Revised Final Report

GAIN and HarvestPlus Commercialization of Agricultural Public Goods Review

Submitted by:

The Development Practice

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Executive Summary:

Commercialization of Publicly Developed Goods Review

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Commercialization framework:

- *No single model of success can be pre-determined for a commercialization initiative. Barriers and enablers to profitability are unique to countries, products, sectors, and individual businesses.* Every commercialization initiative should be mapped out to understand context specific barrier that may inhibit profitable, private sector uptake of a new technology or product.

- Commercialization analysis is similar to a value chain analysis in that both consider how value is added to a product or service. However, *commercialization considers barriers and enablers for specific, private sector initiatives to achieve profitable operations and sales.*

- *A commercialization framework can be used to identify common barriers to different steps of the commercialization process, as well as enablers that underlay all process steps*
  - Commercialization process wheel for barrier analysis include: R&D; Input Supply; Production; Processing; Distribution; Marketing; Final Sales; and Policy
  - Commercialization enablers underpin all successful initiatives and include profitable: Supply; Demand; Finance; Enabling Environment; and -for publicly developed goods- Development Outcomes

- *The commercialization framework is an analysis tool that allows development practitioners to systematically organize their knowledge of barriers and enablers* in order to identify and prioritize possible catalytic investments and partnerships.

Commercialization pathways for publicly developed goods:

- Publicly developed goods have unique characteristics that can both drive and inhibit profitable, private sector commercialization:
  - Development outcomes are the desired impacts of a product or technology that has been publicly developed;
  - If these outcomes are not valued commercially, then private sector may not be the only partner needed for profitable commercialization
  - Pathways for successful uptake of a new product or technology may include institutional, public partnerships and- for agriculture technologies- farm level production and consumption

- The commercialization framework can be used to determine operational capacity gaps as well as profitability barriers that cannot be overcome by the private sector alone

Case study analyses:

- Three case examples were selected to demonstrate how the commercialization framework analysis works for different kinds of technologies and products. Cases were selected to show a variety of contexts and aligned with the GAIN/ HarvestPlus impact pathways
  - 1) US fortified foods is an historical example of one of the most successful fortification initiatives in the world allowing the benefit of hindsight to analyze the full trajectory of industry and consumer adoption.

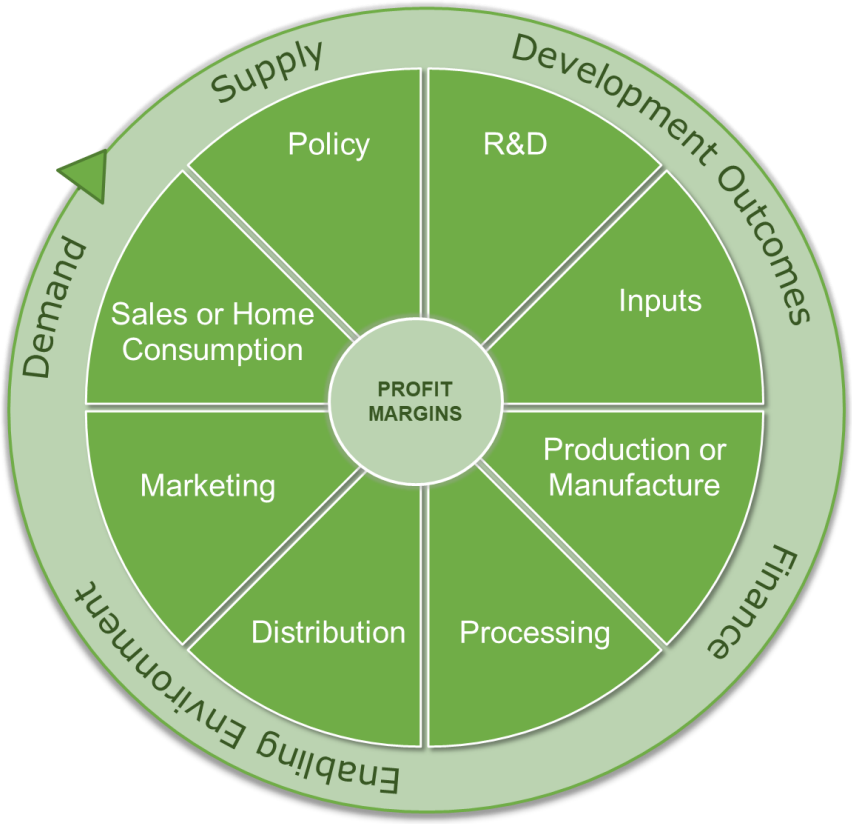
- 2) HIV/ AIDS medication is a global, health sector example that highlights the challenges of scaling a product to low-income countries and consumers.
- 3) Vitamin A cassava in Nigeria is a biofortified seed case that can directly show how this framework can be used by the GAIN/ HarvestPlus partnership.

- Over 15 additional case study examples of commercialization initiatives are presented in the final report to highlight lessons learned for each process wheel step, all underlying success factor categories, and for partnership best practices.

Private Sector Partner Selection and Engagement:

- Partner selection criteria allows development practitioners to clearly recognize how potential private sector partners will address identified commercialization bottlenecks or needed organizational capacity. *Five key criteria for private sector partner selection mirror the five success factors categories: business model (finance), commercial viability (demand), legal requirements (policy), organizational capacity (supply), and beneficiary impact (development outcomes).*

- *The key to successful public-private partnerships is a strategic approach to relationship management that can be implemented regardless of funding mechanism or public sector partner.* All partnerships can be made more effective by focusing on a collaboration to achieve mutual goals. Key management practices that have resulted in successful public-private partnerships include aligning stakeholder goals, selecting appropriate interventions, determining clear criteria, negotiating performance-based milestones, tracking impact collaboratively, and providing clear, transparent decision-making.



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1. Introduction

The Global Alliance for Improved Nutrition (GAIN) works with stakeholders throughout the nutrition landscape to transform food systems to deliver more nutritious food for all people. In partnership with HarvestPlus, a global research organization dedicated to improving nutrition by developing and promoting biofortified foods, GAIN is exploring opportunities to commercialize biofortified foods in six targeted countries where malnutrition is most pervasive. In June 2019, the partnership contracted The Development Practice LLC to review the technology commercialization landscape for publicly developed goods in order to identify and analyze commercialization strategies used to bring new, publicly developed technologies and products to market. Research to inform this analysis included a literature review, key informant interviews, and a comprehensive landscape analysis conducted from June-August 2019. This informed the development of a commercialization framework that can be used as an analysis tool to assess programming decisions across priority countries and value chains. Three case studies were completed using the framework to show how such an analysis work and over 15 additional case examples were studied to identify lessons learned across framework categories.

For the purposes of this study, the partnership defined commercialization as "the process of introducing a new product into commerce or making it available in the market, rather than producing solely for family consumption." This study took a broad view of this definition, looking at technologies and products that were both introduced to the market through the private-sector only, as well as those that were supported by public-private partnerships. While the partnership focused on the commercialization of biofortified seeds in its targeted countries, this review looked more across sectors at nutrition, agriculture, technology, food and beverage, and health sectors to identify examples of publicly developed products that were commercialized both successfully and unsuccessfully.

The following report introduces the commercialization framework's two dimensions – a process wheel and underlying success factors- and then gives case examples to explain the analysis and provide initial lessons learned. The final section of the report introduces best practices for partnership selection and engagement with private sector actors. Five annexes to the report are also attached: Annex A. Executive Summary and Framework Quick Reference (also below); Annex B. Case Studies; Annex C. Methodology; and Annex C2. Methodology References_Literature_Cases_Interview Tools.[1]

2. Research Methodology

This analysis required two key phases of research: (1) a broad landscape analysis of technology commercialization initiatives and (2) framework development with relevant case studies. The landscape analysis phase was informed by a comprehensive literature review and key informant interviews to identify the broadest possible sample of commercialization examples, including their critical barriers, best practices, and enablers. The framework development phase synthesized and added to the information collected during the landscape analysis and distilled the lessons learned into an overarching framework informed by three extended case studies and several smaller case examples.

The landscape analysis was completed through literature searches of both academic and grey publications, and interviews with sector-wide experts with experience around broad technology commercialization, crop biofortification, and agricultural policy. In addition, The Development Practice's Technical Lead Consultant was a key informant on agricultural technology commercialization projects that

[1] The initial final report submission had two additional annexes that included The Development Practice's August 19th Presentation as well as a synthesized review of seed sector specific research.

were supported through investments by USAID's Feed the Future Partnering for Innovation (P4I) and Securing Water for Food (SWFF) programs

The framework was developed through the synthesis of lessons and literature covering the commercialization of biofortified seeds, other agricultural technologies, and both current and historical examples of commercialization from other sectors. Additional literature review and key informant interviews were conducted to provide specific country context, product information, or direct commercialization experience on selected case studies, as well as to provide feedback on the framework. All relevant literature, stakeholders, and commercialization examples were cataloged in the sortable database and categorized by primary sector, secondary sector, institutional partners, targeted geographies, and specific technologies. Annex C contains the more detailed methodology including these databases and a full list of short-listed case studies.

3. Commercialization Framework: Process Wheel

Figure 1 Commercialization Process Wheel

In order to analyze and evaluate technology commercialization interventions identified through the landscape analysis, it was first necessary to develop a complete commercialization process map as a means of understanding how commercialization initiatives work. The literature review identified a limited number of highly relevant publications that broadly analyzed commercialization processes using illustrative frameworks or process maps.[2] The few articles that did this provided either generalized processes, used the agricultural value chain, or focused on research and development steps rather than production and sales. For example, an *Early Generation Seed Study* commissioned by the Bill & Melinda Gates Foundation provided a commercialization framework that aligned with the agricultural value chain, but that did not break out specific steps for distribution, marketing, consumption, and policy; the USAID-funded Integrating Gender and Nutrition Within Agricultural Extension Services program used a technology development pathway in *Assessing Agricultural Technologies* that stopped at distribution without considering marketing, sales, consumption, and enabling environment; and Partnering for

[2] Early Generation Seed Study- Summary (Deloitte Monitor, BMGF, USAID, 2015); Assessing How Agricultural Technologies can Change Gender Dynamics and Food Security Outcomes (USAID INGENAES, Manfre et al, 2017); Success Factors for Commercialization Agricultural Research's (Partnering for Innovation 2017)

Innovation's *Success Factors for Commercialization Agricultural Research* grouped multiple steps into four broad categories that do not provide enough detail for constructive analysis. As a result, a more complete map for a basic commercialization process was developed and validated by the landscape analysis and literature review (Figure 1 above). The resulting process wheel breaks down the commercialization steps into wedges which can be individually analyzed for barriers to profitability.

The center of the wheel is profit margins since this is the core of any successful, private-sector commercialization initiative. The wedges of the process wheel mirror an agricultural value chain, but breaks down distribution, marketing, and sales in more detail then may be typical and generalizes agricultural inputs, production, and post-harvest to be able to apply to non-agricultural products. These wedges are structured for the broadest range of technologies and sectors and may thus be adjusted to analyze different kinds of products. For example, the commercialization of iodized salt in the United States- presented in section 5.1.1 below- did not have a production step, only a processing one.

While this wheel generally represents a commercialization process for bringing any technology to market, it is important to note that seed technologies have unique characteristics that may affect how the commercialization map is represented. Seeds are perishable products that experience counter-cyclical demand and significant production lag times due to multiple cycles of seed multiplication required to reach market volumes.[3] In order to sufficiently break down the potential barriers and enablers for intervention, it is necessary to analyze both sequential phases of the commercialization process: first for the multiplication of seed through the sale of improved seed to farmers, and second for the production of improved grain by farmers through the market sale or home consumption of improved grain by farmers. Using the commercialization process wheel for two independent analyses ensures that key profitability considerations for smallholder seed out-growers and grain producers are included in the commercialization analysis in addition to those of private sector seed companies.

3.1. Research and Development

Research and development (R&D) is represented as one wedge in the commercialization wheel, although it precedes and necessarily beings the commercialization process. This review defined R&D as both the research to develop a new product or technology as well as the often-on-going research needed to characterize and assess the market for that product. There is a significant amount of existing, consolidated literature about best practices and lessons learned for R&D both generally and in the agriculture and seed sectors.[4] Best practices for R&D that were identified in these studies included:

- **Partnership:** Clearly define the role and funding of research institutions and involve the private sector early on
- **IP:** Address intellectual property from the beginning and ensure that research looks at licensing models and best practices for given countries and sectors
- **Quality:** Ensure product quality control and characteristics that are as good or better than current situation
- **Development:** Research is just one part of R&D—development also takes considerable time and resources. Development needs to consider consumer, industry, and public preferences for a given product or technology
- **Customer:** Understand the intended customer from the beginning of the R&D process so that the technology or product is designed for appropriate consumer use from the beginning

When analyzing the R&D process, key factors that should be considered include the operational set-up for the research, the actual product traits that need to be developed, the market dynamics for the product, and the legal or regulatory factors that need to be considered to bring the product to market.

[3] Scaling Up Technology Adoption Among Poor Farmers: the Case of Seed (Boettiger, 2014)

[4] *Success Factors for Commercializing Agricultural Research Lessons from Feed the Future Partnering for Innovation (Partnering for Innovation, 2017); Ten Simple Rules to Commercialize Scientific Research (Fletcher et al, 2012); Crowd-Sourced Lessons About Scaling Seed Systems (Syngenta/ Boettiger, 2013); Integrating Seed Systems: Planning for Scale Brief #3 (Boettiger et al.; AgPartnerXchange, 2013)*

The R&D step should build out the fundamental understanding of how the rest of the commercialization process could or should work. Potential barriers to profitability identified in the literature for R&D include:

- ❑ R&D costs and funding
- ❑ Contracting arrangement with the technology development institution
- ❑ Development timeline
- ❑ Consumer and industry product trait preferences
- ❑ Hidden product costs and risks
- ❑ Desired development outcomes for underserved communities
- ❑ Geographic and target market focus
- ❑ Identification and characterization of potential customer segments
- ❑ Price and profit forecasting
- ❑ Intellectual property ownership
- ❑ Licensing agreement structures
- ❑ Regulations for new products

R&D CASE EXAMPLE: PICS STORAGE BAGS

COUNTRY: Kenya

PUBLIC SECTOR PARTNER(S): Purdue University and USAID

PRIVATE SECTOR PARTNER: Bell Industries

TECHNOLOGY: Hermetically Sealed Crop Storage Bags

R&D BOTTLENECKS: IP rights and licensing as well as capacity support for local production was not initially planned so the product was not cheaply, locally available

INTERVENTION: Exclusive licensing to Bell Industries for manufacture, distribution, and marketing allowed the company to invest in profitable product line for the company and significantly wider product availability for the university

A case example that highlights the importance of looking at intellectual property ownership and licensing agreement options from the beginning is the development of PICs bags for post-harvest storage.[5] PICS bags were developed by Purdue University more than 30 years ago to address postharvest cowpea losses in West Africa. There was high potential to expand their use to other crops across a wider geographical area, but Purdue wanted to maintain their ownership of their intellectual property, in which they had invested significant resources. However, the researchers, scientists, and university staff did not have the business relationships in place to produce, manufacture, and distribute the bags on a commercial scale, and the technology languished on the shelf with only small, foundation supported expansion in West Africa and some R&D around expansion for maize storage in East Africa. In 2013, USAID's Feed the Future program partnered with Purdue to further build out expansion in East Africa. The university used grant money to develop a licensing agreement with Kenyan distributor Bell Industries that allowed them to lease Purdue's intellectual property to manufacture and distribute PICS bags through their existing sales networks. This relationship has resulted in the sale of more than 2 million PICS bags in Kenya and is a profitable national product line for Bell Industries.

