based groups, agribusinesses may also help to strengthen their governance and capacity.⁶

Mitigating and Sharing in Key Lending Risks

An agribusiness may increase SHF bankability for external financiers by helping to mitigate or share in key lending risks. Potential agribusiness contributions are presented in table O.3.

TABLE O.3 Potential Agribusiness Contribution to Mitigate or Share in Key Lending Risks

Risk type	Definition	Drivers	Potential agribusiness contribution
Production	Output is insufficient to repay loan.	<ul style="list-style-type: none"> • Agroclimatic • Farm-level • Production-linked 	<ul style="list-style-type: none"> • Facilitate provision of pertinent inputs, equipment, and extension services. • Scope out the opportunities for including insurance alongside credit to mitigate the drivers of production risk. • Provide necessary assurances concerning the efficacy of the products and services provided under the financing package.^a • Design an effective production-monitoring regime to provide for early detection and remedy of challenges.
Post-harvest	Produce is lost or damaged before reaching market.	<ul style="list-style-type: none"> • Poor harvesting or post-harvest practices 	<ul style="list-style-type: none"> • Facilitate pertinent equipment and training provision in financing package. • Provide necessary assurances on the logistics and the quality of storage facilities.^b
Market and price	Sale of produce generates insufficient income to repay loan.	<ul style="list-style-type: none"> • Absent demand • Volatile/falling price 	<ul style="list-style-type: none"> • Contract with smallholder farmer (SHF) to address market risk.^c • Offer a minimum price guarantee to address price risk.^d • Facilitate access to price risk management instruments (admittedly uncommon in SHF contexts).

table continued

TABLE O.3 Potential Agribusiness Contribution to Mitigate or Share in Key Lending Risks (Continued)

Risk type	Definition	Drivers	Potential agribusiness contribution
Repayment ^e	Timely repayment of the loan is not made.	<ul style="list-style-type: none"> • Side-selling risk • Delivery, marketing, or payment delay • Household emergency • Lack of respect for contract sanctity 	<ul style="list-style-type: none"> • Provide necessary assurances the financing is affordable and worthwhile for the SHF borrower.^f • Design effective harvest monitoring regime. • Provide necessary assurances concerning a timely delivery or collection modality. • Offer a fair pricing mechanism to reduce side-selling temptations. • Share or facilitate a third party to share in overall lending risk.^g

Source: IFC.

- For example, the characteristics of the input package and equipment are suitable to generate upside for the SHF; the insurance policies in place (for example, crop insurance, life and health insurance) mitigate the range of likely downside risk; the inputs and equipment are authentic products from a reputable supplier; the inputs will be available at the right time in the production cycle; there is safe and effective handling of inputs during distribution; efficient equipment repair and maintenance arrangements are in place; and producers have the motivation and know-how to adopt the inputs and equipment and more broadly to perform good agricultural practices and sustainability requirements pertinent to the value chain.
- For example, certification of conformity with pertinent standards, licensing under a warehouse receipt system, robust operational documentation, qualified staff, and independent oversight.
- Contracting may involve a reciprocal set of commitments between agribusiness and producer under the agricultural value chain finance framework. However, contracting may also involve a unilateral off-take commitment by the agribusiness without any obligation for delivery by the SHF. This arrangement still addresses market risk.
- Minimum and fixed-price contracts may be supported through an underlying hedging instrument or through negotiating the contract back-to-back against the agribusiness's own contract with a buyer. An unhedged position may expose the agribusiness to significant price risk.
- Repayment risk is also known as credit risk. However, credit risk is also sometimes used as an umbrella term covering all kinds of lending risk. "Repayment risk" is used here to avoid ambiguity.
- The loan amount is a relatively small proportion of production value. The implied cost of the package (principal plus interest) is more than offset by the upside. The arrangement does not deprive the borrower of liquidity when it needs to fund core business or household expenditures.
- The agribusiness can mitigate some of the risk it takes on board through insurance (e.g., meso-level products, which are products that are larger in financial value than micro products but smaller than macro products; these meso-products payout to the agribusiness if, for example, rainfall is low) or by bringing third parties into the arrangement (for example, donors, patient capital providers, or providers of risk-sharing instruments).

Checklist

- *Pay attention to key trends in the operating environment.* In particular, focus on the social, technological, and environmental elements of the traditional PESTLE (political, economic, social, technological, legal, and environmental) analysis.⁷
- *Think strategically about SHF engagement.* Quantify the potential benefits, map the SHF engagement models to achieve these, and calculate the costs and risks associated with each.

- *Specify targets in quantitative terms.* These may be linked to short- and long-term key performance indicators in the context of overall business plan objectives.
- *Take a portfolio-based approach.* Calculate the number and location of SHFs (and/or intermediaries) with whom to work to fulfill the targets; identify key selection criteria and challenges.
- *Quantify the overall financing need.* Assess the specific funding requirements for value chain actors and appraise the merits of financial product alternatives.
- *Identify and map potential funding sources.* These could include internal funding, existing external financing sources, and alternative potential funding sources.
- *Blend the funding mix.* Evaluate the relative attractiveness of wholesale funding by the agribusiness versus retail funding that would be provided direct by the financier to the SHF.
- *Strategize how best to administer the funding mix.* For example, build in-house capacity for embedded financing, outsource to service providers, collaborate with technology or channel partners, and establish dedicated financing subsidiaries.
- *Understand which cost-effective steps can be taken to improve direct bankability of SHFs to external financiers.* Do this through direct action, or through partnership with well-positioned actors including nongovernmental organizations, agtech platforms, government, and so forth.
- *Appraise the mix of carrots and sticks.* These can be used to incentivize good performance by SHFs—rewards based on good performance and loyalty and mechanisms to tighten the value chain or increase recourse against nonperformance.
- *Consider how digital financial service opportunities may best be exploited.* These can drive efficiency and performance in the agribusiness-SHF financing relationship.



CHAPTER 6

TRAINING AND COMMUNICATION

Training and communication are key to improving smallholder productivity, and agribusiness firms play a vital role in delivering these extension services. Training by lead farmers, supported by appropriate incentives, can be a cost-effective way to increase extension reach and change farmer behavior, while information and communication technology (ICT) developments are transforming how agricultural extension and advisory services are delivered: enabling affordable access to smart phones, global positioning systems (GPS), and tablet computers, among other things. As an example, the International Finance Corporation's Agribusiness Leadership Program uses face-to-face training and e-learning to develop the business management capacity of producer organizations (POs), agro-input retailers, and model farmers.

The Business Case for Farmer Training and Communication

Agribusiness firms that prioritize training and communication as key tools to enhance smallholder supply chain integration are likely to benefit by the following:

- Establishing a sustainable upstream supply of raw materials for their business operations
- Building the capacity of smallholders to meet the needs of global markets and to interact with supply chain partners

- Encouraging loyalty, which reduces side selling and forges long-term and mutually beneficial partnerships
- Enabling joint solutions to overcome inefficiencies and other challenges
- Creating the conditions for adaptation and innovation in the supply chain
- Fostering competitive advantages that go beyond output and quality (for example, in the transfer of roles from firm to smallholder or improved traceability systems)
- Enabling an early warning system, whereby farmers provide the firm with advance notice of emerging problems, and vice versa

Checklist

Agribusinesses are advised to use the following guiding steps when implementing smallholder training programs:

- *Select local partners.* There are multiple ways to work with local partners. For example, agribusinesses might directly contract with those who will deliver training. In other situations, the contracted non-governmental organizations (NGOs), targeted producer groups, or other engaged local partners may further hire or contract the trainers. By working with a local partner, agribusinesses can reach more smallholders, achieving scale. Agribusinesses should build the capacity of their local partner to deliver the trainings, and they should ensure community ownership of the program to secure continuity of the service.
- *Conduct a needs assessment.* A critical part of program design is the needs assessment, which involves talking to a sample of smallholders, POs, extension agents, and other relevant stakeholders. The needs assessment provides insight into the following:
 - *Performance gaps:* In what areas can farmers improve? For instance, are they only delivering half the amount of product promised? Are they delivering a substandard product?
 - *Farmer characteristics and circumstances:* What are their literacy levels? Do they have reliable access to technology? Can they use technology? What motivates them?

- *Existing extension capacity:* Is there an existing network of trainers or extension agents? If not, how will the agribusiness source and train people to deliver the program?
- *Design the extension program.* Decide on the approach and strategy based on the results of the needs assessment. There are multiple channels for delivering training to smallholders, including the following:
 - Traditional channels, such as extension agents (government, NGO, or firm), agricultural training centers, and farmer field schools
 - POs, which can be both targets of training and enlisted to provide training to their members
 - Lead farmers and village agents, as discussed earlier
 - Local businesses, particularly small agroretailers, which have a business incentive to offer advisory services that complement their core product offerings
- *Build partner capacity to deliver the program.* Regardless of delivery channel, firms should train those directly responsible for delivering program services. This helps maintain a consistent level of quality in training delivery. It also fosters the development of a cadre of trained extension professionals who can continue to provide training and advisory services on other projects once the firm's program ends.
- *Create market links.* Training for the sake of training is not sufficient. An effective extension program will commercially benefit smallholders who are engaged in the program and committed to improvement. Firms that provide training and other extension services should facilitate market and other service links where possible. These include links to providers of credit and financial service, market information, and other business development services.
- *Monitor and evaluate progress.* Agribusinesses should track progress, measure results and impacts, draw lessons, and use these to inform remaining program activities including future project designs. Chapter 8, "Measuring Results," provides further details on how to measure change and impact in smallholder farming systems.



