FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

OUTGROWER BUSINESS MODEL LEARNING STUDY

A CONSULTANCY TO EVALUATE THE SUSTAINABILITY OF THE OUTGROWER BUSINESS MODEL AND INDICATORS OF SYSTEMIC CHANGE

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CONTENTS

INTRODUCTION 3
INDICATORS OF SYSTEMIC CHANGE 4
FACILITATING RELATIONSHIPS 6
NEW ROLES IN VALUE CHAIN 11
INVESTING RESOURCES 14
RULES AND NORMS 18
RETURN ON INVESTED CAPITAL (ROIC) 20
REVENUE/OPERATING MARGIN: MARKETING 20

ACRONYM LIST

ADB	Agricultural Development Bank
ADVANCE	Agricultural Development and Value Chain Enhancement
ATT	Agriculture Technology Transfer
FinGap	Financing Ghanaian Agriculture Project
ICT	Information and Communication Technology
LEO	Leveraging Economic Opportunities
MoFA	Ministry of Food and Agriculture
NF	Nucleus Farmer
OG	Outgrower
OB	Outgrower Business
RING	Resiliency in Northern Ghana
USAID	United States Agency for International Development
WC	Working Capital
WFP	World Food Program

Introduction and Objectives

The objective of this report is to evaluate the sustainability of the outgrower business model and indicators of systemic change. USAID's Local Systems Framework identifies local institutions, private sector partners and civil society organizations as the engines of growth and opportunity in country. As such, successful USAID programming should apply effective facilitation approaches to strengthen agents of change as opposed to directly delivering assistance. This report attempts to contribute to the growing body of evidence (see USAID LEO Report No. 49) that the ADVANCE II program has been particularly impactful in this regard, enhancing food security and catalyzing economic opportunities for Ghanaian farming households and related businesses and support systems.

USAID's Ten Principles for Engaging Local Systems

1. Recognize there is always a system.
2. Engage local systems everywhere.
3. Capitalize on our convening authority.
4. Tap into local knowledge.
5. Map local systems.
6. Design holistically.
7. Ensure accountability.
8. Embed flexibility.
9. Embrace facilitation.
10. **Monitor & evaluate for sustainability.**

To define the scope of this evaluation, it is necessary to set clear **boundaries**. The scope of ADVANCE II is to improve maize, rice, and soybean value chains by adopting facilitative approach to link smallholder farmers to markets, finance, inputs, equipment and information through larger commercial farmers and traders who have the capacity and incentive to invest in smallholder production. ADVANCE II is part of a portfolio of USAID projects including ATT, FinGAP, RING and other programs that are targeting input networks, finance sectors and related sectors.

For this analysis, the boundaries include the commercial farm or trader, or so called outgrower business, or "OB" model, which is key to USAID ADVANCE's approach to achieving development impact. Systemic change is most often identified as a change in structural and governance features of a system that impacts the flows of productions, payments and information. USAID's LEO #49 report identifies the OB model as a structural change with high levels of "innovation, imitation, copying, buy-in… [and a] growing number of OBs that do not work with any project and those who are expanding without project resources." This report therefore uses OBs as a lens through which to observe and articulate evidence of broader systemic impacts within cereals systems. This report includes a representative survey of 370 OBs (198 surveyed) and 10 in-depth interviews with OBs.

The USAID ADVANCE II model builds on previous investments of the ADVANCE I project, which was re-programmed in 2010 to shift focus towards Northern Ghana to align with Feed the Future. It should be noted that whereas the term "model" is often presented as a term to signify a highly replicable NGO construct or approach. The OB model identified in this report is uniquely Ghanaian. That is not to say that the features of the OB model are not replicable – there are striking similarities between what an OB in Ghana and other rural agribusiness models – there is a path dependency on how you arrive at such as model. It is this path dependence where USAID's principles of flexible and adaptable facilitation approaches become primarily important to successful programming.