3.2. Raw Material Input

Raw material or input supply refers to the base inputs needed for production or manufacture. For seed technology this step refers to the provision of both foundation seed as well as agricultural inputs needed for on-farm production including nutrients, water, seed, and extension services. For seed technology, there is a significant body of literature that considers bottlenecks and opportunities for successfully scaling seeds systems that ultimately speaks to ensuring adequate input supply.[6] Factors that can be considered for raw material inputs operations include possible economies of scale in terms of how much input supply can be secured, diversification of suppliers to reduce supply chain risk through over-dependency on few suppliers, and guaranteeing quality through different mechanisms, whether through building a trusted supplier network, third-party certification standards, or through spot checks and programming. Literature around the seed sector in this stage also identified best practices around

[5] *INGENAES -Tech-Profile-2016-PICS-Bags-Zambia (2016); Adapting Technologies to Reduce Grain Loss Fintrac Inc (2016);*

[6] Integrating Seed Systems: Planning for Scale Brief #3 (Boettiger et al 2013); Scaling Up Technology Adoption Among Poor Farmers: the Case of Seed (Boettiger, 2014); Crowd-Sourced Lessons About Scaling Seed Systems (Syngenta, 2013)

engagement with both formal and informal markets and traders, considering seed multiplication lag times and production forecasts, and securing supply with purchasing agreements as early as possible. Potential barriers to profitability identified in the literature for Raw Inputs include:

- ❑ Availability and cost of raw inputs
- ❑ Quality of raw inputs including assurance mechanisms
- ❑ Current and forecasted input supply
- ❑ Supplier proximity to market buyers
- ❑ Import subsidies for raw materials
- ❑ Raw material export incentives
- ❑ Import regulations
- ❑ Access to complementary production inputs
- ❑ Access to operational capital to purchase inputs

INPUT CASE EXAMPLE: UNIVERSAL INDUSTRIES

COUNTRY: Malawi

PUBLIC SECTOR PARTNER(S): CIP

PRIVATE SECTOR PARTNER: Universal Industries, out-growers

TECHNOLOGY: OFSP value added products

RAW MATERIAL BOTTLENECKS: Aggregation logistics, limited planting material available for improved varieties, limited market entry for out-growers, out-growers would not sell during drought year

INTERVENTION: Universal had to shift their raw material procurement from a large network of smallholders to more consolidated producers to address consistent supply and logistics issues critical to maintaining volumes and quality needed for processing

A case example that highlights how a processed food company had to work with farmers to ensure their input supply is Universal Industries in Malawi, which is a company that produces value add products from orange fleshed sweet potato (OFSP).[7] Universal is a Malawian, private sector food manufacturer making foods under various brand names that was interested in developing new lines of nutritional food products based on orange-fleshed sweet potatoes high in beta carotene. In 2014, Universal Foods undertook a project to source its raw material input—OSFP—primarily from smallholder farmers for new nutritious product lines. The volume of orange-fleshed sweet potato produced in Malawi was low and mainly grown for household consumption, so Universal Foods incentivized an out-grower network of 8,000 farmers to grow improved, OSFP varieties at commercial volumes through the creation of a guaranteed end market. Challenges included limited planting material available for out-growers due to low multiplication capacity, farmers preference for local varieties they grow for home consumption, and complicated offtake logistics due to inconsistent availability and product bulkiness. Additionally, a major drought in 2013 resulted in significant crop losses across other value chains and out-growers preferred to hold onto sweet potato crops as emergency household food. Universal's inflow of raw materials for sweet potato products came to a standstill. These issues of sourcing, transporting, and processing sufficient volumes of sweet potato to meet existing commercial processing capacity are likely limiting the entry of industrial competitors.

[7] Bringing Seeds to Market (Partnering for Innovation, 2016); Orange-fleshed Sweet Potato Products are Improving Nutrition in Malawi (Agrilinks 2016); Affordable, Delicious and Nutritious: Scaling OFSP in Malawi (P4I 2017); Interview with Bob Rabasky – July 2019

3.4. Production or Manufacture

Production or manufacture can be defined as the multiplication or production of a core product. For seed technology this refers to on-farm production. For value-added products this step refers to initial processing of agricultural commodity (i.e.: flour milling) before the processing of a consumer good (i.e.: bread). Production or manufacture can be defined as the multiplication or production of a core product. For seed technology this refers to on-farm production. For value-added products this step refers to initial processing of agricultural commodity (i.e.: flour milling) before the processing of a consumer good (i.e.: bread). For seed, the production step will have different kinds of bottlenecks depending on the kind of seed (vegetatively propagated, self-pollinated, and hybrid), the average size of farms, and the type of sales that the farms usually engage in. Potential barriers to profitability identified in the literature for Production or Manufacture include:

- ❑ Production quality control requirement
- ❑ Production certification requirements
- ❑ Warehousing and cold chain capacity
- ❑ Ability to hold and manage inventory
- ❑ Manufacture or production costs
- ❑ Export production incentives
- ❑ Government mandated production
- ❑ Forecasted product demand
- ❑ Access to manufacture or production training
- ❑ Access to finance—long-term capital credit, venture capital and growth investment

PRODUCTION CASE EXAMPLE: MKA HATCHERY

COUNTRY: Bangladesh

PUBLIC SECTOR PARTNER(S): USAID, Bangladesh Department of Fisheries, World Fish

PRIVATE SECTOR PARTNER: Moana Technologies

TECHNOLOGY: SPF Black Tiger Shrimp

PRODUCTION BOTTLENECK: biosecure broodstock production by smallholders at scale, to ensure maximum yields that justify cost of purchasing improved shrimp

INTERVENTION: Public-private partnership to develop smallholder capacity to maintain clean growing systems that maximized potentially high-yielding new shrimp variety and justified on-going smallholder investment in improved broodstock

An aquaculture example that shows some of the bottlenecks around production costs and quality control when working with smallholder farmers is the commercialization of an improved shrimp variety in Bangladesh.[8] Shrimp exports from Bangladesh represent more than $350M annually, with a large percentage grown by smallholder shrimp farmers. Smallholder aquaculture producers traditionally depended on hatcheries selling low-quality and disease-prone wild juvenile shrimp bred from stock harvested from the Bay of Bengal. A government ban on harvesting wild broodstock intended to reduce the environmental impact of over-harvesting wild shrimp led to a significant decrease in available shrimp stock and resulted in a critical threat to smallholder livelihoods and the export shrimp market. This created a market opportunity for broodstock and MKA Hatchery worked with US-based biotech firm Moana Technologies to breed a specific pathogen-free black tiger shrimp for smallholder production. The improved variety however required improved production practices such as clean shrimp ponds and different feed. Increased costs of the stock itself, cleaning and new feed made the purchase of broodstock difficult for smallholder producers. The improved feedstock was also still susceptible to some wildstock disease, particularly in non-biosecure ponds. MKA Hatchery developed a public-private partnership with USAID to improve smallholder shrimp breeding, handling, and biosecurity practices to ensure that smallholder producers had the capacity to maintain disease-free shrimp stock in biosecure ponds and produce both the quality and volume required to build the country's export market.

[8] A Bangladesh Shrimp Hatchery Goes from "Zero to Hero" (Feed the Future 2016); Interviews with Management and Trainees at MKA Hatchery (Shrimp News International 2015; Interviews with Bob Rabasky, 2019

3.5. Processing or Value Addition

The processing and value addition step in the commercialization process map refers to the final processing of inputs into the product that will be sold to consumers. For seed technology this may be on-farm post-harvest storage, sorting, drying, cleaning, or any activities that add value to the final farm product. For all products this step includes final aggregation and packaging for distribution. For many non-agricultural products, this step may be indistinguishable from the production and manufacture step in which case the two can be combined for analysis. Potential barriers to profitability identified in the literature for Processing or Value Addition include:

- ❑ Value addition or processing costs
- ❑ Preferred product traits for processors
- ❑ Required product quality and volume
- ❑ Packaging, processing, sorting
- ❑ Packaging or processing standards or requirements
- ❑ Processing certification requirements
- ❑ Access to finance, long-term capital credit, venture capital and growth investment

PROCESSING CASE EXAMPLE: WAREHOUSE RECEIPT SYSTEM

COUNTRY: Ethiopia

PUBLIC SECTOR PARTNER(S): Agricultural Transformation Agency and USAID

PRIVATE SECTOR PARTNER: Farmer Cooperative Unions, Traders, MFIs

TECHNOLOGY: Warehouse receipts

PROCESSING BOTTLENECK: Stakeholder buy-in, including SHF ability to meet quality and grading standards

INTERVENTION: Community warehouse receipt systems to directly serve SHF

USE OF DIGITAL TECHNOLOGY: ECX maintains daily digital price tickers in major towns and mobile applications exist for farmers to send sell-orders to FCUs and traders; but mobile use in rural Ethiopia is still low

A case example that highlights the importance of post-harvest storage, aggregation and achieving certain quality levels for commodity trading is a warehouse receipt program that was implemented in Ethiopia.[9] The warehouse receipt system (WRS) was trialed through the Agricultural Transformation Agency in partnership with the Ethiopian Commodity Exchange (ECX) as early as 2011 with a formal establishment of the Ethiopian Agricultural Commodities Warehousing Service Enterprise established in 2014. The system was created to facilitate aggregation of priority commodities from small-holder farmers in key markets across the country. In addition to aggregation the WRS was meant to assure quality standards across markets, promote market linkages and facilitate credit for value addition activities at farm, trader, and processor levels. The WRS only successfully aggregated and financed sesame and pea bean producers in the 2011 and 2012 seasons—the system has "not truly taken off." The main challenge for small-holder farmer engagement in the system was high storage standards that could not be easily met by SHFs. The grades imposed at the warehouse door were too high in terms of both actual quality achieved by SHF as well as SHF ability to properly sort and/or grade their products. Additional challenges around storage time limits, bank buy-in and financing as well as general trust in the system were also identified. A main recommendation for continuing to develop this system is to develop a tiered system that has different services, terms, and grades for different kinds of producers. One pilot identified for successful SHF engagement was a community warehouse receipt system that operates through cooperatives similarly to the WRS, but with standards that were more easily adopted to local norms, had better financing terms and was better able to connect with farmers around inspections, grievances, and training.

[9] Agricultural Commercialization In Ethiopia: A Review of Warehouse Receipts in the Sorghum, Wheat, Maize, and Tef Value Chains (2017); Interview with Techane Adune, Director of Agricultural Commercialization Corridors for the ATA (July 2019); AGP-AMDe Ethiopia Warehouse Receipt System a Case for Expansion Report (USAID 2014)

3.6. Distribution

Distribution is the process of moving a product from its production and processing point to a final sales outlet. It may include interim warehousing steps and/or several trader or middlemen purchasing steps. For seed technology being promoted to small-holder farmers the main bottleneck is broad, last-mile distribution that is cheap enough for SHF to afford. This kind of penetration usually requires expensive logistics on rural, poor roads or on-going, locally based production systems across many small communities. Successful distribution systems that are achieved in short-time frames usually require large, upfront investment to build and network from scratch or strategic partnership with distributors who already have a network in place that can be plugged into. Potential barriers to profitability identified in the literature for Distribution include:

- ❑ Distribution costs
- ❑ Formal and informal distribution channels
- ❑ geographic and market reach of distribution channels
- ❑ Wholesale and retail distribution outlets
- ❑ Trader networks and third-party sellers
- ❑ Last mile volumes, costs, partners
- ❑ Trusted market channels or outlets
- ❑ Ability to hold and manage inventory
- ❑ Warehousing and cold chain capacity
- ❑ access to short-term operational credit and long-term capital credit
- ❑ Emergency relief product distribution strategies

DISTRIBUTIUON CASE EXAMPLE: ONE ACRE FUND

REGION: East Africa

PRIVATE SECTOR PARTNER: One Acre Fund

TECHNOLOGY: Last mile input distribution system

DISTRIBUTION BOTTLENECK: Reaching small-holder farmers at scale

INTERVENTION: Business model based on hands-on coordination of farmer groups; contiguous market expansion that builds on existing distribution networks to reach new last mile customers with low-cost high-quality inputs rather than a hub-and-spoke model that requires the creation of new high-cost distribution systems

USE OF DIGITAL TECHNOLOGY: Mobile money in Kenya and SMS based receipting and messaging for extension related information

An example that shows the challenges around last mile distribution for small-holder farmers as well as a commercially successful solution to it, is One Acre Fund's business model targeting small holder farmers in East Africa.[10] One Acre Fund is a social enterprise with a core model to provide agricultural inputs on credit to small-older farmers within walking distance (less than five kilometers) of their homes or farms. The company differentiates its products through low-cost bulk procurement, extensive quality controls, reliable seasonal timing, and last mile distribution, as well by providing weekly, in-person training to small groups of farmers focused on practices that maximize the potential of improved inputs that the company distributes. As One Acre Fund has expanded their operations to new countries in both East and West Africa, they have carefully evaluated their overall approach and specific distribution strategies to ensure that they can profitably reach rural customers. In Kenya, One Acre Fund originally used a distribution model where they created "islands" or new hubs separate from their geographic center, and then expanded out from those new hubs. They found, however, that their distribution costs increased dramatically as they had to build new logistical networks to support the new hubs. Additionally, the company had to relocate field officers to serve new geographic regions where they were not familiar with the communities and did not have the local contacts or word-of-mouth publicity resulting in less interest and goodwill from potential new partners. Based on this experience, One Acre Fund changed their growth strategy to expand into areas

[10] Calling for a Distribution Revolution(Farming First 2015) ; Bringing "Take It To The Farmer" To The Very Last Mile (One Acre Fund 2015); Solutions for Last-Mile Input Delivery: #AskAg Highlights (2015) ; Distribution Is The Real Disruption: Transformative Tech For Africa's Farmers (Forbes 2018); Growing Prosperity: Developing Repeatable Models to Scale the Adoption of Agricultural Innovations Excerpt for One Acre Fund (Acumen and Bain, 2014)

that are contiguous to its current operations which allows the company to build on existing distribution systems. This strategy significantly reduces distribution costs and allows the company to operate in contiguous markets that are well understood and tested. One Acre fund also uses mobile technology, particularly in Kenya where there is high penetration of mobile money systems, to do mobile receipting and some digital extension when possible.