CHAPTER 7

MANAGING RISK FOR SUSTAINABILITY AND RESILIENCE

Managing risks in smallholder supply chains revolves around environmental and social (E&S) impacts that are relevant across a range of smallholder contexts, including annual crops, tree crops, and livestock rearing. Climate change risks and impacts, deforestation, and environmental impacts on biodiversity, ecosystems, soil quality, water quality, and air quality must all be considered. In addition, social impacts on labor and working conditions, communities, land and water rights, Indigenous rights, cultural heritage, antibiotic resistance, zoonotic diseases, and food safety are critical issues.

Agribusinesses are increasingly making prominent public commitments on their social and environmental positions. These commitments are driven by environmental and climate change concerns from a range of stakeholders, prompting companies to go further to protect shareholder and brand value, address consumer demands, and ensure market access and financing opportunities.

Assessing E&S risks against credible, internationally accepted standards is an important first step for firms that are developing and implementing a smallholder sourcing strategy. The advancement of information and communication technology as well as falling prices has facilitated the emergence of systems for geolocating, tracking, and reporting smallholder progress on sustainability criteria. For successful, long-term implementation of risk management frameworks that leverage such tools, it is critical that firms and smallholders understand the

costs and benefits of different approaches (including, for example, the inadvertent risk of excluding large numbers of smallholders).

Risk mapping is a first step that firms can use to implement an E&S risk management approach to developing a sustainable smallholder sourcing model. Firms that source directly from farmers or from local intermediaries can use internationally accepted and credible standards to identify which components of a supply chain need targeted capacity building and resources. With that knowledge, they can then build a step-wise roadmap. In addition, certification can increase access to markets that demand verification of a firm's good practices. This is particularly true for specialty coffee, fine flavor cocoa, and horticultural products, for which consumers often seek certified products. Increasingly, government regulations may mandate certain practices, such as the European Union's pending ban on the import of 14 commodities unless they are certified as deforestation-free. Certification is often combined with other risk management tools, as well as collaborative partnerships at scale. Supply chain aggregation points, such as producer organizations (POs), can facilitate risk mapping, certification, and required farmer training. Advances in technology also enable firms to track and manage E&S risks in their smallholder supply.

Strategic and Stepwise Approaches

Identifying Environmental and Social Risks

Firms with complex supply chains (for example, sourcing multiple ingredients from thousands of suppliers across multiple geographies) may find it simplest to start with a high-level country and commodity risk analysis based on publicly available information. Meanwhile, firms with geographically concentrated, single-product supply chains may choose to focus on local risk factors, such as proximity to forested areas and waterways, reports in the local media, and government data.

At the initial stage, it may be most efficient to focus on risks in a landscape or economic radius of a processing facility. An initial desk-based risk assessment can be complemented by field visits and discussions with suppliers, smallholders, civil society organizations representatives, government officials, and other stakeholders, depending on budget and time constraints. More complex risk analyses, such as individual supplier scorecards, can be developed as part of an implementation strategy, once the priority suppliers and smallholder groups have been identified and the targets set.

Prioritizing

Firms should prioritize where to focus their time and resources based on the following:

- The highest E&S risks
- The number of suppliers and volumes associated with the highest risks
- The number of suppliers and volumes associated with unknown risks
- The E&S requirements of their buyers

Typically, firms develop a stepwise approach that prioritizes the supply chains with the highest risk and the biggest volumes. Where firms buy directly from smallholders or local intermediaries, they can use the initial risk and priority assessment to select which regions or smallholder groups to focus on and may include both engagement and exclusion strategies. Given that smallholders are less likely to be able to provide evidence of E&S compliance, firms should not unintentionally exclude them from the supply chain.

The next step is to create a baseline understanding of the priority smallholders' current status with respect to performance against a credible standard or framework as well as the organizational status of farmers. Where firms buy from smallholders or local intermediaries, they can undertake this directly. Downstream firms (further away from smallholder production) likely will need to engage with their suppliers to develop this in partnership. Firms should refine their strategy based on the results of the baseline assessment, tackling the biggest compliance challenges, targeting capacity building and resources to address key gaps, and defining the end goal of the program.

Firms should set a policy that defines which risks, smallholder practices, and level of performance are to be targeted. For many sectors, third-party certification systems are a tool that firms can use to both define the scope of E&S issues and confirm compliance; for example, a firm could set an end target of 100 percent certification of POs and cooperatives.

Interim goals may consist of setting up an internal verification system for the supply base, annual targets for the number of farmers engaged in training, or targets for the number of farmers included in the verification program. Firms may stagger the rollout of their smallholder program based on key issues. For example, training and verification may focus

first on easy wins and then proceed to more challenging implementation topics. Benchmarking continuous improvement, targets for closing out noncompliances, or partial certification targets can also be used to report interim progress.

A stepwise approach can be a cost-effective strategy to respond to buyers' demands for good E&S practices, although firms may be required to negotiate with their buyers on the timescale of compliance. When production practices among smallholder farmers are significantly out of compliance with the market requirements, this approach can lay out a realistic roadmap for firms, farmers, and buyers.

Leveraging Existing Structures

Firms will benefit from integrating E&S strategies into their core business activities and existing quality systems: for example, the International Organization for Standardization [ISO] 14001 certification and food safety systems (such as ISO 2200 certification). Traceability systems that are used for food safety and for monitoring farmer productivity, quality, or payments can be extended to include additional E&S verification elements. Another efficient pathway for implementation—one that can save time and money—is to build on existing external programs and groups that smallholders are already involved with. Existing farmer field schools and other farmer development programs operated by government, development agencies, or other nongovernmental organizations may present useful synergies and partnerships. Existing farmer organizations can also be useful. Firms should also look beyond the more traditional farmer-based groups to villages, families and clans, schools, religious groupings, and even sports groups to leverage existing relationships and trust among smallholders.

Demonstrating and Monitoring Smallholder Compliance

Voluntary certification is a commonly used tool for communicating that a product originates from a farm or landholding that is verified to be in compliance with an established standard. A certification system includes a standard and verification by third-party accredited auditors and has a governance system. The development of voluntary standards is normally undertaken with wide consultation from stakeholders and follows the International Social and Environmental Accreditation and Labeling Alliance (ISEAL) Codes of Good Practice for sustainability systems (ISEAL n.d.).

Standards may also be applied outside of certification, when firms use the requirements of the standard to undertake their own farmer and supply chain checks or use third-party data sources to determine eligibility of suppliers. Some firms choose to develop their own in-house standards and verification systems. However, without the benefit of third-party oversight and governance, the credibility of the results is reduced and the information-sharing burden is higher.

Firms should evaluate the availability of standards and certification systems for their products, whether group certification is available (an approach specifically designed for smallholders), and what their buyers are demanding. It is possible to combine several different standards in a single smallholder support and certification program.

The Value of Implementing Climate, Environmental, and Social Risk Management

As with any supply chain investment, firms should weigh the expected benefits of E&S risk management strategies against the costs. In markets where price premiums are paid for verified or certified products, this is a simple calculation of volume times premium. Where premiums are not paid, but E&S risk management is required for market access, the opportunity cost associated with loss of market access can be calculated.

Quantifying the impacts of climate change is more challenging, since by definition, these impacts will result in more variability. Furthermore, there is no direct relationship at the firm level between investment in climate-smart agriculture and mitigating the global effects of climate change; they represent both an individual and a common global responsibility. A number of climate scenarios show widespread crop and livestock losses, and thus decreases in yield, due to extreme weather. Therefore, it is possible for firms to calculate the cost of single-event losses and extrapolate total cost over time or calculate a drop in yield over time. It may be possible to mitigate some of these impacts on a local scale through adoption of new varieties and breeds or water storage systems.

Some markets may introduce a carbon tax, in which case firms can use the Global Greenhouse Gas (GHG) Protocol Corporate Standard to estimate their carbon emissions, and multiply kilograms of carbon dioxide equivalent (kg CO₂ eq) emissions by a carbon price. Another calculation can be done to show the financial value of avoided emissions, when the firm is able to measure and quantify kg CO₂ eq through new climate-smart practices and/or avoided deforestation.⁸

Firms should ensure that their implementation programs include showing smallholders (and groups of smallholders) how to calculate costs and benefits for themselves. Firms should also encourage smallholders to consider additional benefits, such as health, drinking water, and other ecosystem values. Providing training to farmers on the benefits to their health and groundwater protection may help them to recognize the nonfinancial benefits to compliance. Improved E&S practices that generate cost savings at the farm level and/or deliver higher yields or better-quality produce (either directly or as part of a package of improved practices) can offset the costs of compliance with productivity gains rather than through a market premium. Even if the firm is proposing to pay a higher price, the firm should calculate the likely costs of compliance and any additional costs that might be borne by the smallholders through implementation of climate, environmental, and social risk mitigation. It is the firm's responsibility to ensure that the farmer has a net positive outcome.