The **history and conditions** in which ADVANCE I&II came into effect presented both challenges and opportunities. In 2009, maize, rice and soybean farmers in Northern Ghana traditionally operated in a closed system, primarily selling to local market traders who sold to fractured markets prone to gluts. Baseline yields per hectare were extremely low (maize: 1.6 Mt/Ha rice: 1.4 Mt/Ha, soybean: 0.8 Mt/Ha); a reflection of limited use of technologies and best practices. Moreover, the

interest of large private sector firms to expand to the North was negligible – hardly any lead firms and there was little coordinated supply base with which to contract.

On the opportunity-side, three enabling factors provided the catalyst for the development of the OB model. The first was larger tracts of available land in the North in which a set of mid-sized, semi-commercial farmers had established. The second was a growing practice of in-kind bartering for tractor services between larger farmers and smallholders, as larger farms sought to gain additional incomes from capex investments. The third, was the broader economic transformation in Ghana in which growing urbanization and an emerging middle class demanded more animal-sourced protein (largely poultry) and processed foods. This led to the growth and emergence of large processors in the South which placed a premium on improved quality, efficiency and reliability of supply.

The ADVANCE project successfully leveraged these dynamics to shape cereal markets to create more inclusive economic opportunities for smallholder maize, rice and soybean producers. The focus of **interventions** targeted mid-sized farms and traders as the **primary agent** to develop into OBs to influence the **collective level** how smallholders, private sector companies and financial institutions operated. Broadly, OBs served as a bridge between and disperse smallholders enabling access to markets, finance and technology to increase production and incomes.

The directly-measurable **development impacts** as of the 2015 crop season included 107,533 farmers which have more than doubled their yields and gross margins over baseline. ADVANCE also achieved following targets:

$3,618,909 cash loans from financial institutions facilitated

42,848 benefitted from cash and in-kind loans

$2,861,419 private capital investment facilitated

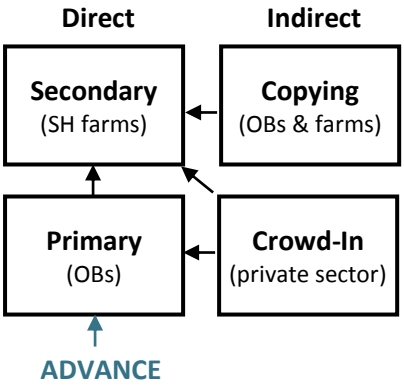
99% of beneficiaries applied one or more improved technologies

244,461 MT of produce were sold, valued at $81,019,558

These results are all well-documented and verified results which are collected and validated through USAID ADVANCE's monitoring and evaluation systems.

Indicators of Systemic Change

There is a need to go a step further than directly-measurable results in evaluating development impact. In the Local Systems Framework, USAID identifies systemic change as significant because of the belief that deeper-rooted change will not be easily reversed and the development impacts created are more likely to be sustained. A further challenge of market systems programs such as ADVANCE is that many benefits are likely to not be directly measurable. The figure below illustrates where indirect results often lie in terms of crowding-in by other private sector firms and copying of farms and OBs of business models, technology adoption and behaviors. The goal therefore of identifying systemic change is to see whether patterns, networks and norms have emerged at such as depth and scale that the positive changes facilitated by ADVANCE are sufficiently deep-rooted to persist in the future.



Difficulty Representing Impact in Market Systems Programs

* Scope of activities is broad, difficult to assess every single actor.
* Largest impact is with secondary and indirect beneficiaries.
* Demonstration effects leads to copying, imitation by other firms.
* Multiplier effects on linked industries (ex. poultry, food processing)
* CLA approaches lead to constantly shifting SOW parameters.
* Technology diffusion means ongoing replication beyond life of project.

The framework recommended for identifying indicators of systemic change is the **5-R framework**.

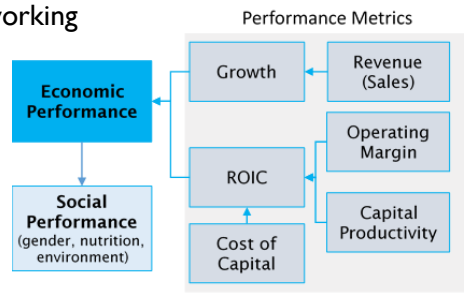
Relationships define the interactions between actors in a system that can positively or negatively influence the willingness of firms to cooperate and invest to achieve better outcomes. We looked at elements of relationship change to measure the strength of such relationships such as social network analysis, network growth and relationship churn.