3.7. Marketing

Marketing encompasses all activities related to promoting and creating awareness of the product or technology. This is the process step where demand creation happens with factors are around customer preferences and targeting, product value, branding, understanding and often behavior change. For brand new technologies or products that have barriers to end-use or value propositions that are not immediately apparent, then the marketing step may be the most important area to invest in. Potential barriers to profitability identified in the literature for Marketing include:

- ❑ Marketing costs
- ❑ Geographic and target market focus
- ❑ Scale of potential customer segments
- ❑ Market channel and messaging selection
- ❑ Characteristics of customer segments
- ❑ Customer buying preferences, demand drivers
- ❑ Quality, convenience, timing, package volumes
- ❑ Lag time for demonstrated product value
- ❑ Quality or production practice certifications
- ❑ Trusted brands or product champions
- ❑ Product licensing labeling regulations
- ❑ Government target beneficiaries and outcomes

MARKETING CASE EXAMPLE: STRIGAWAY MAIZE SEED

REGION: East Africa

PUBLIC SECTOR PARTNER(S): CIMMYT; USAID

PRIVATE SECTOR PARTNER(S): Kenya Seed; FreshCo; NASECO; Tanseed; East Africa Seeds

TECHNOLOGY: Herbicide coated seed

MARKETING BOTTLENECK: Behavior change, specialized knowledge needed to use seed successfully

INTERVENTION: Public partnership to facilitate a widespread campaign for information sharing and uptake by several local seed companies who helped with farmer trials to demonstrate the technology

A case example that shows the importance of marketing campaigns that effectively communicate product value and requirements is imazapyr-resistant maize seeds in East Africa.[11] This case also shows how demand creation cannot always be achieved if the product has too many barriers for end-consumer use. Striga is a parasitic weed that chokes maize production, currently affecting over 20 million ha of crop land in Sub-Saharan Africa causing up to 80 percent yield losses on maize farms in the Lake Victoria region in East Africa. Imazapyr is an herbicide that controls striga, but which can also kill maize plants or drastically reduce its germination rates. An imazapyr-resistant maize seed called StrigAway was developed by CIMMYT and partners to prevent these losses. In 2013, the African Agricultural Technology Foundation (AATF) took over the commercialization of StrigAway through a partnership with the seed developers and seven local seed companies in Kenya, Uganda and Tanzania to produce, package, distribute, and sell StrigAway to smallholder farmers. AATF ran into trouble trying to communicate some of the more complex practices required for StrigAway to work effectively. The improved seed required behavior change from existing farming practices including separate storage away from other seeds products to avoid imazapyr contamination, special safety precautions for handling and planting the seed, and consistent implementation to use as it can take up to three years of continuous planting to significantly impact maize yields. In addition to these new practices, StrigAway was also more expensive than traditional improved maize varieties. As a result, AATF had to rethink their marketing strategy to include not just farmer training

[11] Bringing Seeds to Market (Partnering for Innovation, 2016); *A Twist on Seed Technology* (Feed the Future 2015)*; Weeding out the losses: Striga challenges in Kenya* (CIMMYT 2016)*; StrigAway™ Maize to Address Striga in East Africa (Fintrac/ USAID 2018)*

and product demonstrations, but to also include significant agro-dealer training as this was the primary source of farmers' information on product usage, safe handling, and overall value proposition. While marketing with agro-traders has provided some level of success and penetration for the product, an alternative biological control product requiring less behavior change is also being developed and is expected to compete with imazapyr-resistant maize seed.

3.8. Product Sales and Home Consumption

Product sales or home consumption is the step where the final purchase or use of the product is achieved. For seed technology, this step may not consist of sales, but instead home consumption or use/ planting of the improved variety. Factors are around sale models and systems, behavior change, price, and market regulations or distortions should be analyzed for the product sales or home consumption step. Potential barriers to profitability identified in the literature for Product Sales include:

- ❑ Sales tracking and feedback loop
- ❑ Preferred product traits for consumers
- ❑ Retail outlets
- ❑ Required product quality and volume
- ❑ Product affordability and profitability
- ❑ Access to banking, mobile money, micro-finance
- ❑ Individual loan interest rates
- ❑ Import or government subsidies for equivalent products
- ❑ Government procurement requirements
- ❑ Relief procurement requirements and impact on product markets

PRODUCT SALES CASE EXAMPLE: SAFARICOM NEON SMARTPHONE

COUNTRY: Kenya

PUBLIC SECTOR PARTNER(S): None

PRIVATE SECTOR PARTNER: Safaricom

TECHNOLOGY: No-frills affordable smartphone with operational and app capability for low-income users

SALES BOTTLENECK: Achieving affordability while still meeting low-income user needs and status perceptions

INTERVENTION: Tailoring the product based on core market segment research, eliminating low-priority but high-cost phone elements, creating interoperability and information transfer for easy technology upgrades, effectively communicating price and value to target users

A case example that highlights how to overcome affordability issues is smartphone uptake in Kenya.[12] Most low-income consumers assume that smartphones are unaffordable since smartphone handsets are generally designed with features that are most relevant to mature markets; however, many mobile manufacturers and operators cut costs and target lower-income customers by excluding expensive handset features such as speed optimization and home integration that are not a priority to lower-income markets. In 2015, Safaricom launched a self-branded, entry-level smartphone for $38 called the Neon Smartphone that was marketed to the working poor. The Neon was a 3G smartphone that could be purchased directly from Safaricom shops with 200MB and 20 SMS daily for 30 days. In addition, customers could also use their Safaricom loyalty points, earned through M-Pesa transactions, to receive a discount on purchasing the handset from dedicated stores. In addition to creating a service and product specific to low-income consumers, Safaricom also created a sales mechanism for easy upgrades as individual consumers' income and digital literacy increased. The company saw an 182% increase in average revenue per user for each feature phone user who converted to a smartphone, and ultimately gained more mobile data subscribers to their network. Offering affordable smartphones that respond to the handset needs and value perceptions of local consumers as well as creating a loyalty program and an easy upgrade system resulted in increased sales to a market segment that was left behind by the traditional, higher-end market for the product.

[12] Accelerating Affordable Smartphone Ownership in Emerging Markets (GSMA 2017);

3.9. Policy

Policy as a step in the process wheel refers to legal business requirements, the business landscape, and public-sector services that impacts business creation, operations and growth. For the analysis of barriers for a given commercialization initiative it would consider internal management policies and external public policies that impact profits. This includes regulatory regimes, public infrastructure, business services (B2B or public), commercial law, and systems level business or political factors that can inhibit or promote commercial enterprises. Factors are around public services, business regulations, international trade policies, government programs for private sector development, and availability of financial products and services. Potential barriers to profitability identified in the literature for Policy include:

- ❑ Road, water, power
- ❑ Mobile coverage
- ❑ Access to information systems
- ❑ Access to corporate services
- ❑ Commercial loan interest rates
- ❑ Government loan guarantees
- ❑ Access to grants and catalytic funding
- ❑ Intellectual property and product licensing
- ❑ Business licensing
- ❑ Corporate tax incentives or penalties
- ❑ Regional trade policies
- ❑ Government development or social plans
- ❑ Government agencies and decision-makers
- ❑ Public-private partnerships

POLICY CASE EXAMPLE: AMATHEON AGRI LTD.

COUNTRY: Zambia

PUBLIC SECTOR PARTNER(S): USAID

PRIVATE SECTOR PARTNER: Smallholder farmer out-growers, local traders

TECHNOLOGY: Commodity outgrowing and off-taking

ENABLING ENVIRONMENT BOTTLENECK: Regional trade agreements, import and export prices, market sales drivers

INTERVENTION: None—the company's business model was based on procurement from a dedicated smallholder out grower network; however, regional trade agreements, extreme weather, and other market forces created significant price volatility year to year that the company failed to manage effectively

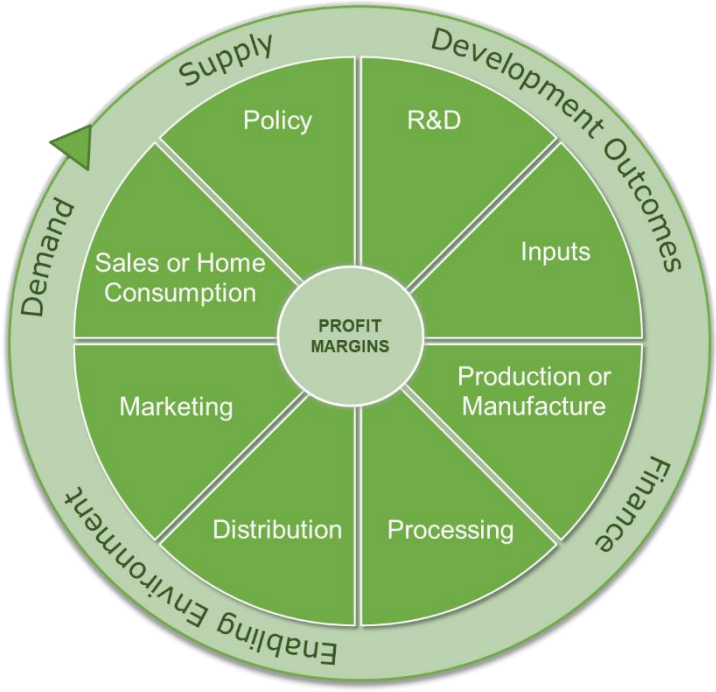
A case example that highlights how trade agreements and import/export policy effect business is a commodity trading company in Zambia.[13] Amatheon Agri Ltd. sells maize, soy, rice, legumes, and groundnuts produced partly on its own large-scale export production farm, but also sourced from an extensive network of more than 6,000 outgrowers throughout central Zambia. In 2017, Zambia's neighboring countries produced high commodity yields, causing their prices to drop. Regional trade agreements limit tariffs on imported commodities, so as local markets were flooded with cheaper regional imports, local prices also dropped. With prices so low, many farmers chose to hold seed instead of sell including Amatheon's soy and pigeon pea outgrowers. In 2018, there was a regional drought at the start of the growing season, causing a 40 percent drop in the national maize yield and limited regional imports. This created a national maize shortage and high commodity prices. Millers and traders were forced to go out to the countryside to buy maize directly at the farmgate. As a commodity trader, Amatheon was not able to match the prices and logistics of farmgate sales. Between 2017 and 2018, the company was only able to procure grain to meet 15 percent of their annual sales targets. Without government policy to help stabilize market prices or systems or services that insure against losses during drought, Amatheon was forced to operate under losses.

[13] Elisa Burrows, Partnering for Innovation- Interview, 2019

4. Commercialization Framework: Cross-Cutting Success Factors

Success categories are cross-cutting enablers that impact multiple steps of the commercialization process. There are five broad categories: supply, demand, enabling environment, finance, and development outcomes. Development outcomes is considered for the commercialization of public goods as these products are publicly supported due to their intended positive, public impact which could help drive commercialization. Within each category, there are specific success factors examples that can be used to identify and develop catalytic interventions that apply across the commercialization process to maximize impact. Success factors provide development practitioners with a less linear, more holistic way to evaluate the potential challenges and opportunities of commercialization. When combined, the commercialization process wheel and cross-cutting success factors offer two complementary dimensions for identifying barriers and enablers.

Figure 2 Commercialization Framework with success factor categories underlying the process wheel



4.1. Demand

Demand-side success factors generally have to do with creating demand and strengthening markets. Part of creation and strengthening is building an understanding of customers' needs and developing the right delivery and sales models to fulfil customer needs. Generally, demand bottlenecks will be more prevalent in that later phases of the process such as distribution, marketing and sales; however, understanding consumer demand requirements is key to getting the research, inputs, production, and manufacture phases of the process map correct. Specific demand creation success factors that likely need to be considered for commercialization initiatives include:

- ❑ Customer segmentation and market targeting
- ❑ Understanding and addressing hidden product costs and risks
- ❑ Product usage
- ❑ Industry preferences
- ❑ Consumer preferences
- ❑ Branding
- ❑ Product advocates
- ❑ Required quality and quantities
- ❑ Trusted market outlets and retailers including export markets
- ❑ Accessibility and affordability
- ❑ Information access

DEMAND CASE EXAMPLE: MCDONALD'S GLOBAL EXPANSION

COUNTRY: India

PRIVATE SECTOR PARTNER: McDonald's

PUBLIC SECTOR PARTNER: None

TECHNOLOGY: Regionally adapted restaurant chain

DEMAND BOTTLENECK: Widespread dietary preferences such as vegetarianism and religious prohibitions around beef consumption were fundamentally at odds with McDonald's approach to standard global menu and it's fast, consistent food across locations

SUCCESS FACTOR: Intensive research and development into the local tastes and demand drivers in the Indian market allowed the company to tailor food, outlets, and marketing to better address local barriers and increase demand

An example that highlights best practices for demand creation is the case of McDonald's expanding into India.[14] McDonald's is an international company well-known for producing fast, cheap, consistent food; but as the company has expanded globally, it has not only had to develop new supply chains, but also adjust its core brand in new contexts to drive new consumer demand. In India, the company conducted in-depth analyses among several states in order to meet specific customer preference requirements. In Gujarat, vegetarianism is the norm, so a company best known for its burgers introduced vegetarian and traditional foods such as samosas; while in New Delhi, meat is more common-place but beef is still unpopular, so the company introduced the Maharaja Mac made with chicken or lamb. In addition, marketing and brand messaging was adapted for the Indian context, and McDonald's initially positioned itself as a family restaurant serving a more formal dining experience, and they introduced specific menu items to appeal to the family financial decision-makers based on their research. Finally, while the company tries to maintain a consistent price range on all its products, prices do vary based on location and income distribution. Prices in India were set to initially attract middle and upper-class consumers as they were best able to afford McDonald's prices; after this target market had demonstrated the brand's desirability, McDonald's then slowly targeted the lower middle class consumers through the introduction of its value menu or India's "happy price menu." McDonald's intensive research and development into the local tastes and demand drivers in different markets has allowed for significant growth, with McDonald's owning more than 10% of the market share in 2012. Their market share has since declined to 7.4% largely due to their own success at creating demand for these kind of restaurant experiences – as Domino's, KFC, and Pizza Hut have moved into India to compete for the same customers.