Checklist

- *Risk assessment:* Firms that source directly from farmers or from local intermediaries can use internationally accepted and credible standards to identify which components of a supply chain need targeted capacity building and resources.
- *Prioritization:* Firms must identify the highest risks along with the biggest volumes and weigh expected benefits against the costs associated with implementing risk management and mitigation activities.
- *Baseline assessment:* Understand the priority smallholders' current performance status measured against a credible standard or framework, as well as the organizational status of farmers.
- *Timebound roadmap:* Set a policy that defines which risks, smallholder practices, and level of performance are targeted. For many sectors, third-party certification systems are tools that can be used to both define the scope of E&S issues and confirm compliance.
- *Smallholder support:* The interventions need to reach the required standard, leveraging existing programs where possible.

- *Smallholder verification:* Firms should evaluate the availability of standards and certification systems for their products, whether group certification is available (an approach specifically designed for smallholders), and what their buyers are demanding.
- *Reporting on interim targets and end targets:* Regular monitoring and reporting of results against targets keeps the intervention on track and enables a firm to assess whether success has been achieved.
- *Reviewing and updating strategy:* Firms should evaluate their approach and revise as needed in order to achieve intended outcomes.



CHAPTER 8

MEASURING RESULTS

Just as firms routinely monitor and measure business performance results, so they must also evaluate their smallholder agriculture supply chain performance. Farm-level impacts are important: farmer well-being is key to supply chain security, and companies can use this to differentiate themselves and/or account to others, too.

Companies may find it hard to measure broad metrics such as development or social impact, but there are tools available. Income and livelihoods can be measured using rapid assessment tools including poverty scorecards that ask a series of easy-to-answer questions related to assets, for example. Rapid tools are also available to measure household food insecurity and diet diversity, which may show changes in the quality of life of smallholders in the supply chain.

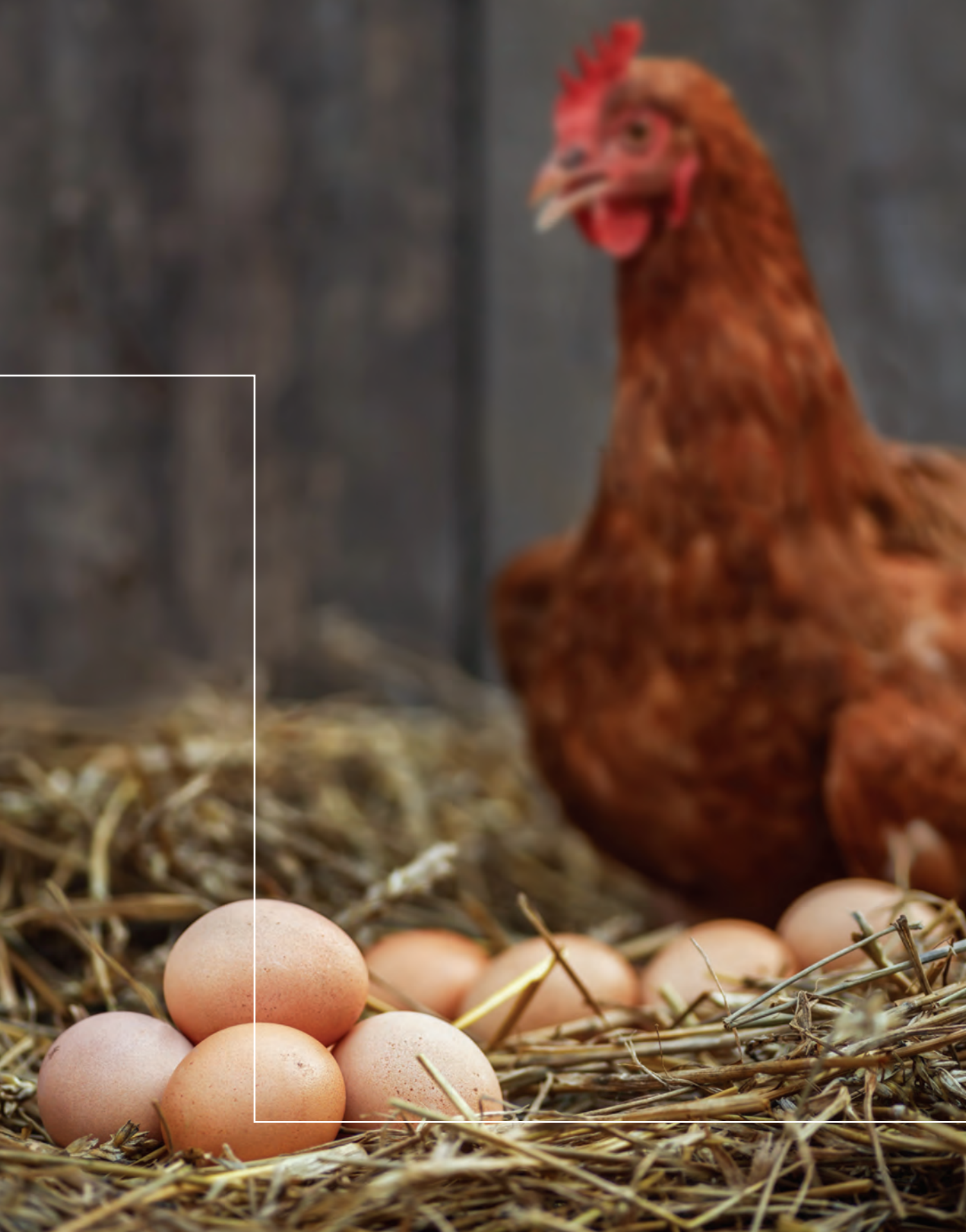
Moreover, new tools are available that simplify and accelerate the collection and analysis of field data, including computer-assisted personal interview systems using smart phones and tablet computers. These digital applications, which are transforming agribusiness engagement with smallholders, can also provide important monitoring information.

Checklist

- *Identify and plan for information needs from the outset, including defining success and its measurement, determining possible obstacles, and deciding which activities need to be monitored.*

- *Use SMART indicators and objectives:* “specific, measurable, achievable, relevant, and time-bound.”
- *Create a logical framework for planning and for measuring results.* It should address the goal and purpose of the project; the activities, outputs, and outcomes needed to help it achieve its goal; and the key assumptions that inform the achievement of the goals through the outputs.
- *Define the right metrics to improve business practices:* lower-level metrics and higher-level questions.
- *Investigate all sources of data* that may be more efficient than conducting an in-depth survey.
- *Monitor management information for firms and other stakeholders.* The agribusiness should have or develop an appropriate system for data collection and analysis.
- *Conduct impact evaluation,* deciding which methodology is the most suitable: quantitative, qualitative, mixed methods, randomized controlled trials, and so forth. The methodology should account for the scope and complexity of the evaluation, how the information will be used, available resources, results needed, and reporting requirements.
- *Consider the impact metrics* that should be measured for smallholder farmer supply chains (for example, farmers reached, productivity, quality, income, and so on).
- *Consider survey tools to measure farmer household income.* These include household surveys, SWIFT rapid assessment tool (Survey of Well-Being via Instant and Frequent Tracking), and poverty scorecards.
- *Also consider survey tools to measure food and nutrition security,* which can be important proxies for smallholder household welfare.
- *Consider qualitative approaches,* including participatory rural appraisal, that are more suitable to uncover causal relationships, process details, and variation among a group. Mixed methods may also be used to gain in-depth insights into the project.
- *Account for the firm’s learning culture,* and whether this exists or needs to be encouraged by management. Develop a plan on how the analysis will inform future operations before committing resources, and reaffirm that plan with the firm’s team.

- *Consider whether to use in-house and/or external teams*, depending on the in-house skill set, scale of field operations, and the need for objectivity.
- *Make preparations* for training enumerators, testing surveys, and addressing special considerations.
- *Be judiciously pragmatic* when choosing data methods.



CHAPTER 9

NUTRITION

Nutrition constitutes one of the most critical elements of human health and well-being. Investment in the nutrition of farmers and their families is a smart business investment that may yield significant return on investment (ROI) from improved farmer productivity, climate resilience, and company brand image. Helping farmers understand the importance of intercropping and cultivating nutrient-dense crops that are already adapted and culturally accepted in that agroclimatic zone can improve dietary diversity while increasing productivity of cash crops through improved soil health.