Roles of the OB in providing or facilitating diverse services to outgrowers – a critical component to ADVANCE's theory of change of OBs as a bridge between the private sector and outgrowers. We looked at the diversification of OB business models, key constraints to growth and innovations to determine strength of new role of OB in VCs.

Rules structure the nature of relationships, providing predictability and standards that build confidence and trust, important conditions for firms to invest in growth opportunities. We looked at the extent to which OBs formalized to adhere to standards, degree to which contracts guided transactions and levels of default as key measures.

Resources are the allocation of debt and equity into working capital, capital expenditures and operational budgets to realize growth and profitability. We looked at investments by OBs in productive assets and infrastructure, the productivity of those assets, and access to sources of finance needed to continue to invest.

Results indicators of systemic change are difficult to measure. Given the OB is the primary agent of change and as private businesses, we decided to employ a return on invested capital (**ROIC**) framework to evaluate their economic performance. Through interviews we also identified social performance of OBs that wasn't accounted for in the survey design. Interviews suggested many OBs were also community leaders in one form or another – working at a health clinic, serving as a teacher, or as a traditional leader. This social dynamic seemed to have plays to their bottom line as well – building trust, reducing default, encouraging new outgrowers to join outgrower networks. It further encouraged OBs to mentor and coach new OBs, often as outgrower graduates. These results are reported on largely anecdotally and area an interesting area for further research. It is also an area to consider for layering of non-economic interventions, such as nutrition and literacy training, etc. Some of these things are already happening, such as by OB Esther Akabzaa.



"There are so many issues facing women, we must help each other" - *Esther Akabzaa*

Esther Akabzaa provides services to 350 outgrowers - 150 of these persons are also members of the Mothers Club she supports as volunteers with the Red Cross. Troubled by the felt that many of her outgrowers couldn't read or write, Esther started on her own adult literacy program, organizing trainings in three different communities for 160 outgrowers. When Esther saw that many outgrowers were idle in the off-season, she decided to launch her own microcredit program. She gave credits of 1,000 GHC to her groups to do some income-generating activity. When Esther sees the future of agriculture in Ghana, she sees one in which people are food secure. She remembers growing up and not having enough food to eat. This is no longer the case for her outgrowers, and she expects everyone will have enough food on their plate.

Facilitating Relationships

Facilitation strategies are a core component of effective market systems programming. The idea is that firms, such as buyers and suppliers, enter commercial relationships on their own accord based on perceived value. The role of the facilitator is to help to broker partnerships, without directly inserting oneself in the contract or negotiations. ADVANCE II utilizes a variety of facilitative tools. These include i) trade missions to connect OBs with buyers in the South ii) pre- and post-harvest events, or trade shows iii) expanding access to market information.

One of the inherent challenges of facilitation is the difficulty of directly measuring results of facilitation. One metric that ADVANCE reports on in its Performance Monitoring Plan (PMP) is the number of contracts facilitated. In FY16, the project facilitated 233 contracts for an estimated 34,552.91 Mt of maize, rice and soybean between 48 buyers and 135 OBs and farmer groups. However, the challenge is that many such contracts cannot be directly monitored, and successful facilitation often has tiered impacts. For example, ADVANCE fieldwork suggests that OBs with contracts are more willing to borrow, connect with input dealers to extend inputs on behalf of outgrowers and if successful, will likely maintain that relationship into the future.

To help identify some of these less tangible effects, **social network analysis** is a tool for measuring with detail the relationships of actors within a value chain system. This level of analysis enables a project to understand what common linkages are important to the function of the system as well as prospective relationship gaps. Conducted over time, network analysis offers a mechanism to track the growth of relationships and analyze their impact on system performance.