[14] McDonald's Success Strategy and Global Expansion, 2007; Analysis & Critical Evaluation of Strategy Follow by McDonald's in India, 2018

4.2. Supply

Supply success factors relate to having the required production systems and strategic partnerships in place to ensure the product can be supplied at the required quantity, quality, and price. Supply-side operations must be run profitably and efficiently through economies of scale or at a smaller scale with complementary partnerships that address capacity gaps. Supply bottlenecks tend to be more prevalent in earlier phases of the commercialization process, such as inputs, production, and manufacture; however, distribution and sales require that strong supply-side systems must also be in place. Specific supply-side success factors that likely need to be in place for commercialization include:

- ❑ Intellectual property ownership
- ❑ Licensing agreements
- ❑ Support from technology development institutions
- ❑ Raw input availability and accessibility
- ❑ Warehousing and storage including cold chains
- ❑ Production training
- ❑ Sorting, processing, packaging systems
- ❑ Formal and informal supply chain channels
- ❑ Appropriate last mile volumes, costs, and delivery partners
- ❑ Proximity to markets
- ❑ Information access on prices, demand, and market requirements
- ❑ Public infrastructure and services

SUPPLY CASE EXAMPLE: VITAMIN A CASSAVA

COUNTRY: Nigeria

PUBLIC SECTOR PARTNER(S): HarvestPlus

PRIVATE SECTOR PARTNER: farmers, processors and traders

TECHNOLOGY: Biofortified vitamin A cassava

SUPPLY BOTTLENECK: Difficult logistics and limited investments for large-scale production; complex processing requirements for the raw product; slow moving adoption and limited reach for small-holder farmers and micro-processors

INTERVENTION: Multi-faceted promotion campaign through different media channels, partnerships, national extension program, and government buy-in

An example that highlights multiple supply-side challenges for a seed technology is the case of biofortified, cassava in Nigeria.[15] Biofortified, Vitamin A cassava was released in Nigeria in 2011 and has had relative success in uptake in targeted program areas mostly in the South and West of the country. This success has been driven by farmer, industry and consumer demand creation initiatives including government advocacy, a multi-stakeholder media campaign, marketing through multiple media channels, and promotion of the crop through the agricultural extension system. Farmers have begun sharing stems outside of target areas, while the agro-dealers have successfully marketed the crop, which is a staple that was not traditionally traded. Farmers and consumers seem open to purchasing, producing, and consuming the product given its improved performance in fields and nutrition on the plate. Although the initial introduction of the product has been successful at the pilot scale, wide-scale adoption across the country has not happened. Expansion through small-holder farmers and micro-enterprises is steady, but slow and limited in scope. Adoption by large-scale producers and processers remains limited by supply bottlenecks including few large-scale producers due to high costs for land and mechanization. Processing at all levels is limited by complex processing requirements that limits the entry of micro-enterprises. Continued investments in both large-scale and small-scale uptake can build on early successes including generally positive market reception of nutritious foods and local production.

15 15 New, More Nutritious Vitamin A Cassava Released in Nigeria (HarvestPlus, 2014); Bio-fortification in Nigeria: A Systematic Review of Published Studies (Onyeneke et. al., 2018); Vitamin A Cassava in Nigeria: Crop Development and Delivery (Ilona et. Al., AJFAND, 2017); Interviews with Pail Ilona and Donald Mavindidze, HarvestPlus Africa and Nigeria (August 2019);

4.3. Financing

Finance related success factor generally have to do with creating a profitable business model and financial partnerships related to ensuring that businesses have access to the working capital needed to establish operations and get new products to market. Most businesses will try to access finance directly, but financing can also be achieved through partnerships that provide capital assets, in-kind services, and/or direct cash flow from grants. A profitable business model is core to addressing finance bottlenecks; if profitability cannot be achieved in a realistic timeline, then financial partnerships or sustainable public financing partnerships need to be considered for bringing new technologies to consumers. Success factors that fall under the finance category include:

- ❑ Commercial finance
- ❑ Consumer finance
- ❑ Impact investment and catalytic funding
- ❑ Business profitability
- ❑ Public financing
- ❑ Public-private partnerships
- ❑ Operational credit
- ❑ Capital asset credit
- ❑ Venture capital and growth investment
- ❑ Strategic partnerships
- ❑ Traditional banking
- ❑ Microfinance institutions and financial products
- ❑ Individual interest rates
- ❑ Complementary business services
- ❑ Accounting and tax systems

FINANCING CASE EXAMPLE: TOLARO GLOBAL CASHEW PRODUCTION

COUNTRY: Benin

PUBLIC SECTOR PARTNER(S): USAID

PRIVATE SECTOR PARTNER: Tolaro Global

TECHNOLOGY: Business model for profit-sharing with smallholder out-growers

FINANCING BOTTLENECK: Low raw product yields and poor quality were exacerbated by smallholder side-selling and lack of cash flow to invest in improved production practices

SUCCESS FACTOR: Tolaro created an innovative profit-sharing model that pays participating farmers 10% of the profit from sales of value-added cashew products in addition to the raw cashew prices they receive at farmgate; incentivizes investment in higher yields, better cashew quality, and overall company growth

An example that shows how a food product company in Benin created a successful business model for procuring from small holder farmers is Tolaro Global.[16] 40% of the world's cashew nuts are grown in West Africa, but almost all of the harvest is sold as raw product with other countries capturing higher margins for final value-add products that are shelled, roasted, and processed. Tolaro Global is a cashew processor based in Benin that was founded to help smallholder cashew producers capture high margins from value-addition. For their first five years of operations, Tolaro purchased raw cashews from an out-grower network of smallholder producers through contract farming agreements; however, they struggled to maintain a consistent supply of raw cashews for processing due to farmer side-selling. Additionally, the cashews they could buy varied widely in quality due to limited production resources of smallholders and a general lack of complementary inputs. Rather than trying to enforce production contracts that were not meeting either party's needs, Tolaro instead created an profit-sharing model that pays participating farmer cooperatives up to 10% of the profit from the sales of value-added cashew products on top of farmgate prices for raw cashew. This arrangement guaranteed sales prices and additional revenue, allowing cashew producers to invest in improving quality and quantity of production while also reducing the risk that they would sell to other buyers. Additionally, increased product quality and traceability that resulted from this profit-sharing model allowed Tolaro to produce fair-trade and organic certified product lines. Sale in high-end US and European markets now provide farmers with an additional price premium of up to 12%. This mutually beneficial business model positively incentivizes

[16] *Impact Measurement CaseStudy: Tolaro Global (2017); Common Fund for Commodities Newsletter: Processing Cashew Nuts in Benin with Tolaro Global (2018); Interview with Elisa Burrows (Partnering for Innovation 2019)*

smallholder farmers to invest in the growth of Tolaro's business and incentivizes the company to build producer capacity and support smallholder growth.

4.4. Policy

Policy success factors generally relate to the establishment of a positive enabling environment, usually in terms of government laws, regulations, and certifications for business operations. Services and infrastructure that are publicly provided such as roads, telecoms, and health services are also included in this category. Policy bottlenecks do directly overlap with the enabling environment process phase, allowing these issues to cut across the process map and to be analyzed along its own vertical to capture how individual businesses may be affected by enabling environment factors. Policy success factors include:

- ❑ Consistently applied legal/regulatory systems
- ❑ New product regulations
- ❑ Import subsidies for raw materials
- ❑ Business licensing
- ❑ Land access and ownership
- ❑ Export production incentives
- ❑ Processing and packaging standards and regulations
- ❑ Product labelling requirements
- ❑ Subsidies for equivalent products
- ❑ Market regulation
- ❑ Government procurement programs and strategies
- ❑ National programs and strategies particularly those related to economic development

POLICY CASE EXAMPLE: AGRICULTURAL COMMERCIALIZATION CLUSTERS

COUNTRY: Ethiopia

PUBLIC SECTOR PARTNER(S): Government

PRIVATE SECTOR PARTNERS: farmers, processors, traders

TECHNOLOGY: Industrial processing parks and farmer production clusters

POLICY BOTTLENECK: Central planning across multiple geographies and value chains has led to inconsistent implementation and slow uptake in the first 5 years of implementation

SUCCESS FACTOR: Further prioritization of investments and coordination among multiple interventions and partners for the next phase of implementation

A case example that shows a broad, government-led initiative to create a positive enabling environment and promote commercialization in the agricultural sector is the agricultural commercialization cluster (ACC) program in Ethiopia.[17] The ACCs are a core component of Ethiopia's Growth and Transformation Plan II – a five year development strategy across the government running from 2016-2020. The ACC vision is the "rapid, sustained and inclusive development of priority agricultural commodity value chains in a geographically-focused approach that provides a strategic and commercially viable platform for the implementation of multiple key interventions." The initiative is working across several government programs with interventions and investments that are meant to develop agro-industrial parks and farmer production clusters. Farmer clusters are meant to coordinate and commercialize SHF farmer production on the supply side bottlenecks, while the agro-industrial parks create a demand sink and value addition as well as private sector development. A key recommendation for continued development of the warehouse receipt system presented as a case example in section 3.4 above is alignment and implementation through ACC's to facilitate aggregation from and credit to SHF. Full evaluation of the first 5 years of the program will come at the end of the GTP period (2021), however some initial challenges have been getting up to the scope and scale envisioned in the time period. Initial investment and development have taken place in some of the ACCs, but additional prioritization needs to concentrate investment for transformational growth. While the ACCs in Ethiopia

[17]Agricultural Commercialization Clusters (ACC) Presentation (ATA, 2019- offline, 2015 Briefing Document); Agricultural Commercialization In Ethiopia: A Review of Warehouse Receipts in the Sorghum, Wheat, Maize, and Tef Value Chains (2017); Interview with Techane Adune, Director of Agricultural Commercialization Corridors for the ATA (July 2019); Agricultural Growth Corridors: Mapping potential research gaps on impact, implementation and institutions (CGIAR and ECDPM, 2016)

represent a program that may not be replicable without extensive government buy-in and market control, it is based on best practices of other industrial led policies that have been globally successful, particularly Asian industrial zone development. Other African governments are implementing these approaches (SAGCOT in Tanzania; Maputo Corridor in South Africa and Mozambique; Staple Crop Processing Zones in Nigeria) and could offer strategic partnership opportunities in value chains and geographies where multiple stakeholders are already aligning to improve the enabling environment for commercialization.

4.5. Development Outcomes

Development outcome success factors relate to the intended impact or benefits that publicly developed technologies are meant to create or provide. The degree of impact and the demand for that impact can drive commercialization if it is high enough; however, if the technologies being commercialized require longer timeframes to show impact or demonstrate value, then it will be more difficult to create commercial demand and a publicly financed intervention may be a better approach. Success factors related to development outcomes include:

- ❑ Scale of intended impact
- ❑ Target beneficiaries
- ❑ vulnerable populations
- ❑ Measurable impact indicators
- ❑ Public sector role
- ❑ Public-private partnerships including public financing
- ❑ Impact timeframe
- ❑ Geographic and value chain focus
- ❑ Employment opportunities
- ❑ Increased incomes
- ❑ National delivery mechanisms
- ❑ National policies and programs around development, humanitarian aid, and nutrition

EXAMPLE: MICSA BIOLOGICAL PEST CONTROL PRODUCTS

COUNTRY: Guatemala

PUBLIC SECTOR PARTNER(S): USAID, Universidad del Valle

PRIVATE SECTOR PARTNER: MISCA

TECHNOLOGY: Biological pest control

OUTCOMES BOTTLENECK: Donor partnership required and only counted sales to target, preferred geographic zones and low-income market segments that were not profitable

SUCCESS FACTOR: MICSA went outside the restrictions of the partnership and invested its own funds to target higher-yielding markets that could generate revenues needed to grow sales in less profitable markets

An example that shows the importance of setting realistic and profitable requirements on funding that supports commercialization is from a USAID funded program to support sales and promotion of biological pest control in Guatemala.[18] Farmers in Latin America use chemical pesticides to control crop pests and ensure export quality of their produce. In Guatemala, MICSA, a regional agribusiness, is developing biological pest control and soil health products to end the region's dependence on chemicals and provide small farmers with safer, more effective chemical alternative. Through a public-private partnership with USAID, MICSA launched its new state-of-the-art biological production facility in 2017 with the capacity to produce multiple biological pest control products at commercial volumes. USAID required MICSA to focus its sales on smallholder farmers in Guatemala's remote Western Highlands as part of the partnership agreement. While smallholder farmers are a core market segment for MICSA's products with limited competition, reaching commercial sales targets in the Western Highlands required considerable upfront investment in rural distribution networks, demonstration plots, and hands-on farmer training. MICSA's business model for low-income, remote markets that required longer-term returns on investments is to simultaneously invest in high-yielding markets with shorter-term returns such as export coffee or horticulture production. By restricting the company's attributable sales to the Western Highlands, the public-private partnership actually limited MICSA's ability to demonstrate the profitability of their biological pest control product lines and weakened

[18] Interview with Bob Rabasky, Partnering for Innovation 2019

internal corporate support for the product in the smallholder market. Ultimately, MICSA expanded its target market to include high-value, export crop producers in other regions of the country to ensure market traction, increase overall corporate profitability, and demonstrate product effectiveness.

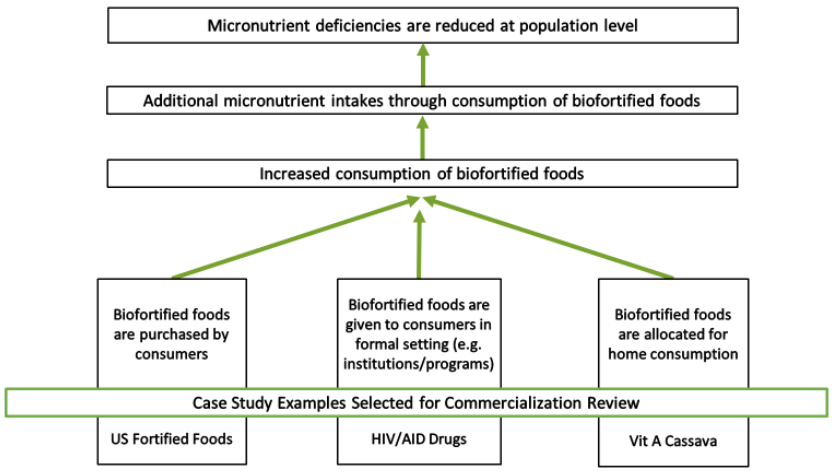
5. Commercialization Framework and Example Case Analyses

The commercialization framework is an analysis tool that overlays the commercialization process wheel and with the success factor categories in order to break down the commercialization process to identify profitability barriers and cross-cutting enablers. It allows development practitioners to organize their knowledge in a simple, consistent way so that complex information for different products being commercialized in different markets and across different country contexts can be systematically organized, analyzed, and compared. This allows for business or portfolio level analysis. Rather than providing a single solution or intervention to address each individual barrier, this framework allows practitioners to identify areas where cross-cutting interventions can accelerate impact across barriers.