The Business Case for Nutrition

Improving nutrition is a sound business decision because of its proven links to improved human development and economic productivity. The range of quantifiable benefits may include increased workforce productivity, increased staff presence at work, and increased yields in farming supply chains. On a broader scale, investments in nutrition have a very high economic rate of return. For every US\$1 invested in children's nutrition there is a return of US\$16 generated, accrued mainly through increased productivity from improved health and reduced illness (IFPRI 2014). Breastfeeding is one of the best investments in global health, as

every US\$1 invested in improving suboptimal *breastfeeding* practices generates US\$35 in economic *returns*. In the longer term, improving child nutrition leads to better cognitive development, improved educability, and, in time, increased productivity and earnings in adulthood.

The poor health and reduced productivity associated with malnutrition not only affect the lives of farm families but also have adverse effects on the economies of local communities and countries (Siddiqui et al. 2020). It has been estimated that the economic losses of malnutrition on the global economy are upwards of US\$3.5 trillion, more than the gross domestic product (GDP) of African countries combined (World Vision 2021).

Farm families often face chronic or seasonal food insecurity and malnutrition, which results in poor health and the inability to work at full performance. In addition, farmers with malnourished spouses or children need to take time off to care for their sick family members. By contrast, well-nourished farmers are qualitatively healthier and stronger and tire less easily. As a result, they are more productive especially when the work is physically demanding, as is often the case in smallholder agriculture. These farmers are better partners for the agribusinesses that source from them, and where nutrition improvements have been made accessible by companies, loyalty to the supply chain improves.

Some agribusiness industry trendsetters, including Olam, Unilever, Bayer, and Ferrero, recognize the importance of nutrition for their businesses and not only invest in nutrition of their employees but also ensure that the smallholders in their supply chains have access to good nutrition. Agribusinesses also see the benefits of investing in nutrition along their supply chains, as they fulfill their sustainability commitments and improve brand image and therefore cater to the new generation of consumers who care about the impact associated with the products they choose (Speelman et al. 2020).

Checklist

- Establish *whether* and *why* nutrition is a challenge in the communities where your company is active. Collect relevant reports and survey data on nutrition in the given geographic area. Analyze the data to identify major nutrition challenges. Validate the conclusions with local nutrition experts.

- Understand *who* is already working in nutrition in your areas. Map out entities working on nutrition or related activities in the given areas. These groups may include the ministry of health, ministry of agriculture, civil society organizations, and international development organizations. These entities represent potential partners with which to coordinate or co-fund nutrition support. Reach out to these groups to learn more and ascertain the feasibility of collaborating.
- Think through *what* could be done to address nutritional challenges and narrow down interventions to the most relevant—those that are in line with your business objectives and the existing nutrition challenges and activities in the area.
- Identify *how* to deliver nutrition education and support. Potential entry points and delivery channels may include the following: company's own agri-extension staff; producer organizations, agriretailers, village-based agents, government extension agents, savings groups (for example, a village savings and loan association), and local health facility-led community nutrition activities.
- Track your success to see *which* nutritional interventions were successful and which were not. Several indicators at output, outcome, and impact levels can show how successful nutrition interventions are. Some of them are directly linked to ROIs in nutrition: improvements in farmer health and physical capacity, increased volumes for off-taking, improved dietary diversity, decreased absenteeism from farmer training due to illness, and improved brand image.



CHAPTER 10

YOUTH PARTICIPATION

Generally, as countries develop, agriculture's role as an employer declines, and the average farmer becomes older and more wage oriented (Christiaensen, Rutledge, and Taylor 2020). In parallel, the agrifood system expands, and the scope for agriculture-related job creation shifts beyond the farm to include jobs in the agrifood value chain including production, processing, preservation, and other handling processes, as well as packaging and marketing. This structural transformation shifts more people from agriculture to nonagriculture jobs. Recent studies have found that postfarm opportunities can create positive spillovers by developing economic links, infrastructure, and local market integration.

There is a perception that youth in emerging markets may no longer be interested in agriculture (IFAD 2019) and are fleeing agriculture to seek opportunities in urban centers. However, it has been shown that there is no sudden accelerated exit of youth from the sector (Christiaensen, Rutledge, and Taylor 2020). Studies (Mabiso and Benfica 2019) show that the absolute number of young African farmers is expected to rise in the coming decades. In fact, many youths remain in agriculture and, with the right support, are likely to lead on modernizing the sector, increasing its productivity and the range of products—which is also a key part of the structural transformation process. Young people, on average, are more agile, educated, and adaptive to changing labor market conditions. Others might move into jobs in agribusiness services, which form an

increasingly important part of the agrifood chain (Christiaensen, Rutledge, and Taylor 2020).

Companies can benefit in a number of ways from investing in youth across smallholder supply chains. Empowering young farmers could help support sustainable agriculture supply chains and create win-win opportunities for both young farmers and the private sector. Although few companies have structured initiatives for engaging youth as suppliers, there are many examples of their supporting youth entrepreneurship programs as an alternative pathway to economic independence (MCI 2019). Some companies, such as Cargill and Nestlé, are actively engaging with youth, helping them with access to land, skills, and micro-loans, while revitalizing their own supply chains. Young farmers benefit from easier access to finance, stronger market links, and higher incomes, while the private sector benefits from better quality yields, increased trade volumes, and a stable supply, which is important for agribusiness since farmer suppliers are often older. Because this approach helps youth access economic opportunities, it also contributes to Sustainable Development Goal 8 (UN 2023). Youth are valuable resources in numerous ways, including the following:

- *Youth as a human resource:* For an employer, human capital creates value, growth, and prosperity. Companies recognize the importance of young people's career choices, and they engage with potential job seekers during their education, school-to-work transition, and beyond. Many agribusinesses are addressing youth jobs and skills indirectly through platforms in which they participate. For example, Barry Callebaut, Cargill, and Olam are all partners in Mondelez's Cocoa Life program,⁹ which focuses on five areas of transformation in cocoa farming, including making cocoa farming a more attractive profession for young people, who are a critical source of innovation, creativity, and forward thinking.
- *Youth as consumers:* Youth represent a significant customer segment for the private sector, both as individual consumers and as future purchasing decision-makers for their organizations. Engaging with youth as potential buyers demands deep understanding of their preferences, tastes, and habits, which can be developed by engaging them as suppliers. Such investments in engaging youth as suppliers creates shared value because the company gains commercially or competitively while social value is also created.

- *Social cohesion:* Above all, businesses thrive in peaceful, cohesive, and inclusive societies. When young people feel safe and valued as citizens, and when they have access to education and good economic opportunities, they become builders of the future in their communities. The private sector has a crucial contribution to make toward advancing the well-being of young people and toward stable, prosperous communities.

Checklist

According to the Organisation for Economic Co-operation and Development report *The Future of Rural Youth in Developing Countries: Tapping the Potential of Local Value Chains*, success factors for integrating youth into agricultural value chains include the following (OECD 2018):

- *Rural youth profiling:* Understand the nature and conditions under which the different youth groups are engaged or excluded, and the generational and power dynamics along the value chains, to help identify the bottlenecks to be addressed when designing a youth-sensitive agricultural value chain project.
- *Peer-to-peer learning:* Use peer-to-peer learning as an effective way to provide agricultural extension services; for example, an increasing number of young people with higher education have begun starting agrifood businesses. Peers can act as role models for other young people and play an important role in creating and investing in small industries in rural areas, building networks, and generating employment.
- *Awareness campaigns:* Inform young people in rural areas about the different activities possible along the value chain in order to change their minds about potential jobs in agriculture. Campaigns should include information about market requirements, product standards, knowledge, innovative tools, and new production methods.
- *Physical proximity:* Organize activities close to young people's homes. This is especially relevant for young women who cannot travel far to attend training or take a job.



CHAPTER 11

WOMEN'S PARTICIPATION

Women farmers represent at least 40 percent of the agricultural labor force, but they have less access to land, finance, training, extension service, and inputs than their male counterparts. Women farmers play different roles in different agricultural value chains, yet the tasks they perform are often key to productivity, quality, and income generation. Improving women's access to training, finance, markets, and other resources will directly address these challenges and help improve overall productivity and quality, while at the same time improving financial, social, and economic outcomes for the farmers, their families, and communities.

The Business Case for Increasing Women's Participation in Smallholder Value Chains

Closing the global gender gap in agriculture will lead to an increase in yields by approximately 20–30 percent while raising the total agricultural output by 2.5–4.0 percent. For companies with agricultural supply chains, closing the gender gap can contribute significantly to business outcomes. Sixty-one percent of enterprises in the agricultural, forestry, and fishing sectors reported that gender diverse policies contributed to increased profits and productivity (IDH 2016).

While women play key roles in production and post-harvest handling, these roles are often informal, unacknowledged, and underresourced (IFC 2021). To boost access to affordable agricultural inputs and advisory services, one firm in Liberia examined its client base for local agro-dealers and found a large untapped market of female customers. Their subsequent strategy to move sales outlets from urban centers to weekly markets where more women participate saw an increase in annual sales by 77 percent and doubled the firm's customer base to 17,000 farmers (Garbarino and Beevers 2022). This showcases the importance of intentionally targeting female customers, as well as the ability to analyze sex-disaggregated data and use that information for business strategy and growth. Women control 64 percent of consumer spending (UNDP 2019) and gender equality in supply chains, which means looking at women not only as producers but also as customers/buyers, investors, and leaders in sustainability.