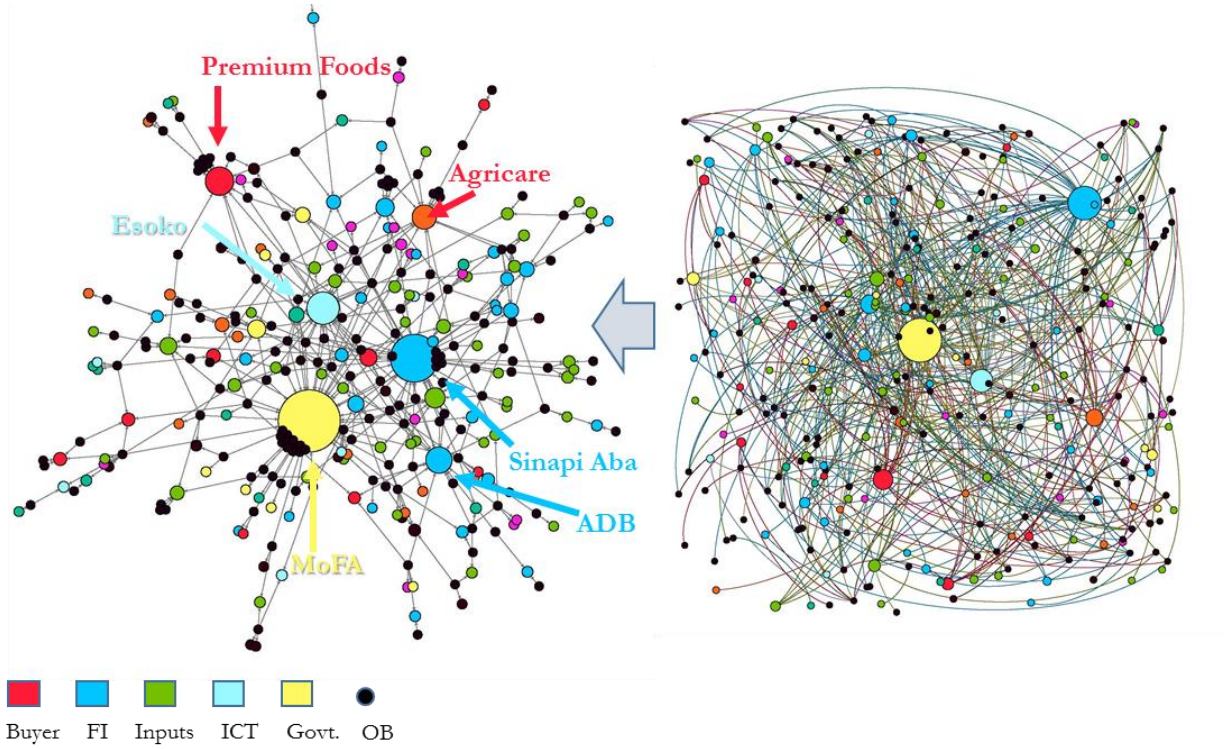
The social network analysis section of the survey recorded 165 out of 198 OBs (or 83%) reporting some significant linkage to a government of private sector actor for their business. Of those that reported linkages, the average OB reported links to 2.4 actors, ranging from 0 to 10 linked actors per OB. In terms of the extent to which ADVANCE impact these linkages, 70% of OBs surveyed reported ADVANCE helping them to link to an input dealer, 69% of OBs surveyed reported ADVANCE helped them to link to a buyer, while 42% of OBs surveyed indicated ADVANCE

helped to link them to a financial institution. All but 2 OBs reported a positive impact of each linkage.