The framework can identify where there are opportunities and bottlenecks for commercialization, however if the analysis fails to yield a compelling business case for private-sector partnership then it is also important to remember that commercialization is just one possible tool for achieving development outcomes. Pathways that rely on public support and end with at home consumption for farmers may also be an effective way to meet the broader aims of the GAIN/ HarvestPlus partnership. The commercialization framework can also map an organization's internal capacity or existing partnerships to identify capacity strengths and gaps and where new strategic partnerships may be necessary.

Three case studies were selected to demonstrate how the commercialization framework can be used to analyze different kinds of products along different GAIN/ HarvestPlus pathways. The three cases are not exhaustive; literature reviews and a limited number of case interviews were conducted in order to do an example analysis. Cases were selected to show a variety of contexts: (1) US fortified foods is a historical example of one of the most successful fortification initiatives in the world allowing the benefit of hindsight to analyze the full trajectory of industry and consumer adoption. (2) HIV/ AIDS medication is a global health sector example that highlights the challenges of scaling a product to low-income countries and consumers and a solution that involved large-scale public, institutional procurement. (3) Vitamin A cassava in Nigeria is a biofortified seed case that directly shows how this framework can be used by the partnership. The full analyses of these cases are presented in the attached Annex B, and the sections below summarize the background, findings and key takeaways of the selected cases.

Figure 3 GAIN/ HarvestPlus Pathways and Selected Case Analyses



5.1. Case One – US Fortified Foods – Fortified Wheat Flour and Iodized Salt

Widescale consumer and industry adoption of fortified foods was achieved in the United States throughout the twentieth century.[19] It began in the 1920's with iodized salt, continued in the 30's with vitamin D milk and in the 40's with vitamin B fortified wheat flour for bread. From the 1950's onward there was general public and industry support of the idea of fortification and growing guidance, regulations and industry acceptance of fortified production. Added calcium became an industry led effort in the 80's and from the 90's until the current day, the food and beverage industry actively adds, markets, and sees profit margins from products that are fortified and perceived to have health benefits. The evolution of the industry and creation of consumer demand for fortified foods was not inevitable – early efforts faced a variety of challenges. Iodized salt was initially developed for livestock with advocates promoting a medical product- iodine drops- for human health. Looking at how early fortification efforts in the United States led to broad uptake of fortified foods over the course of a century allows the benefit of hindsight to understand the lessons that can be learned. Early food fortification campaigns required significant public support, strong public-private partnerships, government advocacy at federal and state levels, and private-sector leadership, particularly for creating consumer demand. The cases of iodized salt and fortified wheat flour provide snapshots of two products that achieved wide-scale commercial success with initial public-sector support, but which had different demand drivers and perceived value dynamics.

5.1.1. Iodized Salt

In the early 1920s, goiters were a significant public health concern in certain areas of the US and scientists had developed an understanding of how iodine could prevent them. At the time there were no precedents for the widespread addition of nutrients to food and scientists suggested that iodized salt be used to prevent goiter in livestock and with iodine droplets for children. In 1922 a pediatrician at the University of Michigan persuaded the Michigan State Medical Society to set up an Iodized Salt Committee to promote the iodization of salt for human consumption.

The Michigan State Medical Society launched one of the world's first food fortification campaigns. The society hired experts to develop the technology for large-scale manufacture and to investigate the salt industry's concerns. The salt industry was not fully on-board. Some large manufacturers were excited by the potential to provide a public service and with others thinking that the expense of iodizing salt for consumer markets was not worth it.

The Society began to work with Michigan State legislators to plan regulations that would mandate the production of foods that would protect state citizens from goiter. Salt makers feared that unless they iodized their product, they would have to only produce unrefined salt—which contained iodine naturally—but was not aesthetically pleasing. To help create demand for iodized salt, the Society organized an educational campaign with the help of the University of Michigan, the advertising departments of the salt companies, the salt retailers, and the press. Additionally, physicians and schoolteachers were recruited to give lectures and lessons about iodized salt and government advocates proposed legislation that threatened heavier regulations. The salt industry and the Medical Society conducted baseline and on-going surveys to show impact of iodized salt on goiter prevalence. The health benefits proved by these studies were incorporated into advertisements and marketing by the salt industry and contributed to growing consumer demand.

[19] The History of Food Fortification in the United States: Its Relevance for Current Fortification Efforts in Developing Countries (Bishai and Nalubola, 2002); Dietary Reference Intakes: Guiding Principles for Nutrition Labeling and Fortification: Chapter 3, Overview of Food Fortification in the United States and Canada (Institute of Medicine Committee on Use of Dietary Reference Intakes in Nutrition Labeling. National Academies Press (US), 2003); History of U.S. Iodine Fortification and Supplementation (Leung et al, Nutrients 2012);

Categorizing the development and promotion of iodized salt on the commercialization map shows that significant investment was needed around R&D, processing and demand creation. When categorizing these bottlenecks and interventions into success factors, it is clear that investments were significantly clustered around R&D as well as development outcomes. The full analysis of this case is presented in the attached Annex B, but high-level lessons learned included:

R&D Bottleneck: Market and Product Development

- Industry-led product development may not be possible, but ***early R&D that can make the business case*** and build industry buy-in
- ***Public-sector R&D for new or improved processing techniques*** may also be a necessary intervention for industry buy-in
- ***Science should support claims of product value and impact*.** Independent studies can be important drivers of marketing and demand and may continue medium- and long-term to provide a sustained case for the impact

Demand Success Factor: Development Outcomes

- ***Multi-stakeholder campaigns can use multiple levers*** to bring industry to the table and drive demand
- ***When development outcomes are strong enough, that can be enough to drive demand itself.*** This happened in the 'goiter belt' areas of the United States where the Michigan State Health Association and legislators drove market creation
- ***Development outcomes may not be enough to drive broad demand beyond the main, target beneficiaries***, however they provide a compelling case to bring major stakeholder investment into parallel marketing campaigns and government advocacy

Figure 4: Iodized Salt Analysis

	Supply	Demand	Enabling Environment	Finance	Outcomes
Research and Development	• **Product Creation**: Initially created for animal consumption and supplements recommended for children	• **Product Testing/Development:** MSMS did research on salt consumption, iodine toxicity, taste, and processing to drive industry and consumer demand	•	• **R&D Costs:** MSMS bore most of the cost for product creation/ development & further testing with a coalition of public groups	• **Health Outcomes**: Public/ private partnership to complete surveys showing reduced goiter prevalence
Raw Material or Inputs	•	•	•	•	•
Production or Value-Add	•	•	•	•	•
Processing or Manufacture	• **Processing Technology Development**: MSMS did R&D and provided technical assistance manufacturing process	•	• **Threat of legislation** helped prompt some industry cooperation for adopting iodization process	• **Adoption of new processing** systems was ultimately paid for by private sector, but with much technical assistance	•
Distribution	•	•	•	•	•
Marketing	•	• **Multi- partner, public campaign** with a diverse array of partners to create demand	•	•	• **Industry ad campaign** that highlights the medical claims and benefits
Product Sales or Home Consumption	•	•	•	•	• **Product is a perfect/enhanced substitute** for non-iodized salt; sales were not reliant on behavior change & demand for the health outcome drove sales
Policy	•	•	• **State level legislation (Michigan)** to mandate all salt sales have minimum sodium-iodine levels	•	• **National legislation for labeling** requirements that highlight health benefits of iodized products on all salt

5.1.2. Fortified Wheat Flour

In the 1930's, vitamin-B enriched wheat flour and products were developed in the United States to prevent beriberi and pellagra. In contrast to iodized salt and goiters, however, these diseases were not particularly visible in the US and were not considered common public health problems at the time. The public had little awareness of the diseases or their impact. Rather, nutritionists based the need for intervention on estimated consumption rather than existing disease burden and framed their efforts as an insurance against future nutritional deficiencies. As a result, demand for enriched products was low.

Government incentivized industry to enrich wheat flour and products through philanthropic appeals, but the cost of fortification meant that only large mills and bakeries (representing 40% of the total supply) could reach the economies of scale needed to enrich without increasing prices. Smaller mills and bakeries instead waited to see consumer demand and willingness to pay would increase, while still producing non-enriched products at a lower price than enriched products. A public awareness campaign was launched to help increase demand, but it relied heavily on technical language that did not resonate with consumers, so it had no impact on demand. Large mills and bakeries, seeing their prices undercut by smaller competitors with non-enriched products reversed their decision to produce enriched products and the market for enriched foods diminished. Government attempted to support the market by issuing a wartime requirement for enriched foods for army procurement and a temporary mandate for all consumer foods to be enriched, but ultimately demand still failed to materialize.

It was not until after the war when government partnered with national health and science agencies, industry associations, and consumers to create a comprehensive marketing campaign that targeted consumers, industry, and legislators with focused, meaningful information about the benefits and impacts of enrichment that they were able to tip the scales on consumer demand, increasing small processors' ability to compete profitably and ensuring a long-term market for enriched products. Ultimately, state-level legislation for enriched wheat products was facilitated by conducting public research on the vitamin deficiency burden, potential impact, and food fortification policy. In addition, federal labeling requirements were passed requiring that all unenriched products must be labeled as not containing essential vitamins. These initiatives eventually contributed to the elimination of pellagra in the US.

Categorizing the development and promotion of fortified wheat on the commercialization map shows that significant investment was needed around processing and enabling environment. When categorizing these bottlenecks and interventions into success factors, it is clear that investments were significantly clustered around demand creation at both the industry and consumer levels. At the industry level the key profitability bottleneck occurred around processing economies of scale since enrichment was only profitable for large-scale processors, but these processors only made up 40% of industry, so the market failed to coalesce around enrichment. Consumer demand was also low because there was no proven disease burden, prevention of beriberi and pellagra was not a compelling driver of demand, and marketing information highlighted abstract health benefits that were largely imperceptible by consumers in highly technical language that did not resonate with consumers. The full analysis of this case is presented in the attached Annex B, but high level lessons learned included:

<u>Bottleneck: Lack of Consumer Demand</u>

- ***Without a clear, compelling business case for consumers, these levers were not sufficient to drive demand***
- ***A comprehensive, targeted marketing campaign with clear messaging for consumers, industry, and legislators with meaningful information*** about the benefits and impacts of enrichment was needed to tip the scales on consumer demand

Bottleneck: Industry Demand and Costs

- Consumer demand failed to materialize because the initial ***public awareness campaign failed to communicate the disease risk effectively,*** the public had no awareness of a visible disease burden, and the benefits of enrichment were imperceptible
- Processor willingness to enrich failed to materialize ***because incentives were not based on profitability or demonstrated consumer demand*** and instead relied patriotic or philanthropic appeals
- ***Government procurement can drive initial demand, but it cannot be successful without simultaneous investment*** in building strong consumer demand for ongoing commercialization

Figure 5 Fortified Wheat Flour Process Map

	Supply	Demand	Enabling environment	Finance	Outcomes
Research and Development	·	• **Beriberi and pellagra not priority** public health problems	·	·	• **case for enrichment was not disease burden**, rather as insurance against future deficiencies
Raw Material or Inputs	·	·	·	·	·
Production or Value-Add	·	·	·	·	·
Processing or Manufacture	• **smaller processors could not reach economies of scale** needed to enrich without increasing consumer prices	• **small processors incentivized to make cheaper nonenriched** products, larger processors reversed enriched production	·	• **No business model** (profitability) to justify the investment needed for processing enriched flour	·
Distribution	·	·	·	·	·
Marketing	·	• **marketing info about benefits of enrichment was confusing** and focused on pre-venting unknown diseases	·	·	• **nutritional benefits of the product** were not clearly marketed or compelling to most consumers
Product Sales or Home Consumption	·	·	• **Government procurement:** existed to buy only enriched flour for military consumption during wartime	·	• **Limited health impact:** flour enrichment did not offer an immediate and visible benefit to consumers
Policy	• **government-issued wartime mandate** that all flour must be enriched to leverage national defense to address nutrition	• **Failed government appeals:** philanthropic & patriotic language and threats of legislation were not effective	• **no federal labeling requirements** for enrichment, most efforts at state level and not uniform	·	·

5.2. Case Two –HIV/ AIDS Medication for the Global Market [20]

Commercialization of HIV/AIDS medication in the global market was a 15 years process from high priced medication being marketed mostly to high-come countries in the 1990's, to widespread, global availability with low cost drugs being available by 2007. Distribution of HIV/AIDS medications increased from less than 1 million treatments in 2003 to 190 million from 2004 – 2007; competition in the market increased and the price fell more than 50 percent over five years.

In 1996, antiretroviral (ARV) treatments became available, and transformed HIV/AIDS from a death sentence to a chronic disease in countries where patients, their insurance companies, or their governments could afford to pay for treatment. While HIV/AIDS became an expensive, but treatable chronic disease in the US and Europe, it became too expensive to treat in low-income markets throughout

[20] HIV Market Report (Clinton Health Access Initiative, 2018); AIDS Drugs for All: Social Movements and Market Transformations (Kapstein, Ethan and Joshua Busby. Cambridge University Press, 2013) Drug Companies Are Focusing on the Poor After Decades of Ignoring Them (McNeil, Donald. New York Times, 2019); Indian Company Offers to Supply AIDS Drugs at Low Cost in Africa (McNeil, Donald. New York Times, 2001); Interview with Prabhu, Vineet, Associate Director of HIV Market Intelligence at CHAI (August 2019); This is Not Charity (Rauch, Jonathan. The Atlantic, 2007); Market Shaping Strategy (The Global Fund, 2015); A Dollar A Day: Creating the World Market for Lifesaving AIDS Drugs (Tweel, Tamara Mann. The Open Philanthropy Project, 2018)

Africa. In the 1990's, Brazil invested in large-scale procurement of generic ARVs, turning to India, a crucial world source for generic drugs and active ingredients. Indian generics manufacturer Cipla Ltd. began reverse-engineering ARVs, creating enough volume to supply Brazil.

In 1995, the WTO implemented the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). In 1997 pharmaceutical companies used TRIPS to challenge generic ARV production when 39 pharmaceutical companies sued South Africa. The lawsuit galvanized activists and increased public awareness of the low-cost ARV access issue. The access campaign was comprehensive and critical, and used a "name and shame" approach to pressure pharmaceutical companies and politicians to drop the lawsuit and introduce 'philanthropic prices' for low-income countries. Ultimately, philanthropic prices were not a long-term solution to access for while they did lower prices, drugs were still unaffordable and by 2001, only 2 percent of people in low-income countries were receiving life-saving drugs. From 1996 drug prices went from $15,000 to $1000 per person year.