Investing in women as farmers, producers, employees, and customers can therefore generate greater business growth, profitability, and sustainability in agricultural supply chains. As more companies and consumers focus on sustainability and traceability in supply chains, different opportunities for gender inclusion emerge in sourcing, such as the following:

- *Smallholders*: women farmers' and producers' access to leadership and decision-making, technical capacity, and access to quality inputs
- *Larger farms*: working conditions for women laborers, sourcing from and supplying to women-led SME suppliers and distributors

Increasing women's participation in smallholder-based supply chains and improving their technical capacity can help maintain and grow production volumes, improve productivity, and reduce management costs. Increasing women's participation can also help improve product quality and enhance the company's credentials to target premium markets (Chan 2010).

Checklist

The following should be undertaken when developing initiatives to facilitate inclusion and women's participation, to bring agribusiness operations to a higher level of performance:

- Develop gender-smart targeted solutions to help identify innovative opportunities and address gender imbalances to facilitate women's access to advisory services, finance, education, training (particularly financial skills), and capacity development to increase their productivity, access to markets, and income.
- Cover the logistical costs and create other enabling factors to support women in their efforts to attend training and coaching. The training venues and facilities should be comfortable for women with children.
- Provide access to childcare, safe transportation, safe warehouses, packaging facilities, and market sites, as well as resources and training to combat gender-based violence and facilitate women's access to training and economic opportunity.
- Enable women to access information and communication technology and achieve connectivity using cell phones to help them to receive timely information regarding price and product availability. Also enable them to access digital financial services solutions and enhance their ability to make timely decisions on market opportunities.
- Include sex-disaggregated indicators and gender-inclusive indices to measure women's economic empowerment (Women's Empowerment Agriculture Index and so forth). Tracking and evaluating metrics will facilitate the design of interventions that are most beneficial in the implementation of projects and programs, thus enhancing women's leadership and participation in economic opportunities.

These are several interventions that, if adopted in a timely manner, can contribute to enhancing business performance through women's integral participation. When presented with entry points and an enabling business environment, women smallholder farmers will engage in positive trends, improving their livelihoods while furthering the integration of women smallholders and suppliers in the sector.



CHAPTER 12

PARTNERSHIP STRATEGIES

Multistakeholder partnerships (MSPs), comprising various combinations of public- and private-sector entities, are an increasingly common approach to addressing shared, complex, system-level issues that are beyond the scope or control of any single group. Sustainability is now the main driving force behind MSPs in agriculture (often catalyzed by regulation), although unlocking market access, managing changing consumer preferences, and risk management are also significant drivers.

Governance, financing, and accountability remain key challenges affecting the effectiveness of MSPs. Good practices in MSPs include undertaking meaningful and sustained stakeholder engagement, setting clear and realistic goals, ensuring that interests and incentives are aligned among the stakeholders, establishing effective governing and financing structures, and monitoring progress in a transparent way that allows stakeholders to be accountable for their contributions.

According to the Global Development Incubator, the number of MSPs more than quadrupled from 2000 to 2015, with agriculture-sector examples focused primarily on (1) smallholder capacity development, market access, income diversification, and commercialization; (2) climate and biodiversity issues, especially around land pressures and deforestation risks; and (3) labor standards and supply chain equity and inclusion (GDI n.d.).

Multistakeholder collaborations in agriculture are distinguished by the breadth and depth of the shared system-level issues they seek to

tackle, the wide range of stakeholders resolved to act in concert, and the use of structured formats and governance mechanisms to achieve enduring change in market systems (Winter, Bijker, and Carson 2017). Stakeholder groups brought together under MSPs typically include some combination of the following: private-sector entities (agribusinesses, financial services providers, and retailers); farmers and producer organizations (POs); civil society organizations (nongovernmental organizations, academia, and consumer groups); and governments, donors, and multilateral organizations. MSPs can be grouped into the following main categories:

- Private-private commercial partnerships where there is a complementary fit to achieve a common commercial goal
- Private precompetitive partnerships such as the Sustainable Agriculture Initiative (SAI)
- World Bank-sponsored “productive alliances”
- Landscape partnerships
- Public-private partnerships
- Food security partnerships using blended finance

A good example of public-private partnerships focused on smallholders is the Global Agriculture and Food Security Program (GAFSP), which was created in response to the food price crises of 2007–8. GAFSP supports both public and private initiatives and is a leading global financing instrument dedicated to fighting hunger, malnutrition, and poverty in low-income countries. GAFSP supports resilient and sustainable agriculture systems by channeling additional financing through existing multilateral agencies. GAFSP has a Private Sector Window (PrSW) supported by the governments of Australia, Canada, Japan, the Netherlands, the United Kingdom, and the United States. It offers blended finance solutions with the International Finance Corporation’s (IFC’s) investments and expertise to support projects in the agriculture sector that may not attract commercial funding. It supports agribusiness and agrifinance projects across the entire food supply chain, including farm inputs, logistics, storage, processing, and retailing. Together, the GAFSP PrSW and IFC invest either directly in agribusiness companies or indirectly through financial intermediaries such as banks or microfinance institutions. GAFSP PrSW’s concessional terms are combined with commercial terms from IFC in a blended finance solution that covers short- and longer-term loans, guarantees, first- or second-loss cover,

and equity capital. In addition, GAFSP PrSW offers funding support to IFC Advisory Services projects that complement the investment projects. To date, GAFSP has approved US\$446 million in 84 agribusiness investment projects in 29 countries and US\$47 million in 95 advisory projects in 33 countries, all aimed at improving the lives of more than 1 million smallholder farmers.

Effective Strategies and Best Practices for Building Strong Partnerships

While MSPs can soak up significant management bandwidth and budget, they offer potential solutions to a growing number of challenges. These challenges might otherwise prove intractable in a global agrifood economy where market access and product differentiation increasingly rests, not only on price or quality competitiveness, but also on a company's sustainability credentials and supply chain traceability and equity.

Across all categories of MSP, success requires significant time and resources. Therefore, adequate planning, dedication, and alignment of all actors are vital, and companies need to take time to reflect before venturing into them. Most companies do not have a formal overarching strategy for choosing, creating, or exiting collaborations. Companies could therefore benefit from developing a high-level collaboration strategy, built around consideration of the following fundamental areas (Volkman, Petroy, and Lee 2020):

- *Vision*: Set out a high-level ambition for the company's collaborations.
- *Breadth versus depth*: Outline whether the company will focus on a few initiatives or spread itself out across many.
- *Business strategy alignment*: Lay out how the collaboration strategy supports the overall business goals and drives business value.
- *Sustainability strategy alignment*: Ensure focus on material issues and support of company goals.

After identifying the right partners, it is critical to develop a shared partnership agenda, including goals and priority areas. This planning is aimed at ensuring a proper alignment of interests, which is what most unsuccessful partnerships lack. At this stage, it is good for the key actors to identify potential areas of concern and seek to address them from the outset. Building trust and alleviating tensions are vital.

When drafting the roadmap and actionable plans, it is necessary to clearly define the roles and responsibilities of each partner and agree on accountability. A framework should be established for regular meetings and reporting to track progress toward achievement of goals, including easy-to-use digital interfaces and data storage or data analytics. It is also beneficial for the partners to discuss and agree how costs and risks will be shared and mitigated.

Governing Structures

Strong management and collaboration are a prerequisite to driving progress toward the shared goals among different stakeholders. Appropriate structures should be put in place to help formalize the partnership's mandate for action and build ownership and commitment to the agenda. The partners should draft a governance agreement and establish management bodies such as steering committees, a secretariat, and/or project teams.

Implementation

As the partnership transitions from visioning, it should focus on how to implement the agreed upon action plans. Implementation usually involves engagement of other parties outside the partnership agreement such as POs, consumers, government, civil society organizations, and private contractors. Activities involving such a diverse range of parties will inevitably yield a wide range of results. The partnership should therefore build in flexibility to “fail fast,” adapting each area of activity rapidly on the basis of fast feedback loops and lesson learning.

Checklist

Internal

- Ensure that there is a clear imperative for a partnership approach to this challenge. Consider existing partnership activities, capacities, and resources that can be leveraged; cost or risk sharing; and whether the goals are measurable and realistic.

- Align the partnership with the company's mandate, objectives, geographic focus, and competitive advantages so that it can help to deliver strategic priorities.
- Set up the partnership so that it adds value by addressing key challenges or constraints in the company's supply chain, as well as providing any additional benefits.
- Establish a formal mechanism to work with the partnership organizations, linking the collaboration with the company's business model and ensuring that partners have the capacity to fulfil their commitments.
- Consider risks and develop appropriate mitigation mechanisms.
- Understand the resources required and check that the costs are acceptable to the company. Secure a funding source and allocate staff time, ensuring that there is sufficient internal capacity and commitment to participate.