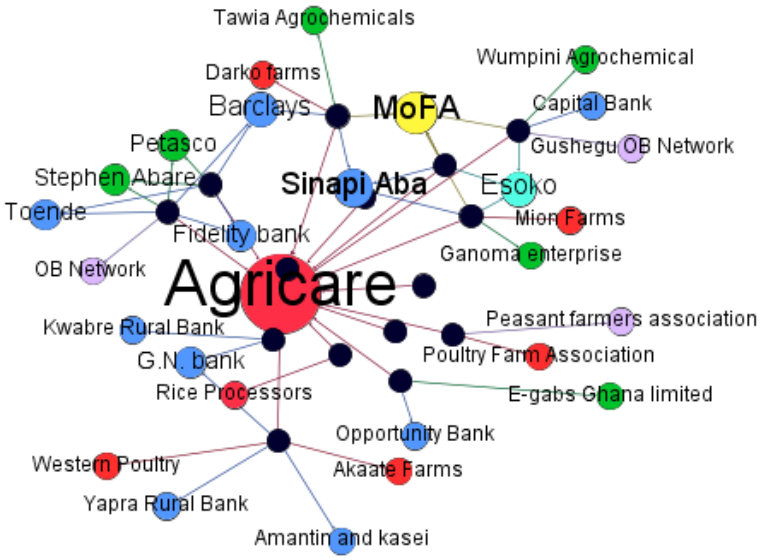
In the survey, of those reporting links - 17% chose not to report or otherwise did not indicate a linkage - 53% of OBs identified a link to at least one specific financial institution, 37% reported a link to at least one buyer and 44% to at least one input supplier. In terms of other categories, 39% reported links to MOFA or some other governance agency, 18% to ICT and another 12% to an association. This was the first-time network analysis has been conducted on the ADVANCE project, and many OBs chose not to report and/or likely underreported each of their contacts.

Financial Institutions	**# OBs**	**Input Suppliers**	**# OBs**	**Buyers**	**# OBs**
Sinapi Aba	38	Simple Prince Enterprise	11	Premium Foods	19
ADB	17	Antika	8	Agricare	15
Opportunity Bank	9	18th April Ltd	5	AVNash	8
BUCO Bank	7	Yara	5	Royal Dynamac	5
Barclays	6	Green Belt	4	Savanna Farm Market	5
NIB	6	Wumpini Agrochemical	4	Vestor Oils	4
GN Bank	5			Yedente Ltd	4
Amantin and kasei	4	**Government & Other**			
Ghana Commercial Bank	4	MoFA	60	SADA	9
Toende	4	Esoko	23	Gushegu OB Network	6

The social network graphic below represents each actor as a node (see color key) and the connecting edges (or lines) represent linkages between actors. The graphic to the left is the output of a ForceAtlas modeling of the random distribution to the right to illustrate centrality of various actors and which actors are bridges to other actors within the system (i.e. two actors are connected by another node). The size of the nodes represents the number of linkages to that actor. In this example, MoFA, Sinapi Aba, Esoko and ADB are the largest and most centrally located nodes in the ADVANCE network, yet many OBs appear to rely heavily on periphery nodes such as Premium foods and AgriCare. Input dealers though smaller, appear to be well connected to OB networks as well.



The real value to this analysis stems from when you zoom in on specific networks of relationships. Let's take Agricare as an example. While two of Agricare's OBs rely on Agricare exclusively, the other OBs in Agricare's network boast linkages to 3 or more other actors in the value chain. Most OB in Agricare's network is connected to a financial institution. Interestingly, many OBs also maintain a second buying relationship. The other top buyers in the OB survey include Premium Foods and AVNash. The ADVANCE team believes that contracts are important factors to create demand for finance and better technology usage within OB networks. If we test this theory counting the number of network linkages, we see that OBs with contracts to Agricare, AV Nash and Premium foods are more likely to report linkages to a finance institution, input supplier, and other buyer or service. OBs in Agricare, AV Nash and Premium Foods supply networks on average had 3.5 linkages compared to OBs not in these networks which had 2.1 linkages on average. This difference is statistically significant with a p-value of <0.000.