By 2001, Indian manufacturers were continuing to innovate and were able to combine multiple drugs into one fixed-dose pill, as well as develop heat resistant drug formats which no longer required cold chain. Despite these innovations, there was not a large market for these drugs as there were few existing third-party buyers and ongoing issues with pharmaceutical lawsuits. In partnership with activists, Cipla was able to lower prices of generic ARVs through bulk discounts on raw materials, manufacturing innovations, packaging elimination, and leaving distribution to national health services. From 2001 to 2003 drugs went from $1000 to $350 per person year.

Finally, in 2003 Global Fund, PEPFAR, and UNITAID started purchasing bulk orders of ARVs and distributing them to countries capable of reaching patients. These large-scale pooled procurements guaranteed the market, demonstrated demand, and incentivized increased efficiency. As a result, generic manufacturers were able to shift from high-price low-volume to low-price high-volume manufacture and stabilize the generic market to ensure low-cost access. In addition, CHAI negotiated forward prices with generic manufacturers that reflected the weighted average of their cost structure over time in order to bring ARV prices down even further. On the supply side, CHAI convinced manufacturers to accept smaller margins but produce more drugs, it helped source cheaper ingredients, and it funded the development of less expensive manufacturing and synthesizing techniques. On the demand side, CHAI persuaded manufacturers to sign multi-year deals that it had secured with large-scale third-party purchasers to aggregate national orders, smooth demand, and ensure that payments would not be defaulted. From 2003 to 2005 drugs went from $350 to $140 per person year.

Categorizing the development of ARV's on the commercialization process map shows that significant investment was needed around sales and enabling environment. When categorizing these bottlenecks and interventions into success factors, investments were clustered around supply and demand. The vertical cluster around enabling environment highlights the early perception that ARV drugs could not be used effectively in low-income countries and the lack of corporate willingness to ease intellectual property patents and increase transparency around price considerations. These enabling environment bottlenecks were mostly addressed with supply interventions once generic producers were able to bring down drug prices through raw material discounts, product innovation, process improvements, packaging elimination, and country-level distribution through national health services. Bottlenecks around sales highlighted inability of the generic markets stabilize and smooth demand in order to achieve the economies of scale and of pharmaceutical companies to serve low-income markets. These sales bottlenecks were largely overcome with success factors around demand consolidation though global, multi-lateral initiatives and national government purchase orders which stimulated innovation and economies of scale for affordable, generic drugs.

Figure 6 HIV/AIDS Medication Process Map

	Supply	Demand	Enabling environment	Finance	Outcomes
Research and Development	• **Lack of transparent pricing:** from pharmaceuticals	•	• **International patent and IP laws**: designed to protect corporate investments and not to open markets or public goods	• **IP:** pharmaceuticals patented ARV IP for high-income markets with profitable business models	• **Generic drug development:** slowed down by political unwillingness in high-income countries
Raw Material or Inputs	•	• **Limited ability to achieve bulk procurement of raw materials:** market demand was initially low and fragmented	•	•	•
Production or Value-Add	• **Poor demand forecasting:** based on current orders rather than potential need and PO lag time led to production shortages	• **Limited market information:** led to inefficient generic production with small market sizes, low growth, and high entry barrier	• **Legal production limited:** to patent holding pharm companies, which limited competition and innovation	•	•
Processing or Manufacture	• **Processing Technology Development: MSMS did R&D and provided technical assistance manufacturing process**	•	• **Limited quality control**: for generics produced without international regulations or centralized agency	•	•
Distribution	• **Undeveloped distribution networks** • **Difficulties maintaining cold chains**	• **Low-income consumers:** were hard to reach and required high-cost distribution channels to be built	•	• **High distribution costs:** limited companies and philanthropies from reaching last mile, low income consumers	•
Marketing	• **Generic market inefficiencies:** limited product availability, unaffordable prices & lack of tailoring to low-income markets	• **Limited uptake of new treatments:** driven by provider attitudes and client perceptions of side effects	•		•
Product Sales or Home Consumption	• **Limited forecasting** possible for disorganized generic markets leading to product not being available	• **Unaffordable:** drugs developed by patent-holding pharmaceuticals and initially by generic producers	• **Large-scale procurement** makes drugs affordable, but has potential to distort markets and must be tailored to specific product or country	• **Lack of transparent pricing:** from pharmaceuticals limited development of alternatives and viable business models	• **Limited political willingness to** for low-cost innovations • lower prices could put high costs on new firms, generics, govts
Policy	• **IP laws** designed to enforce the most restrictive laws	• **Lack of market transparency** on volumes, prices, and demand, which decreased competition and split procurement	• **Global commitment needed** to stabilize generic market prices which were irregular, opaque, & dependent on patent-holders	• **Global intervention needed** to stabilize generic markets and create a viable business model for generic producers	• **Low priority** in most low-income countries due to complexity of ARVs, limited funds and infrastructure

The full analysis of this case is presented in the attached Annex B, but high level lessons learned included:

<u>Enabling Environment and Supply Efficiencies:</u>

- ***Public institutions can play a key role in creating and consolidating markets*** to benefit low-income markets by leveraging public funds to pool procurement so that manufacturers can supply a smoother demand and quickly reach economies of scale
- Promoting *full* ***market transparency—price data, volumes, demand, and supply—can contribute to increased competition and improved negotiations*** even for buyers not participating in pooled procurement
- ***Intellectual property and market regulation policies can be amended to create a win-win*** by protecting technology developers' interests in high-income markets while still ensuring that low-income consumers with a high demand for affordable drugs tailored to their product use needs have access to live-saving technology

<u>Product Sales and Demand Consolidation:</u>

- Addressing demand drivers was critical in lowering drug prices, but it was not enough to drive affordability; **market shapers must work on both sides of the equation, building advocacy for consumer demand and creating willingness by suppliers** to engage on price
- Given the global nature of markets, **strong partnerships are especially important;** the cooperation between public institutions, nonprofits, and generic pharmaceuticals to lower drug prices was completely novel
- Without a serious **global commitment to permit and promote generic production**, ARV prices would have remained irregular, opaque, and completely subject to the companies holding patents

5.3. Case Three –Vitamin A Cassava in Nigeria [21]

It is estimated that one-third of preschool aged children and one-fifth of pregnant women in Nigeria are Vitamin A deficient. Supplementation and fortification programs exist to address these deficiencies; however it is estimated that only about half of school aged children receive the treatment, and that while fortification requirements have increased Vitamin A consumption through wheat and maize flours, vegetable oils, margarine, and sugar, consumption remains relatively low. In this context, biofortified Vitamin A cassava was developed in Nigeria by the International Institute for Tropical Agriculture and the International Center for Tropical Agriculture (IITA & CIAT) from 2003 to 2011 when the first variety was approved for release. Another improved variety was released in 2014, which can provide up to 40 percent of the Vitamin A recommended daily allowance for children under five. In addition to its higher beta-carotene content, biofortified Vitamin A cassava varieties also have improved pest- and disease-resistance and are high yielding.

Programming to promote Vitamin A cassava has included public and private sector partnerships for multiplication and distribution of stems to farmers through extension agents and rural facilitators. Additionally, public awareness campaigns to promote consumer demand have been implemented leveraging mass media, Nollywood, education institutions, and government advocacy. HarvestPlus is also working to increase and connect market outlets by promoting commercial processing for gari and fufu, and through one-stop shops where consumers can buy vitamin A cassava stems, tubers, and ready-to-eat products. Concentrated advocacy efforts focused on strengthening national ownership of biofortification through effective integration into national nutrition and agricultural policies including the Agricultural Transformation Agenda and the Micronutrient Nutrient Deficiency Control programs.

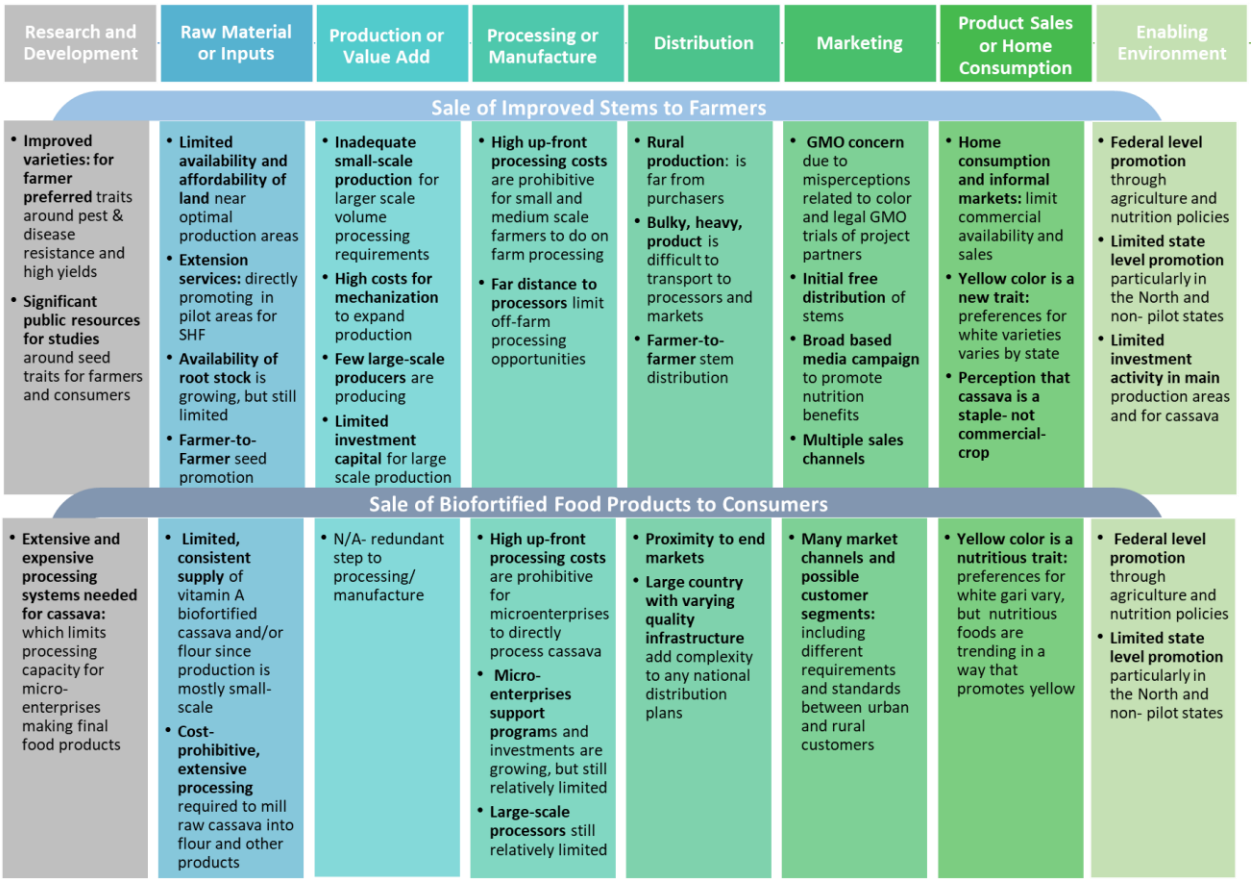
A significant amount of literature has been published to date to both document these efforts and monitor uptake of the crop. Studies generally show the cost effectiveness of biofortification as compared to supplementation, consumer acceptance of the product especially when paired with health information, and general efficacy of biofortification in Nigeria in terms of estimated production, consumption and estimated impact on Vitamin A deficiency. HarvestPlus estimates that about 1.3 million improved cassava stems have been distributed to 672 communities and almost 460,000 farmers across Nigeria with 245 cassava processing centers established. Vitamin A cassava remains one of the most successful HarvestPlus, biofortified crops in terms of estimated uptake.

While these numbers represent significant adoption, uptake has been mostly concentrated in south and west, half a million farmers are a small percent of the estimated 14 million small holder farmers in Nigeria, and processing has been mostly focused on micro-enterprises that have limited reach. The logistics and costs of expanding medium- and large-scale commercial production and processing of cassava are not insignificant. Large scale investors are not connected to the priority markets and issues remain with producing or delivering required quantities of Vitamin A cassava input to large scale processors. Promotion to small-scale farmers and microenterprises is effective but is a time and labor-intensive process, particularly considering HarvestPlus and GAIN targets to reach hundreds of millions of consumers with biofortified products in the next 5 years. Although stem sharing has organically occurred in non-

[21] New, More Nutritious Vitamin A Cassava Released in Nigeria (HarvestPlus, 2014); A Technical Review of Modern Cassava Technology Adoption in Nigeria (1985–2013): Trends, Challenges, and Opportunities(Oparinde et al., HarvestPlus Working Paper, 2016); Bio-fortification in Nigeria: A Systematic Review of Published Studies (Onyeneke et. al., 2018); Vitamin A Cassava in Nigeria: Crop Development and Delivery (Ilona et. Al., AJFAND, 2017); Yellow is good for you': Consumer perception and acceptability of fortified and biofortified cassava products (Bechoff at al, 2018); Global Prevalence of Vitamin A Deficiency in Populations at Risk 1995–2005 (WHO Global Database on Vitamin A Deficiency, 2009); http://www.harvestplusng.org/ (Website accessed August 2019); Interviews with Pail Ilona and Donald Mavindidze, HarvestPlus Africa and Nigeria (August 2019); HarvestPlus: State-of-Art and Program Strategic Priorities in Biofortified Crop Development and Commercialization - Page 28 (Pfeiffer, 2015); Improving nutrition through biofortification: A review of evidence from HarvestPlus, 2003 through 2016 (Bouis and Saltzman, Global Food Security, 2017);

targeted areas, this natural distribution is also a slow process. Additionally, while national policy and programming has been supportive of the variety, state level programming has been slower to incorporate Vitamin A cassava into their agendas and programs. Initial promotion of the crop has been a relative success, but sustained investment is needed for the crop to reach it's intended scale of impact.