External

- Articulate a clearly defined vision that informs the partnership strategy and a set of activities showing how each partner contributes to solving the challenge at hand.
- Develop a governance structure that is balanced, legitimate, and credible. Each partner should be equally recognized in decision-making.
- Put in place a mechanism to ensure partner accountability along with a penalty for nonparticipation.
- Collect and share data regularly to measure progress.
- Identify a strong "backbone" institution to support the partnership.
- Leverage regular communication channels to share news and connect with partners and a wider stakeholder group.



CHAPTER 13

MULTISTAKEHOLDER ROUNDTABLES AND VOLUNTARY STANDARDS

Roundtables are initiatives that bring together different types of stakeholders around a voluntary sustainability standards system (as opposed to a binding set of regulations), usually focused on a specific crop, commodity, or product. These standards systems have historically also been called *voluntary sustainability standards* or *sustainability certification schemes*. Standards developed through roundtables have an emphasis on stakeholder participation, balanced representation, and open membership. Key roundtables for smallholder farmers include those in the palm oil, soy, rice, beef, sugarcane, and cotton sectors.¹⁰

Ensuring buy-in from a wide range of stakeholders leads to greater uptake and creates opportunities for efficiencies. Smallholders and producers can benefit from only needing to meet one set of requirements, as well as accessing shared resources such as training materials. Firms can benefit through fungibility between buyer demand and may also benefit from data efficiency (particularly where information technology systems for sharing data exist in the chain).

When determining whether to engage in a roundtable and implement its standards system, firms should consider the following:

- *Scope of standard*: Does it address the key sustainability issues in their sector?

- *Market demands:* Are there buyers or financiers asking for compliance and/or evidence that key sustainability issues have been addressed in the firm's operations? Are there national or regional regulations that the standard can be used to meet? Does it deliver the level of assurance the buyers, financiers, or regulators are asking for?
- *Firm's policy, values, and commitments:* Does the standards system align with what the firm has said it plans to do? Can it provide a useful framework for analyzing the firm's operations?
- *The extent to which the firm could benefit from active engagement:* Who are the stakeholders and what structures and processes are there in place to connect with them? What opportunities are there to shape the strategy and direction of the roundtable?
- *The credibility of the roundtable:* Is there reputational value or risk in being a member of the roundtable? Firms can consider the following, for example:
 - Balance of membership (stakeholder categories)
 - Number of members
 - Governance and transparency¹¹

Checklist

- Identify whether there is a roundtable and/or sustainability standards system for the agricultural and horticultural crops or livestock relevant to the firm's operations and supply chain. International Trade Center's (ITC's) Standards Map is a good starting point.
- Analyze the sustainability requirements of existing and potential buyers and financiers.
- Create a short list of potentially relevant roundtables and sustainability standards systems and review for compliance with the International Social and Environmental Accreditation and Labeling Alliance (ISEAL) codes of good practice.
- Review the list in terms of balance of membership (stakeholder categories), number of members, and governance and transparency. ITC's Standards Map and the websites of each roundtable are valuable resources.

- Read the statutes of the roundtable, the sustainability standard, and the assurance system documents.
- Understand the current context of the roundtables under consideration—this may include internet research, discussions with peers, and direct discussion with the roundtable secretariat.
- Determine which roundtables are relevant and credible for the firm's operations.
- Create an action plan for implementation, taking into consideration how smallholders in the firm's supply chain can be supported to meet the requirements of the sustainability standard.
- Create an initial direct cost estimate, including cost of membership, estimate cost per audit (multiplied by the number of potential audits), and cost of buying credits where applicable (in lieu of purchasing).
- Create an initial indirect cost estimate, including the costs of setting up systems, training, and other financial or labor implications of implementing good social and environmental practices.
- Engage in the collaboration and opportunities for exchange that the roundtables provide.



CHAPTER 14

FUTURE OUTLOOK

Smallholders operate in a dynamic environment. Some of the key trends that will shape smallholder supply chains over the coming decade are described in the following sections (see table O.4). This selection is not exhaustive. The trends selected are the ones with direct and increasing relevance for operational managers responsible for integrating smallholders into value chains—as suppliers, clients, or customers—during an era in which the climate crisis takes center stage.

TABLE O.4 Emerging Trends Shaping Opportunities and Threats in Smallholder Supply Chains

1	Smallholder participation in carbon projects increases as carbon markets mature.
2	Regenerative and low-input agriculture move toward the mainstream.
3	Global shocks highlight the need for flexibility and redundancy in agrifood supply chains.
4	Urbanization and value chain integration trigger expansion in city-based, peri-urban farming.
5	Increasing overall adoption of agricultural technology (agtech) masks divergence among emerging markets.
6	Traceability emerges as a key requirement of firm-level competitiveness in agriculture.
7	Evolving preferences and technologies drive evolution in protein markets.

Source: World Bank.

Key Trend #1: Smallholder Participation in Carbon Projects Increases as Carbon Markets Mature

The upswing in carbon credit demand and pricing prompted by the gradual emergence of a viable global carbon market will create substantial opportunities for smallholders and their supply chain partners in the medium term. In order for farmers to benefit from carbon markets, the challenges in accurately recording and monetizing carbon sequestered by smallholders must be overcome—these challenges may be due to measurement, reporting, and verification costs, as well as the complexities involved when multiple crops are produced on the same land parcel. Security of land tenure presents a further challenge, as it can be difficult to prove long-term ownership of small land parcels in rural areas, a requirement of many greenhouse gas (GHG) removal and sequestration projects, whereby emissions reductions credited under the project must be not only real and additional but also demonstrably permanent.¹²

Yet such challenges are surmountable. As more centralized global carbon markets gather momentum, parallel efforts will be required to develop effective guidance for implementation that addresses the current barriers to investment into GHG-efficient small-scale farming practices and farmer-led carbon projects. Governments, multilaterals, nonprofits, research institutions, and companies all have important roles to play in developing the following:

- User-friendly and open-source models to accurately estimate project baselines and the anticipated quantity of carbon sequestration using affordable techniques for assessing soil characteristics and farming practices
- Enabling mechanisms for farmers to leverage land title, or property rights, to access carbon markets),¹³ including real-time satellite monitoring-based techniques that circumvent the need to overhaul legacy land-titling systems.

Multistakeholder advocacy will be required to tailor generic, first-generation global carbon market standards to smallholder farming in developing countries, which presents an opportunity for global agribusinesses to pilot innovative models that channel funding from carbon offsets into smallholder-led projects. Practical examples of agribusiness-led and smallholder-focused activities designed to remove carbon or mitigate climate impacts include the following:

- Training on improved agricultural practices to safeguard productivity amid weather uncertainty
- Introduction of new products and varieties to diversify what small-scale farmers produce in order to reduce the concentration of climate-related risks
- Investment into modernized storage and locally based processing to limit post-harvest losses
- Access to improved inputs tailored to boost climate resilience
- Provision of real-time market and weather information to manage volatility
- Technical assistance to switch to lower emission cropping practices (for example, upland rice production as a lower methane alternative)
- Brokering of carbon project development platforms that bring together three stakeholder groups: global investors specializing in carbon projects, agribusinesses, and farming communities

Key Trend #2: Regenerative and Low-Input Agriculture Move toward the Mainstream

Regenerative agriculture is the application of diverse technologies and context-specific farming practices to an agricultural production system with the goal of improving yield and income resiliency while cutting emissions, reducing reliance on chemical inputs, making more efficient use of rainfall, improving soil health and biodiversity, and enabling soil-based carbon capture or sequestration. At its heart, regenerative agriculture is a way of producing food that leaves the soil richer and eliminates reliance on costly synthetic inputs.

Most regenerative farming business models remain nascent, primarily due to concerns about high up-front costs and slow returns on investment, which impose limits on adoption and replicability. Entrepreneurship and innovation is required to develop a menu of context-appropriate and commercially attractive regenerative farming models from which smallholder farmers (SHFs) can choose (de Wit, Whitehead, and Withers 2022). At present, although the long-term benefits are recognized, the speed of adoption of regenerative agriculture is “too slow to make a significant difference to climate change and biodiversity loss in the near future. Regenerative agriculture is currently

practiced on approximately 15 percent of cropland and is being adopted at a rate of 0.6 percent hectares per year” (Kassam, Friedrich, and Derpsch 2019).

Technology has a role to play (from tracking carbon to measuring nutrients), but financing will be critical. Flexible financing mechanisms will be required to underpin regenerative agriculture models that are suitable for small-scale farmers. Smallholders may lack creditworthiness with commercial banks, and for those with low savings operating on thin margins, interventions must mitigate two risk factors: (1) there may be a multiyear time lag before investments into regenerative practices are recouped, especially for cash crops, and (2) transitioning to regenerative models may involve a multiseason period of reduced productivity before gains are obtained, which may temporarily affect household and economy-wide food security. In both cases, innovative mechanisms are needed to smooth the yield-based and financial returns that smallholders can expect from investments into regenerative practices.