"I can now sell any amount, and I don't have to worry about the market"-*Mahama Tia*

Mahama Tia started his outgrower business in 2014. Today Mahama supports 339 outgrowers, including 133 women. Mahama participated in his first trade mission to the South in 2016 where he made the contact through Agricare. Through a pre-financing scheme Agricare supplied fertilizer and Dupont Pioneer seed to Mahama's outgrowers in exchange for maize as repayment. During that season, though the rains were unfavorable some farms achieved up to 1.7 Mt per acre. All his farms repaid on-time and Mahama was able to fulfill the terms of his contract. He also aggregated on behalf of Agricare and to date has delivered 130 Mt of maize through the contract terms. Next year he will sign Agricare but looking into the future he says; he envisions over time that farmers in Northern Ghana will not only be able to look South but also beyond to export.

The concept of **relationship churn** is highlighted in market systems toolkits for measuring strength of relationships. The OB-OG partnership is fundamentally one that is formed to meet market requirements which want timely, quality volumes of maize, rice and soybean. If OG's continue to maintain their relationships with OBs, then it is suggestive that it is a win-win partnership in which both parties benefit. Gross margin analysis is one indication that OGs benefit from these relationships. We also looked at relationship churn to see whether OGs continued to access OB services as another indicator that they were participating in a "win-win" relationship.

To determine the impact of relationship churn we must understand a) the rate of relationship churn b) the reasons for why relationships churned. The recall of churn was likely to be somewhat difficult as new OGs would more than replace the OGs that left the business. OBs reported growing from 166 to 271 OGs between 2014 and 2016 at a CAGR of 28%. However, when surveyed 89% of OBs reported that "all" or "most" of their outgrowers in 2015 were also their outgrowers in 2016. Another 92% report that "all" or "most" of their outgrowers in 2016 will also be their outgrowers in 2017. We estimate the rate of relationship churn is in the range of 10-20% of OGs. OBs cited numerous reasons for relationship churn. The most frequent cause of relationship churn was that OB's excluded OGs from services because they did not fully repay from the previous season. More than 60% of OBs indicated that they had done this in the past year. The top reason other than exclusion, was that OGs "graduated" with 20% of all OBs reporting this occurred and another 5% of OBs departing for other reasons.

We will look at farmer default, and exclusion, in the rules section below. Graduation is an interesting phenomenon in the ADVANCE project. There are several types of graduation. The first type is that the OG becomes an OB themselves. The pathway that was understood that was that OG becomes an operator/associate of a larger OB and then started his or her own business. Only an estimated 2% of OBs reported that they started this way, though an estimated 17% of OBs reported mentoring new OGs to start their own OB. This suggests that the original framing of the question "what motivated you to start your outgrower business" was misunderstood, or comprised multiple reasons and should have allowed for multiple selections. ADVANCE is currently working to develop this mentorship/affiliate-OB pathway through the creation of OB networks – this is an important step to reducing the barriers to entry for new OBs and creating a durable OB "profession."

"I am looking to help other farmers become OBs, just as Gundaa did for me""- Subila Iddrisu

Subila Iddrisu began as a farmer and outgrower of Gundaa Produce Company. After three years, in 2012 Subila decided to buy a used tractor with the proceeds and started to plow on behalf of Gundaa as an associate outgrower business (OB). Subila saw the demand for support amongst farmers and decided to launch his own OB which he called Yong Dakpemayili Company Ltd. Today Yong Dakpemayili Company Ltd has over 400 outgrowers in 8 different communities. Nearly 40% of his outgrowers are women. Yong Dakpemyili sells most of their produce to Gundaa Produce Company. Gundaa in turn has contracts with buyers such as WFP and Nestle Ghana which have strict quality requirements. He himself would like to grow his business to take on direct marketing. Subila is looking to take on new OBs as associates to help manage his network so he can look to his own future as well.

The second pathway is graduation from financing by OBs. OBs typically define their OG network in terms of the farms for which they provide services (such as plowing) and/or inputs on a credit basis. Therefore, definitions of who is and isn't an OG can vary depend on the degree to which transactions are cash or credit based. In some cases in the South, cash-based transactions are more frequent. Oftentimes, OBs reported OGs "graduating" from credit to cash payments, but who still access other services from their previous OB. In several cases OBs had set-up input shops or became seed growers and supplied to their "graduates." In other cases, graduate OGs would work together with their former OBs to co-market their product to fulfill sales contracts. There seems to be a trajectory of the line between OB and OG further blurring as these models diversified and OGs gain access to broader relationship networks.