Figure 7 Vitamin A Cassava Barrier Identification Done in Two Parts



Categorizing the development of biofortified cassava on the commercialization process map shows a clustering of investments and activities are needed for raw material inputs. A horizontal clustering along the supply reinforces the analysis that commercialization bottlenecks for cassava lie more on supply-side issues for both the seed to farmer and industry to consumer processes. Initial clustering of potential success factors around outcomes and demand are positive indications that continued activities in these areas may be able to yield results as larger supply bottlenecks are overcome. The full analysis of this case is presented in the attached Annex B, but high-level lessons learned from the initial eight years of commercialization efforts for Vitamin A cassava include:

<u>Overall lessons:</u>

- Strategies for commercialization of seed need to ***consider bottlenecks for both how seed will reach farmers and how biofortified grains and products will reach consumer markets***
- Both ***small scale (SHF and micro-enterprise) and large-scale production and manufacturing are both viable options for broad commercialization, but each comes with trade-offs.*** Outreach through small and medium sized channels may need more time and resources for widescale adoption, while large market channels may not reach the most vulnerable, target populations

- ***Complex supply, market, and distribution channel eco-system requires a multi-pronged marketing*** and outreach campaign that still may only reach limited customer segments

Key Bottlenecks: Input supply chains

- ***Demand creation may not be enough*** to drive supply chain partners when significant processing, distribution and marketing costs and barriers exist
- ***Successful farmer promotions can have spillover effects outside of target areas,*** but more investment may be needed to speed up market penetration timeline
- ***Successful small and medium scale production is limited in scope.*** Broader reach to national, state or urban markets likely need larger-scale partners and a different strategy for production and market supply

Figure 8 Vitamin A Cassava Commercialization Analysis

	SUPPLY	DEMAND	ENABLING ENVIRONMENT	FINANCE	OUTCOMES
Research and Development	• **Extensive and expensive processing systems needed for cassava**	• **Improved varieties: for farmer preferred** traits around pest & disease resistance and high yields	•	•	• **Significant public resources for studies** around seed traits for farmers and consumers
Raw Material or Inputs	• **Limited availability & affordability of land** • **Availability of root stock** is growing, but still limited	• **Farmer-to- Farmer** seed promotion is growing but still limited	•	• **Cost-prohibitive, extensive** processing required to mill raw cassava into flour	• **Extension services:** directly promoting in pilot areas for SHF
Production or Value-Add	• **Inadequate small-scale production** for larger scale volume processing requirements	•	•	• **High costs for mechanization** • **Limited investment capital** for large scale production	•
Processing or Manufacture	• **High up-front processing costs** are prohibitive for small scale farmers & limited no. of large-scale processors	•	•	• **High up-front processing costs** are prohibitive for small and medium scale farmers and microenterprises	• **Micro-enterprises support programs** and investments are growing, but still relatively limited
Distribution	• **Proximity to end markets** • **Bulky, heavy, product** is difficult to transport	• **Farmer-to-farmer** stem distribution	• **Large country with varying quality infrastructure** add complexity to any national distribution plans	•	•
Marketing	• **Multiple sales channels** and possible customer segment requires differentiated product delivery	• **GMO concern** due to misperceptions related to color and partner programs • **Initial free stems**	•	•	• **Broad based media campaign** to promote nutritional benefits
Product Sales or Home Consumption	• **Home consumption and informal markets:** limit commercial availability and sales	• **Yellow color is a new trait:** preferences for white varieties varies by state	•	•	• **Yellow color is a nutritious trait:** growing in popularity, although preferences for white gari still vary
Policy	• **Federal level programs** to promote and improved, nutritious production	•	• **Limited state level promotion** particularly in the North and non- pilot states	• **Limited investment activity in main** production areas and for cassava	•

6. Partnerships and Program Management

Once a commercialization case has been made, private sector partners can be identified based on their unique ability to profitably address the identified barriers and enabling opportunities identified during the analysis. Partner selection criteria allows development practitioners to clearly recognize how potential private sector partners will address identified commercialization bottlenecks or needed organizational capacity. Five key criteria for private sector partner selection mirror the five success factors categories: business model (finance), commercial viability (demand), legal requirements (policy), organizational capacity (supply), and beneficiary impact (development outcomes). It is important to note that these criteria do not focus just on the innovation of a company's technology or the potential impact, rather they allow development practitioners to identify partners who can make a strong business case for bringing a new technology to market profitably. For potential partners that are strong in some key areas but do not

meet all five criteria, requirements can be prioritized according to the most pressing capacity needs and potential value-add to the partnership.

Some literature around developing both operational partnerships and broader, multi-stakeholder initiatives (MSIs) in the agriculture sector can be further referenced to identify more lessons learned for selecting and engaging with partners.[22] *Scaling Agriculture Technologies through Public-Private Partnerships* characterized four partnership models to boost commercialization: (1) distributor; (2) aggregator; (3) acquisition; (4) from existing networks and systems, while the fourth is more relevant to public sector, cross-cutting partnerships. These cross-cutting partnerships are further characterized in *Multi-stakeholder Initiatives: Lessons from Agriculture* into two kinds of functional relationships: (1) launch type and (2) functional types. These partnership categories help break down unique lessons learned for getting a new initiative off the ground and for maintaining them for on-going programs. Both publications offer several relevant, agriculture sector case-studies. These publications, as well as *Partnering for Innovation's: Practitioner Guide* and many landscaping interviews, guided the development of partnership selection and engagement best practices.

One important pre-condition for moving forward with partner selection and program planning is an assessment of profitability. Bottlenecks identified during the analysis will likely relate back to areas where costs limit profits or where financial success factors are not in place. For seed technologies, multi-year seed demand forecasts for target customers in both formal and informal markets (and accounting for saved seed) will determine the scale of the potential interventions and impacts. Cost analysis is essential to making the case for pure, private sector commercialization. If the targeted technology is not profitable for any stakeholder along the process, then commercialization will not succeed and the private sector is not an appropriate partner; rather, a public sector-oriented intervention is required instead (BGMF, 2015). Once the private sector has been determined to be an appropriate partner, the five key criteria can be used to select the most appropriate private sector partners.

6.1. Private-Sector Partner Selection [23]

Partner selection should be based on the strengths, weaknesses, opportunities, and constraints within the sector, organization or initiative being considered. Partner selection criteria allows development practitioners to clearly recognize how potential private sector partners will address identified commercialization bottlenecks or needed organizational capacity. These criteria do not focus just on the innovation of a company's technology or the potential impact, rather they allow development practitioners to identify partners who can make a strong business case for bringing a new technology to market profitably. For potential partners that are strong in some key areas, but do not meet all five criteria, requirements can be prioritized according to the most pressing capacity needs and potential value-add to the partnership.

Business Model: At the core of the finance success factor is a profitable business model, which any private sector partner should have for a fully commercial initiative. Most companies use multiple business models at the same time and shift between different models over time to address evolving challenges. There is no one model that provides the best fit for private sector engagement, rather it is important to demonstrate that a strong business case exists for the product and partner. The technology being commercialized must be part of the partner's core business model rather than part of a social impact or corporate social responsibility program and must contribute to the partner's total financial profitability or provide a break-even point when the product will provide returns. A general indicator of a private sector

[22] Scaling Agricultural Technologies Through Public-Private Partnerships (Feed the Future and Agrilinks 2013, Spears et al); Partnering for Innovation: Practitioners Guide (Partnering for Innovation 2018); Multi-stakeholder Initiatives: Lessons from agriculture (Winters et al, Harvard Kennedy School 2018)

[23] In addition to the citations referenced in the previous footnote, this section is also informed by Interviews with Burrows and Rabatsky

partner's potential success is a clear understanding of their business capacity, market strengths, and strategic partnerships already in place. Specific partner criteria should focus on the partner's business goals and objectives, how the products or services contribute to those objectives, target customer segments, market constraints and opportunities, and the company's competitive advantage.

Commercial Viability: At the core of the demand success factor is commercial viability both generally and in terms of target markets and customers. This requires private sector partners to establish a clear commercialization timeline with realistic milestone dates for manufacture, product launch, distribution, initial sales, and total profitability. In addition, the potential for long-term growth of the technology's market share and market sustainability must be verified based on reliable market research. Specific partner selection criteria should focus on the affordability of the product or service, the cost of production, its break-even point, current market share, and at least five years of financial projections. A general indicator of a private sector partner's potential commercial success is a clear understanding of their differentiated customer segments; for example, targeting market segments with geographic, gender, income, and age differentiation. In addition, awareness of market competitors and the ability to articulate the company's competitive advantage all demonstrate an ability to serve the market in the long term.

Legal Requirements: At the core of the policy success factor is compliance with legal requirements including registration to conduct business in the country or region. Additionally, the partner must have legally licensed the intellectual property for the technology, and all required labor, health, and environmental certifications. This due diligence will determine whether the partner has the operational, financial, and administrative systems in place to appropriately manage the partnership, including accepted accounting practices, inventory management, and customer tracking. Specific partner criteria should focus on assessing the strength of the proposed company's organizational and operational systems and processes, including organizational structure, principal corporate officers, financial management systems, technical experience, scale of operations, and past performance. This work includes requesting and compiling copies of all management, administrative, financial, and technical documentation to ensure that the partner has the necessary working capital and organizational structure to carry out the proposed work successfully. A general indicator of a private sector partner's operational, financial, and administrative readiness is feedback from business references, audits of financial systems, as well as site visits to see offices, facilities, and farms.

Organizational Capacity: At the core of the supply success factor is the operational systems and capacity to deliver a final product to the market. Partners must demonstrate that they have access to sufficient human capital, physical assets, and credit necessary to commercialize the technology. The proposed initiative must have political and financial support within the company and cannot be fully dependent on donor funding or partnership support for market entry. Specific partner selection criteria should focus on the partner's business and management qualifications as well as leadership buy-in. At a minimum a business' leadership needs to be aware and supportive of the partnership and associated level of effort; in a best-case scenario, leadership is directly involved and has a direct stake in the success of the partnership. A general indicator of a private sector partner's organizational capacity is the involvement of multiple key corporate decision-makers in the partnership development process. If the senior leaders and key decision-makers are not totally committed to growing their share of the technology's market, then the partnership will not result in sustainable outcomes.

Beneficiary Impact: At the core of the development outcome success factor is the intended beneficiary impact of a publicly developed product. Private sector partners need to demonstrate a business model that reflects long-term commitment to marketing the commercialized technology to the targeted beneficiaries and geographies. This usually requires a track record in operating and marketing technology in the target market and a capacity to market the product at the scale needed for the intended impact.

Specific partner selection criteria should focus on the number of beneficiaries potentially impacted by the commercialization of the technology, the extent to which individual beneficiaries are impacted by the commercialization of the technology, the extent to which individual beneficiaries are impacted by resulting value chain improvements such as improved market opportunities or increased access to information, and how traditionally marginalized market segments such as women or last mile customers. A general indicator of a private sector partner's ability to reach the targeted beneficiaries is the extent to which the targeted beneficiaries comprise a key market segment for the company across other products and services offered.

6.2. Partnership Engagement Best Practices

The key to successful public-private partnerships is a strategic approach to relationship management that can be implemented regardless of funding mechanism or public sector partner. All partnerships can be made more effective by focusing on a collaborative partnership for the achievement of mutual goals. Development practitioners can foster a more strategic relationship by drawing on the strengths of both public and private sector partners to better implement commercialization activities. Key management practices that have resulted in successful public-private partnerships include aligning stakeholder goals, selecting appropriate interventions, determining clear partnership criteria, negotiating performance-based milestones, tracking impact collaboratively, and providing clear, transparent decision-making.

Align Stakeholder Goals: Multiple stakeholders need to work towards successful commercialization initiatives. Collaboration will only be successful if each stakeholder's motivation is clearly aligned with the overall outcome. Even if stakeholder goals seem clear, they are often understood intuitively rather than explicitly. All partners need to explicitly and transparently share their goals including the assumptions and trade-offs used to determine priorities. In particular, the private sector will prioritize its financial bottom line over the achievement of development goals, so partnership value statements need to reflect all goals that will be achieved through the initiative.

ALIGN GOALS CASE EXAMPLE: EXPORT TRADING GROUP

COUNTRY: Mozambique

PRIVATE SECTOR PARTNER: ETG

PUBLIC SECTOR PARTNER: USAID

PARTNERSHIP GOAL: Promote female entrepreneurship

PROPOSED ACTIVITY(IES): Establish independent input shops at their rural aggregation hubs that would be run by women entrepreneurs.

RESULT: The company had no incentive to train or support the women entrepreneurs, as it did not contribute to their bottom line. Without any business training and support, 30 to the 33 input shops failed. At the end of the partnership, ETG sold the shop network to a strategic partner with retail experience to own and operate more effectively.

An example that demonstrates the need to align stakeholder goals is Export Trading Group (ETG) in Mozambique. ETG is a multi-national commodity exporter with supply chains throughout Africa and South Asia providing vertical integration of procurement, warehousing, processing, and finished goods. Smallholder farmers are deeply integrated into their business model, and in Mozambique ETG partnered with USAID to build last-mile infrastructure that would allow them to purchase and warehouse smallholder output closer to the source, benefitting both the company and farmers. To increase their competitiveness for the USAID funding, ETG proposed to establish independent input shops at their rural aggregation hubs that would be run by women entrepreneurs. While this element of their proposal was attractive to the funder, the shops were independent and did not add to the company's bottom line. As a result, the company had no incentive to train or support the women entrepreneurs, and they were left to largely succeed or fail on their own with some of them taking on considerable debt to keep their business afloat as long as possible. Without any business training and support, 30 to the 33 input shops failed in less than a year. The input shops and women entrepreneurs met the development agency's goals, but did not contribute to ETG's objectives, and the company fail to invest in them accordingly. At the end of the

partnership, ETG sold the shop network to a strategic partner with retail experience to own and operate more effectively.

Select Appropriate Interventions: The private sector is not an appropriate partner for all development activities; rather, public institutions and development organizations must identify where public and private sector priorities overlap and select areas of intervention that maximize the strengths that both public institutions and private sector companies bring to the partnership. This process allows development organizations to select specific areas of intervention with the private sector based on mutual partnership goals, sector opportunities, and individual organizational strengths, as well as public priorities such as gender empowerment, social inclusion, environmental sustainability, and collaboration with other initiatives working in the region. Even if targeted value chains and geographic regions are already determined according to organizational strategy, this selection process allows development organizations to identify where in the commercialization process they can best focus their efforts within those constraints, and how to best leverage the private sector's strengths to catalyze scalable impact.

A case where a donor failed to select appropriate interventions is USAID in Guatemala. In 2015, USAID/Guatemala began a program to strengthen private sector partner in the agricultural sector to achieve a number of economic development goals but failed to select specific areas of intervention that were aligned best to private sector involvement. USAID restricted partner activities, focus regions, and target beneficiaries to only their key focus areas and regarded any technology introduction outside of these restrictions as irrelevant to the partners' required deliverables. As a result, the private sector partners struggled to meet their targets, and began focusing on achieving numbers by any means necessary and some companies lost broader corporate support for the funded product lines as they appeared to be unprofitable given their sales restrictions. One example was horticultural exporter Fair Fruit who in partnership with Mercy Corps was required to facilitate youth farming groups for horticultural production. Due to the geographic and age restrictions imposed by their donor funding, they were required to focus in a region where youth have limited access to and ownership of land. Since adults were not applicable to their final targets, Mercy Corps created unsustainable youth farmer groups where participants did not necessarily live in the same communities or even know each other, but where there was at least some access to land. As a result, the youth groups were large and unwieldy and unable to produce sufficient volume for all members to see some profit, and they fell apart after the end of the partnership. With such restricted target beneficiaries, the private sector was unable to make sustainable systemic change for smallholder farmers; in such cases, public sector partners or nonprofit organizations could be better leveraged for successful interventions.