Above all, a multistakeholder approach is required to drive accelerated uptake of regenerative farming practices, as individual organizations will struggle to recast incentive structures and close knowledge gaps alone. Rather, food-producing companies, farmers, governments, financial institutions, and nongovernmental organizations need to align on specific metrics and actions that drive (and reward) adoption of regenerative farming techniques at scale.

Key Trend #3: Global Shocks Highlight the Need for Flexibility and Redundancy in Agrifood Supply Chains

Recently, in the face of a complex range of global challenges, such as Russia’s invasion of Ukraine and COVID-19, there is increasing demand for greater supply chain resilience and redundancy (defined as the creation of sufficient alternative sources and routes to ensure product flow despite bottlenecks in one or more segments of a company’s main supply chain). Redundancy may entail marginally higher costs under normal conditions, but it can prove a worthwhile investment when external shocks occur, enabling lengthy disruptions to the supply chain to be avoided.

This is especially true of the “inherently risky business” (*Financial Times* 2014) of agriculture. Complex agrifood supply chains may face sector-specific vulnerabilities in terms of the limited shelf-life of food

products, complex regulatory environments governing food safety, outsized roles for public and nongovernmental institutions in agricultural supply chain infrastructure, and the inherent seasonality and quality inconsistency of organic produce (Stone and Rahimifard 2018). While the monetary effects of some production-level risks can be mitigated through crop insurance, hedging strategies, or futures exchanges that guarantee forward prices, there are no ready-made risk mitigation options for the manifold inflationary cost pressures and supply continuity risks that can affect cross-border agrifood supply chains in the event of global shocks. Instead, there is growing recognition that integrated agribusinesses must address the growing threat of external shocks through preemptive and ongoing investment into shorter, more diverse, and higher-agility supply chain arrangements.

In addition to unforeseen shocks, the requirement for greater redundancy in agrifood supply chains is also driven by a set of entirely foreseeable longer-term trends, including:

- Intensification of trade barriers
- Increasing complexity of supply networks
- Growing frequency of weather and climate shocks
- Emerging market and developing country dietary transitions, shifting consumption habits, and population growth
- The long-term trend toward more stringent environmental, social, and governance (ESG) requirements

Managing Volatility in Agrifood Supply Chains: Proactive versus Reactive Mitigation

A first option for cost-effectively enhancing resilience is to proactively shift from a geography-agnostic supply chain model to a model that explicitly prioritizes regional or local hubs of production and consumption. This cost-benefit analysis must be a continuous process, as the factors determining local versus nonlocal production competitiveness are dynamic.

Shortening of supply chains has the additional advantage of boosting market access and competitiveness within emerging market regions that have existing—or planned—regional trade agreements that privilege within-bloc production and trade. For example, the African Continental Free Trade Area, signed by 54 countries in 2021, created the world's largest trading block by membership.

Second, supply chain managers should work closely with all key functions such as ESG, marketing, legal, risk, investor relations, and finance when designing more adaptive supply chains. Successfully changing a company's sourcing and production model is likely to require (1) a long-term capital strategy and shareholder relations approach that emphasizes long-term sustainable returns, (2) a cross-functional culture that values resilience, and (3) a decision-making lens that incorporates social and sustainability goals.

Third, supply diversity should be prioritized within the bounds of minimum necessary cost, volume, safety, and quality criteria. Diversification of production sources, logistics routes, and end markets creates "multiple pathways for absorbing shocks," (FAO 2021), whereas highly centralized food chains are fragile "because if they go 'wrong,' they fail" (*Financial Times* 2020). Especially in developing countries, this proactive widening of the supply base is likely to require that agribusinesses commit to hands-on technical support and off-take guarantees to help develop a broader range of small and medium-sized producers and associated cooperatives with the capacity to meet minimum supply standards (*Financial Times* 2020).

Finally, supply chain managers are advised to maintain a rolling review of emerging agtech applications to assess their efficacy in terms of supply chain strengthening. Digitization of supply chain risk management systems and processes can allow for (1) precise analytics and simulations, using real-time and predictive data, to inform and prioritize risk mitigation interventions; (2) early warning notifications and quick decisions on operational problems (Bain & Co. 2022); and (3) the ability to build an evidence-based business case internally for supply chain adaptation, identifying and costing key risks and single points of failure across the supply chain to justify investments into improved redundancy and resilience (Bain & Co. 2022).

Key Trend #4: Urbanization and Value Chain Integration Trigger Expansion in City-Based, Peri-Urban Farming

Although most commentaries on smallholder farming focus on rural settings, small-scale urban agriculture is set to expand in scale and importance in the coming years. While city-based and near-city farming will never replace the traditional food system, "it may well replace part of our food system . . . and benefit the environment in the process" (Jacobs 2018).

Out-migration from rural areas to urban centers is a global trend: The relative number of rural smallholders is falling, while the proportion of SHFs engaged in urban or peri-urban farming is rising. In parallel, we see a growing stock of domestic investment in emerging markets and developing countries flowing into short-chain food markets and multifunctional urban agriculture, driven by opportunities created by new connectivity infrastructure and market links, agtech innovation, a desire to strengthen local food system resilience in the face of global supply and climate shocks, and the presence of “megacities” that provide a strong base for food consumption.

Roughly 800 million people are now involved in urban agriculture worldwide, the majority part time. Approximately 150 million work full time on urban plots—primarily in Africa and Asia. These urban farmers, virtually all small scale, contribute 5 to 20 percent of global food needs and represent the fastest growing category of smallholder farming (Teng 2020). Significantly, as the world’s farming population grows older and an increasing proportion of young people chose city life, the rise of urban farming provides an important part of the solution to the problem of who will fill the supply gap. The rise of urban and peri-urban farms provides an entry point into agriculture for young people previously deterred by the stigma sometimes associated with farming in rural areas.

The idea of growing food close to where it is needed is not new, but policy makers and consumers will need to embrace unconventional approaches to food production, and even food types, if urban farming is to realize the self-sufficiency gains on offer. There is a critical need for city planning and infrastructure investment that is sensitive to land-constrained urban agriculture requirements, alongside an enabling policy environment for innovation in these areas. Indeed, the greatest existing barriers to investment in small-scale urban farms across Africa and Asia remain the perennial threat of displacement by construction, uncertainty about zoning and land ownership, and the lack of nodal cool storage and logistics infrastructure suited to urban farming needs (Nandwani and Akaeze 2020).

Key Trend #5: Increasing Overall Adoption of Agtech Masks Divergence between Emerging Markets

The scope and reach of agtech products will evolve primarily in response to advances in backbone connectivity infrastructure. In many

emerging markets, the traditional binding constraints to mobile communication, mobile money, and mobile data will ease significantly in the coming five to ten years, providing a strong tailwind for agtech:

- Most farmers will have access to a mobile phone by 2030 as we edge toward universal phone access.
- Substantial increases in smartphone access are forecast as device costs fall and novel payment solutions help overcome up-front costs (GSMA 2017).
- The cost of mobile data will fall in many countries.
- Awareness of and familiarity with agtech solutions will improve among farmers.
- The role of data analytics will become more important as we shift from an agtech ecosystem primarily reliant on *static* observational data to one producing real-time and even *predictive* data.
- There will be a steady rise in the availability of low-cost automation and artificial intelligence (AI)-driven solutions.
- A step-change will occur in the short to medium term regarding the organizational maturity of key agtech players. Joining the field in the wake of pathfinding start-ups, more established entities are set to enter the space—including global technology leaders, e-commerce giants, and “big-agri” incumbents.

Divergence in Agtech Market Development: Stalled Progress versus Step-Change Advances

At a country level, divergence will be the key trend in agtech through the 2020s. Agtech ecosystems in countries experiencing breakthrough advances in connectivity and energy infrastructure will race ahead as sudden increases in the availability and affordability of agriculture data open up vast opportunities—especially in remote sensing, data collection and analytics, diagnostics, and the internet of things. In contrast to these high potential markets, many countries risk stagnation in agtech market development, as poor or nonimproving backbone infrastructure places a handbrake on innovation and uptake. For this reason, jurisdiction and location will become a decisive determinant of agtech business model viability in the coming decade. The most successful agtech models will adapt to an environment in which digital infrastructure progresses at widely different rates, both between and within countries.

Key Trend #6: Traceability Emerges as a Key Requirement of Firm-Level Competitiveness in Agriculture

Across all agricultural value chains, the shift toward full-spectrum traceability is building. In a prevailing business culture dating to the 1990s that prized supply chain efficiency above all, companies have in the past often deprioritized traceability in the pursuit of simplification. Today, however, these priorities are changing on three levels. First, to compete effectively, agribusinesses must ensure that their supply chains are not just efficient but also *resilient*, *agile*, and *equitable*. Second, new technologies and partnerships are reducing the complexity and cost involved in developing best-in-class traceability. Third, global food and agriculture companies are increasingly required to holistically assess and disclose their business operations across all jurisdictions in order to report on their climate impacts to regulators, shareholders, and other stakeholders.