Though not asked in the OB sustainability survey, there are several hypotheses based on qualitative discussions with OBs, former OGs and ADVANCE staff as to what enables a farm household to graduate:

There is likely a minimum production threshold for a household to reach economically self-sustainable scale to "graduate." This likely involves a complex calculation of household food needs, opportunity costs and how much is needed to reinvest. Both cases below highlighted a scale of 3.5+ Mt of (maize) per season. We didn't collect profitability information from these cases, though this is likely a linked factor as well.

There is likely a level of perceived and actual resilience that is required for farmers to take the leap to graduate. The two graduates interviewed stayed with their OB several years before graduating. Both cases cited the need to accumulate savings over time to cope with the disruptive weather variability, while still maintaining their relationship with their OB as a "safety net."

There is likely a requirement for some off-farm or non-farm diversification opportunity. The two OB cases cited opportunities to invest farm earnings in off-season so that capital continued to generate a return. This could include investing in milling services, a dry goods shop, or participating in a VSLA where they could invest their earnings to gain some additional return.

There appeared to be a reported dynamic among women against borrowing that led to graduation. Several OBs reported that women would repay their outgrower credit sooner and were less likely than men to want to borrow in subsequent seasons. OBs reported this was presumably due to

responsibility for household expenses and lack of control over incomes (i.e. fearing that men would take their money).

Margaret Ballans started as an outgrower to Hamidu Delinmwine in 2012. Margaret was able to earn around 1 Mt per acre, more than doubling her yield with the support of Hamidu who provided her tractor services and inputs on credit. One of the ways Margaret used these proceeds was to invest in her provisions shop expanding her inventory for sale. She was also able to wait longer to sell her maize when prices increased in the market. In 2016 Margaret decided that she would not need the credit services of Hamidu. She rented his tractor also paying him cash to plow her land and bought inputs from Hamidu's shop using her own funds. Margaret keeps her business relationship with Hamidu so financing is available if she needs it. Margaret also remains involved in her producer group so she can learn good agricultural practices.

New Roles in Value Chain

The OB model represents a structural innovation impacting the flow of goods, finance and information. The presumed gap in non-market systems programs is often the producer. They lack knowledge, finance, and markets- so, the logic goes that projects should directly provide those things and the system will work. Whereas, market systems approaches tend to assume the opposite – if you can address underlying, structural problems in the market system, producers will be able to then access knowledge, finance and markets on their own. The challenge with the market systems logic is that in many cases, the private sector isn't in its current state able to address the underlying constraint. Simple partnerships alone aren't sufficient to mobilize change. There is a need for an existing actor to take on an entirely new role, or for the creation of a new actor altogether. Here was the challenge that ADVANCE faced in Northern Ghana, and how the business model behind the OB is central to sustained impact of the project.

Whereas previously Northern Ghana were tractor service providers and medium-scale farmers that provided tractor services on credit to their neighbor smallholders on a bartered basis for product at the end of the season. This basic function evolved overtime to include a variety of other functions including primarily tractor, input credit, threshing and marketing services as commercial functions. The tables below present the CAGRs for each of the services between 2014 and 2016. The greatest growth services were tractor services (20% CAGR), followed by threshing (14.4% CAGR), input credit (13.5% CAGR) and marketing (5.4% CAGR). The number of OBs providing respective services were tractor (78%), threshing (54%), input credit (65%) and marketing (76%).