SELECT APPROPROATE INTERVENTIONS CASE EXAMPLE: USAID/ GUATEMALA PRIVATE SECTOR PROMOTION

COUNTRY: Guatemala

PRIVATE SECTOR PARTNER: Multiple; Fair Fruit Exporter

PUBLIC SECTOR PARTNER: USAID; Mercy Corps

PARTNERSHIP GOAL: Promote livelihood development for specific marginalized populations

PROPOSED ACTIVITY(IES): Establish youth farming groups in a region where there was limited land access

RESULT: The partnership established groups across multiple communities that were far apart, but where some land could be found. Groups were logistically difficult to maintain and not truly community based and land size was still limited in a way that limited profitable production. Groups fell apart after project without MercyCorp's facilitation.

Determine Partnership Criteria: Development organizations often invest time and resources in partnership opportunities reactively, but it's critical that they clearly state their terms for partnership with the private sector proactively to select the right partner to reach their goals. Staff have limited time and resources, and relationship management takes significant investment, so all private sector partnerships

must be strategically chosen, rather than simply partnering with companies that are available or interested. Organizations must use a transparent decision-making process for determining what kinds of private sector partners are most appropriate for addressing the specific development challenges they are facing in their selected intervention areas. This will allow them to set the terms for partnership from the outset. This will ensure that investments go to partners with the most effective business strategy, organizational capacity, and commercial viability, rather than those with interesting technology or visionary leaders.

It is also important to remember that rather than prioritizing selection criteria in order of "importance," development organizations should think about the partner selection criteria in terms of what is more or less negotiable. For example, if a partnership activity is not in a company's financial interest then no amount of negotiation is going to incentivize them to implement that activity; on the other hand, criteria such as geographic focus or total overall impact may be more negotiable and should not disqualify potential partners who do not initially meet required targets. Also, while it is best to not be too restrictive when determining partner selection criteria in order to allow the broadest possible range of partners, it is also easier to weed out unsuitable partners from the start, so development organizations must decide how to best manage that trade-off.

DETERMINE PARTNERSHIP CRITERIA CASE EXAMPLE: NETAFIM

COUNTRY: Israel

PRIVATE SECTOR PARTNER: Netafim

PUBLIC SECTOR PARTNER: Partnering for Innovation (PfI)

PARTNERSHIP GOAL: Bring potentially transformative agriculture technologies to market for small-holder farmers

PROPOSED ACTIVITY(IES): Sales of innovative, micro-drip irrigation systems for smallholder farmers in Kenya

RESULT: The partnership was driven by a single, global board member without broad company buy-in. PFI moved forward based on the technology and company reputation. Product was offered by local distributors, but not promoted and sales remained low. The initiative failed to reach a even a fraction of its sales goals.

An example of how selection criteria can impact partnership decisions is USAID's global Partnering for Innovation program and their partnership with Israeli drip irrigation company Netafim. USAID's Feed the Future Partnering for Innovation program is a $60M investment portfolio providing strategic grant funding to private sector partners to bring potentially transformative technologies to global markets. The program has completed over 20 rounds of funding, resulting in over 50 private-sector partnerships. In early funding rounds, PfI's selection criteria as set widely as possible to attract the broadest range of companies, and they heavily weighted the technology criteria. As a result, early funding rounds focused on innovative, exciting technology, but often failed to adequately consider the product's business model and business management capacity. One of the first program partners was Netafim, an international leader in drip irrigation, who proposed sales of micro-drip irrigation systems for smallholder farmers in Kenya. The company was selected based heavily on their proposed technology, as well as their global reach and reputation. However, the proposal came largely from one board member and was viewed internally as a passion project, and the company was unwilling to devote resources to its success. Netafim's local distributors also considered the micro-drip kit a product they had to sell to keep their supplier happy, but they were not incentivized to promote the product, and as a result, sales were low. These were all issues raised during the due diligence and negotiation process, but the program interested in promoting a strong technology and they failed to account for the significance of the corporate management challenges. Ultimately, the partnership failed to reach even a fraction of its goals. Partnering for Innovation re-evaluated their approach in subsequent funding rounds to focus more on business capacity and management, as well as technology innovation.

Negotiate Performance-Based Milestones: It is important to have a clear, transparent process for negotiating performance milestones upfront with private sector partners. While this process requires a considerable amount of work upfront, it allows development organizations to set realistic, mutually beneficial expectations and provides easy check-in points for monitoring progress throughout the partnership and sets the tone of the partnership. Milestones work well to clearly indicate partnership requirements and timelines, but also allow businesses enough flexibility to respond to market changes quickly in order to meet the partnerships ultimate goals. This means that private sector partners are not locked into an approach so long as they deliver the agreed upon results. Milestones may be negotiated as part of a funding mechanism; however, with or without funding, they are a management tool that can provide relationship managers with clear check-in points and deadlines for key activities. Milestones must contribute to the private sector's bottom line and build up to a final results rather than intermediate processes; milestones around development activities like training or data collection should be avoided unless they're critical to the intervention's success since private sector partners will not be incentivized to invest in activities that are not profitable.

NEGOTIATE PERFORMANCE BASED MILESTONES CASE EXAMPLE: MUSONI MICROFINANCE

COUNTRY: Kenya

PRIVATE SECTOR PARTNER: Musoni Microfinace

PUBLIC SECTOR PARTNER: Grameen Foundation

PARTNERSHIP GOAL: Improve and expand its smallholder loan product in rural areas

PROPOSED ACTIVITY(IES): streamline the loan application process, shorten the disbursement time, and increase reach to smallholder borrowers

RESULT: Negotiation was used to streamline and improve the partner's proposed activities including identifying places where the donor could strengthen capacity to achieve highest possible targets. Musoni achieved smallholder loan targets of more than four times their original proposal.

An example of how milestone negotiation can add value to public-private partnerships is Musoni Microfinance in Kenya. Musoni Microfinance is a cashless, data-driven banking institution in Kenya that provides loan products designed to maximize the business potential of low-income and unbanked individuals through the provision of affordable, flexible, and customer-oriented financial services. Musoni, in partnership with Grameen Foundation Kenya, sought donor funding to improve and expand its smallholder loan product, Kilimo Booster. The donor was deeply interested in a partnership that would help Musoni develop a software to streamline the loan application process, shorten the disbursement time, and increase the financial institution's reach to smallholder borrowers in rural areas across Kenya. However, partnership activities were not simply accepted at face value; rather, negotiation was used to streamline and improve the partner's proposed activities. For example, Musoni was naturally conservative in its estimates for potential impact, so the donor pushed them to build their capacity to achieve the highest possible targets and ensure maximum impact for smallholder farmers. As a result, Musoni achieved smallholder loan targets of more than four times their original proposal. When asked about the negotiation process at the end of their partnership, Musoni said "at first, we weren't friends," but indicated that once negotiations had been completed, everything after that was easy. While the upfront negotiations were intense and often uncomfortable, they ultimately added value to the partnership by increasing both the partner's profitability and the donor's outcomes.

Track Impact: Private sector partners operating under resource constraints simply will not collect data that doesn't impact their business. Even if funding is provided, they will only do the bare minimum if the data has no value beyond donor reporting. Upfront negotiations that recognize the trade-offs between data quality and data collection costs as well as the value of the data for each partner can reduce tensions that will naturally arise over the need to meet reporting requirements. It is critical to be realistic about what information the private sector can collect, to use existing sales information when possible and provide additional support for data and reporting when it is needed.

Often private-sector partners may not realize how useful customer information and business management data can be and it may be the development organization's role to demonstrate that value. Conducting a customer survey or improving sales data systems on behalf of a private sector partner is a good way to demonstrate the value of good customer data. Development organizations also have the capacity to leverage and support reporting so their role should also be negotiated to recognize existing resources for data collection, including organizational monitoring and evaluation activities, field implementation projects, and local government data and surveys.

TRACK IMPACT CASE EXAMPLE: KIDOGO

COUNTRY: Kenya

PRIVATE SECTOR PARTNER: Kidogo

PUBLIC SECTOR PARTNER: BMGF, IDEO.org, World Vision, Echoing Green, UBS, and Global Grand Challenges

PARTNERSHIP GOAL: Expanding the number of community hubs serving poor women and children

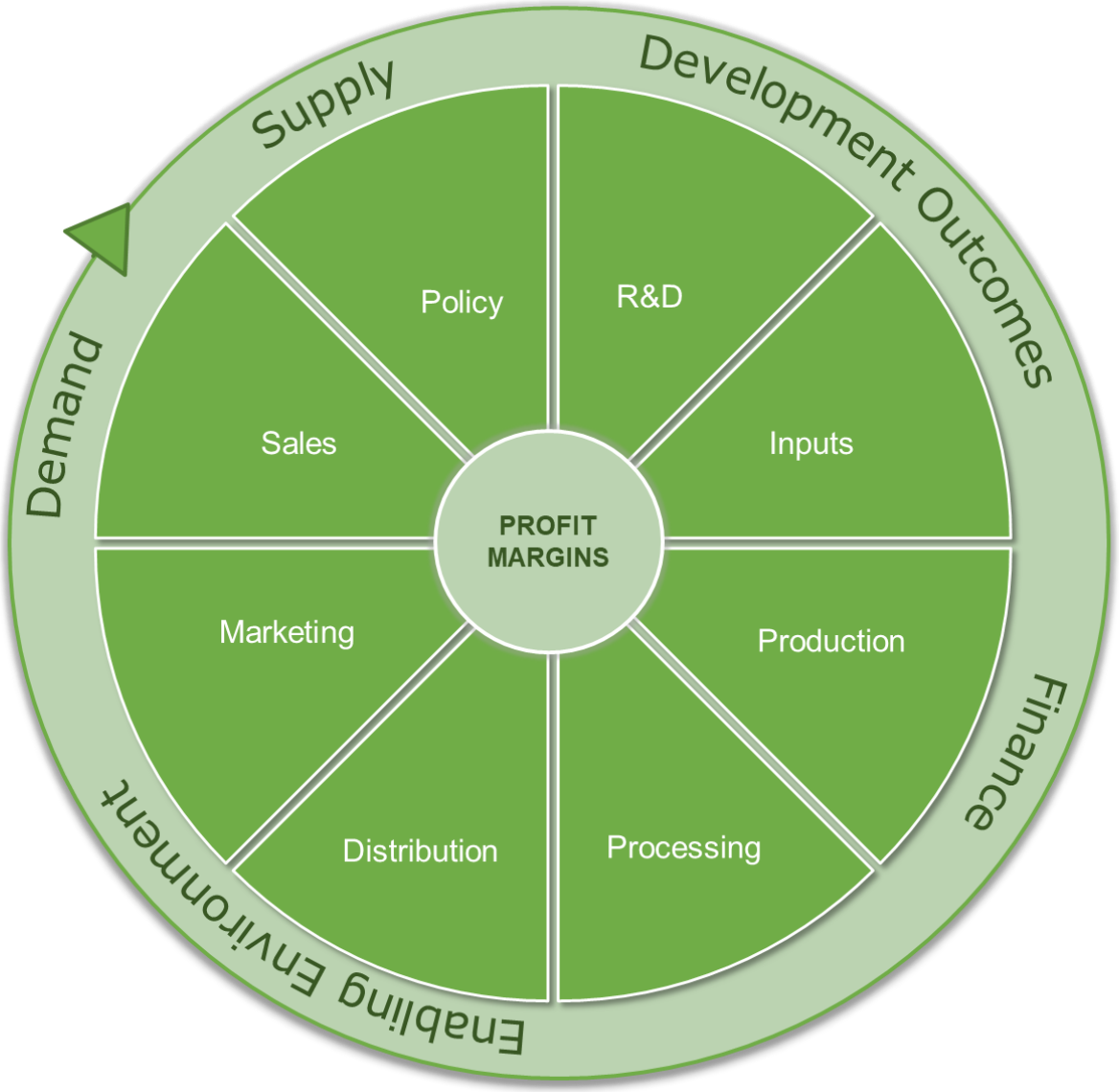
PROPOSED ACTIVITY(IES): On-going, expanded operations with additional reporting requirements from all funders

RESULT: Kidogo staff conducted a cost-benefit analysis of their different funding relationships and found that several of their grants were costing them as much to manage as they contributed to program activities. Staff developed a list of metrics that were useful to the business and renegotiated their data indicators with their funders to streamline reporting requirements.

An example of the need for collaborative impact tracking is Kidogo in Kenya. Kidogo is a social enterprise dedicated to providing high-quality childcare and livelihoods for vulnerable women in Nairobi's urban slums. Kidogo helps women achieve financial independence by starting their own childcare businesses, which provide livelihood opportunities to the entrepreneurs and safe spaces for children whose mothers work outside of slums. In 2014, this business had secured funding through both many investors and funders including the Bill & Melinda Gates Foundation, IDEO.org, World Vision, Echoing Green, UBS, and Global Grand Challenges and was actively expanding the number of community hubs serving poor women and their children. With so many funders requiring different metrics, company staff felt that they were dedicating more time to reporting than implementation. So Kidogo staff conducted a cost-benefit analysis of their different funding relationships and found that a number of their grants were costing them as much to manage as they contributed to program activities. So staff collaborated to develop a list of metrics that were useful to the business and renegotiated their data indicators with their funders to streamline reporting requirements, and opted not to renew or pursue funding relationships that did not meet their metric reporting criteria. By negotiating their performance indicators, Kidogo is not only saving staff time and resources, both of which are exremely limited in a startup, but they are also leveraging their funding relationships to generate critical business information that can feed back into improving the quality and efficiency of their services.

Manage Successful Relationships: It is important to look at private sector partnerships as relationships between equals rather than donor or development relationships. As such, both parties need to bring value to the relationship and the development organization must dedicate time and resources to ongoing relationship management. The key factors to strong private sector partnerships are mutually beneficial outcomes, clear expectations, direct communication, transparent decisions, and trust. Especially when the development organization is the donor, it is the organization's responsibility to demonstrate the trust and transparency it expects from the private sector partner. In addition, clear communication of expectations is critical for strong private sector partnerships, and regular and ongoing communication with partners that revisits these expectations, even if both parties are seemingly clear, helps ensure that they are met. Transparent decision-making is critical for building and maintaining trust with private sector partners; if both parties understand how decisions were arrived at, they are more likely to accommodate unforeseen needs as they occur.

7. Annex A 1– Commercialization Framework



Annex A 2– Commercialization Framework Worksheet

	SUPPLY	DEMAND	ENABLING ENVIRONMENT	FINANCE	OUTCOMES
Research and Development	•	•	•	•	•
Raw Material or Inputs	•	•	•	•	•
Production or Value-Add	•	•	•	•	•
Processing or Manufacture		•	•	•	•
Distribution	•	•	•	•	•
Marketing	•	•	•	•	•
Product Sales or Home Consumption	•	•	•	•	•
Policy	•	•	•	•	•