The benefits of eliminating information asymmetry within the supply chain increasingly outweigh the costs. Full product traceability provides control and transparency of information within the supply chain, builds trust and confidence with distribution partners and consumers, and is also an increasingly necessary capability for agrifood companies to obtain the certifications required for access to the best end markets. Taking these factors together, it is clear that end-to-end traceability is becoming a cornerstone of competitiveness. And with more rigorous certification regimes coming onstream, agrifood companies that have end-to-end traceability also have greater agency: they possess the data and the credentials to help shape standards and market parameters in their sector.

Key Trend #7: Evolving Preferences and Technologies Drive Evolution in Protein Markets

As populations and incomes grow across emerging markets, demand for animal-source foods will grow. In order for global agriculture to sustainably increase affordable protein supply by approximately 30 percent to feed a future global population of 10 billion (GFI 2021), three concurrent shifts must take place: (1) increased market share for the most price-competitive and scalable alternative proteins (“alt-proteins”), though this will largely be contained to industrialized countries; (2) rebalancing of human diets to manage protein demand;¹⁴ and (3) a transition from

overly intensive livestock rearing toward agroecological modes of animal protein production. Therefore, we can expect to see a multidecade shift toward a mixed protein marketplace in which some farmed meat products become a premium product, and some low-cost plant-based substitutes gain meaningful share of the market in certain countries and cultures, but without anything close to a full transition away from animal proteins. Under this scenario, the following would occur:

- Many global consumers will adopt a more mixed protein intake (according to one source, more than 90 percent of alternative-meat customers also buy animal meat) (Djanian and Ferreira 2020).
- Although production of meat and dairy will continue to grow, companies operating in livestock value chains in both developed and developing economies will need to demonstrate increasingly robust sustainability credentials to retain market access and market share.
- Traditional nonanimal sources of protein such as pulses (beans, peas, and lentils that are high in protein, carbohydrates, vitamins, and minerals) will achieve mass market prominence and end-product diversification and value addition, with growth likely to prove fastest in the largest and most populous markets in the Asia-Pacific region, where some processed protein-rich plant-based foods (for example, tofu and tempeh) are already well-established.¹⁵

Conclusion

What stands out from the summary of trends is the *accelerating pace of change* affecting the factors shaping the operating context for agribusiness supply chains—changes in technology, demographics, consumption, regulation, resource use, and climate. Above all, one long-term structural trend is clearly observable: the incremental smallholder transition in which farmers everywhere are either shifting toward more commercialized and tech-enabled farming, or exiting farming for other roles in the supply chain or other sectors in the economy. This incremental transition, occurring at different speeds between and within each country, may tempt industry participants to view the trajectory for agricultural market development as predictable and certain. But that would be a mistake.

Any notion of a linear transition is belied not just by the increasing frequency of market shocks (from COVID-19 to Russia's invasion of Ukraine), or by the increasing number of disruptive business models and technologies coming to market, but also by the *certainty* that the climate crisis will worsen before it stabilizes. For smallholders, climate conditions will increase in volatility in the coming decades, upending growing conditions not just for crops but also for pests, weeds, and diseases, with knock-on effects for yields. Hence, while the endpoint for the gradual smallholder transition is clear, we anticipate that the journey is likely to be marked by greater market volatility and operating model disruption than agribusinesses have faced in the past. This, in turn, underscores an unprecedented need for built-in agility, strong local market intelligence, and continuous adaptation in supply chain models—in short, a focus on flexibility and context-specific design in place of the overwhelming focus on efficiency that largely defined supply chain management in previous decades.

NOTES

1. FAOSTAT (database), Food and Agriculture Organization of the United Nations, Rome. <https://www.fao.org/faostat/en/#home>.
2. World Atlas of Desertification (database), European Commission Joint Research Center, Brussels, <https://wad.jrc.ec.europa.eu/yieldsgaps>.
3. Where mobile data are ubiquitous and relatively affordable—and where smartphone ownership is common and 3G, 4G, or even 5G networks are present—agtech solutions that depend on connected field sensors, advisory services delivered via video, or apps for field diagnostics of pests, diseases, and soils all become viable. By contrast, where connectivity infrastructure is weak or expensive, agtech models must revert to unstructured supplementary service data (USSD), short message service (SMS), and interactive voice response (IVR) channels for text delivery, reducing their usefulness.
4. Several of these principles are aligned with recommendations provided in the excellent AgDevCo presentation, “Navigating the Agri-Tech Landscape” (Capelli, Valverde, and Roberts 2021) as well as in Valverde (2020). A further pathfinding report by GSMA (2022) informed the development of these principles.
5. Other prominent risks to AVCF include production, agroclimatic, and price risks. Production risks relate to the capacity of the producer to produce the required volume of crop to fulfill the AVCF delivery obligation and is typically mitigated through provision of extension services to prefinanced farmers. Agroclimatic risks refer to adverse weather and climatic patterns that may undermine production of the required volume of crop to fulfil the AVCF delivery obligation and is typically mitigated through insurance-based solutions. Price risks relate to the market value of the crop at the time of harvest so that the outputs delivered by the SHF have sufficient value to effect repayment on the prefinancing. According to context, it may be mitigated either through the off-taker stipulating a minimum price under an off-take agreement or through a hedging instrument, typically a financial derivative such as a futures or options contract.

6. The Agribusiness Market Ecosystem Alliance (AMEA) is one such global framework. See <https://amea-global.com/>.
7. PESTLE analysis is a favored strategy tool to assess the political, economic, social, technological, legal, and environmental components of an organization's operating environment.
8. Biodiversity losses are also difficult to quantify financially at the individual firm level. Loss of species and collapse of ecosystems can have significant impacts on agriculture systems (for example, the local disappearance of bees and other insects as pollinators, or pest outbreaks when natural predators are gone). Firms can evaluate the natural processes their smallholder production relies on and therefore estimate the potential financial cost of compromised processes.
9. For more on the Cocoa Life program, see Mondelez International's website, <https://www.cocoalife.org/>.
10. Fair trade and organic labels share some similarities with standards systems but with some important differences. For this reason, these labels are often used alongside other certification systems.
11. A key resource to help firms better understand what roundtables and standards systems offer is the online web tool Standards Map, which provides free, comprehensive, verified, and transparent information on over 300 standards for environmental protection, worker and labor rights, economic development, quality and food safety, as well as business ethics. In terms of the standards systems, the International Social and Environmental Accreditation and Labeling (ISEAL) provides information on which systems meet their codes of good practice for standards systems ("code compliant") and which are still in progress toward compliance ("community members"). More about the International Trade Center (ITC) Standards Map database and tool can be found at its website, <https://www.standardsmap.org/en/home>. ISEAL provides an enormous amount of resources on its website, www.isealalliance.org/.
12. For an excellent overview of the challenges involved in carbon project structuring, see de Wit, Whitehead, and Withers (2022), *Creating Carbon Offset Units on the Voluntary Market*.
13. Permanence requirements refer to the need for the increased carbon stock or avoided loss to be maintained for long periods, often for more than 50 years, to be used as an offset (de Wit, Whitehead, and Withers 2022).
14. The importance of dietary balance is illustrated by the difference between the increase on existing protein production required to feed 10 billion consumers at the World Health Organization (WHO)-targeted daily protein intake of 60 grams per person (only a 2 percent increase required), and the increase required if 10 billion people consume at the current developed world average rate (79 percent increase needed). All figures are estimates (IFC internal presentation, 2022). See also Sweet (2019).
15. A challenge for this category of plant-based foods is that they can be less nutrient-dense than livestock-derived foods and "may need to be supplemented through a diverse diet to ensure the full complement of nutrients is provided" (WEF 2019).

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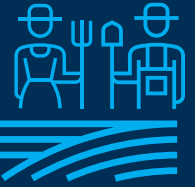
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Smallholder farmers are the stewards of more than 80 percent of the world's farms. These small family businesses produce about one-third of the world's food. In Africa and Asia, smallholders dominate the production of food crops, as well as export commodities such as cocoa, coffee, and cotton. However, smallholders and farm workers remain among the poorest segments of the population, and they are on the frontline of climate change. Smallholder farmers face constraints in accessing inputs, finance, knowledge, technology, labor, and markets.

Raising farm-level productivity in a sustainable way is a key development priority. Agribusinesses are increasingly working with smallholder farmers in low- and middle-income countries to secure agricultural commodities. More productive smallholders boost rural incomes and economic growth, as well as reduce poverty. Smallholders also represent a growing underserved market for farm inputs, information, and financial services.

Working with Smallholders: A Handbook for Firms Building Sustainable Supply Chains (third edition) shows agribusinesses how to engage more effectively with smallholders and to develop sustainable, resilient, and productive supply chains. The book compiles practical solutions and cutting-edge ideas to overcome the challenges facing smallholders. This third edition is substantially revised from the second edition and incorporates new material on the potential for digital technologies and sustainable farming.

The handbook is written principally to outline opportunities for the private sector. The content may also be useful to the staffs of governmental or nongovernmental development programs working with smallholders, as well as to academic and research institutions.



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