Services	Unit	% Total OBs	Average/OB 2014	Average/OB 2016	Diff	% Growth Rate 3-year	% Growth Rate Annual	% OBs to Increase	% OBs to Decrease
Tractor	Acres	78%	218	314	96	44%	20.0%	79%	5%
Threshing	Mt	65%	57	75	18	31%	13.5%	84%	9%
Input Credit	GHS	54%	15,519	20,000	4,482	29%	14.4%	68%	16%
Marketing	Mt	76%	93	102	9	10%	5.4%	69%	22%

In terms of the durability of these services, 79% of OBs will increase tractor services, 68% will increase input credit, 84% will increase threshing and 69% are expected to increase marketing. Only 5% of OBs will decrease tractor services, 16% will decrease input credit, 9% will decrease threshing services and 22% will decrease marketing. It is worth better understanding those OBs which are looking to decrease marketing and input credit. Further analysis should look to reveal any correlations between default rates for input credit, and whether for marketing those OBs which intend to decrease marketing had a contracted buyer in place. Overall however there are strong indicators that the ADVANCE OB network has, and will continue to provide, more services for more farmers.

OBs also played other more facilitative roles in the maize, rice and soybean value chains. These services are often linked to the provision of revenue-earning services mentioned above. For example, 85% of OBs hosted a demonstration plot in the last year. Interviews suggest demonstrations to important convening function. Many OBs learned of the ADVANCE model by participating in demonstrations, and interviews with producers suggest that input/technology adoption was largely attributed to participating in a demonstration. 33% of OBs linked their outgrowers to financial services and 60% supported their OGs to set-up savings groups. The ability to increase contribution by farms in their production and/or utilize external financing allows OBs to reach more OGs more cost-effectively. Furthermore, 55% of OBs supported their OGs with weather services.

"After seeing the ADVANCE demonstration, no one will use grains as seed again" - Hamidu Delinwine

A former outgrower himself of Antika, Hamidu registered both his outgrower business Delamine in 2012 Farms and his input business Delamine Enterprise. Hamidu's outgrower network now includes 186 farmers of which 161 are women. He provides seeds, fertilizer and tractor services on credit. He saw the need to support women given his experience that women were especially diligent in applying good practices. This past year Hamidu hosted hybrid maize demonstrations in conjunction with ADVANCE. The demonstration was right by the roadside and achieved a yield of 1.6 Mt per acre with hybrid maize. Typically, farmers in his community earn only 0.6 Mt per acre. The whole community saw the impacts and wanted to know how they could plant the same. Sales at his agro-input shop have increased and he believes that never again will people plant grains as seed. Hamidu says that the key to success is realizing that you can't succeed on your own. If you profit while everyone else in your community still struggles, you will be resented and thought of as greedy.

To determine key **constraints to growth**, we asked OBs which were the top 3 barriers facing their business. Lack of finance is the number one constraint with 75% of OBs reporting it among their top barriers to growth. OBs are small and growing businesses, and many of the services which OBs provide require capital expenditures in tractors, threshers and can be working capital intensive, particularly pre-financing. This barrier was followed by logistics/transportation, outgrower loyalty and weather volatility each with 42-45% of OBs reporting. Scheduling of transport is unreliable and a significant problem with many OBs looking to invest in own transport. Outgrower loyalty is a challenge as well and presumably for newer OBs but this would need to be verified. Weather volatility is unsurprising and several OBs interviewed indicated that through ADVANCE's climate-smart demonstrations, they are looking to invest in rippers to offset some of this impact. Finally, getting the best price and finding ways to grow business had 28% and 20% of OBs reporting respectively.

Each OB is unique. The outgrower business development manual and business planning workshops hosted by ADVANCE appear to be helpful tools to identify specific constraints and trouble-shoot them. Moreover, networking of OBs promotes the exchange of information and coordination of services for greater efficiency. For example, 68% of OBs coordinate tractor services, 49% partner to fulfill supply contracts, 69% collaborate on the establishment of demonstrations and 67% are part of an association or network. Greater horizontal coordination seems to help to overcome some of the capital constraints with expanding services and clients. Further, efforts to reduce the capital intensity of some services by enhancing smallholder ability to self-finance, notably through the VSLA initiative, has taken stride and is rapidly expanding through OB networks. The continuation of these initiatives is likely to lessen the impact of financial constraints and improve overall resiliency of the OB system.

"We [OBs] help each other with market and weather information" - Faustina Amoah

Faustina works across eight communities currently. Her agent who is a youth was trained by ADVANCE to provide extension services to her network. Either her or her agent visit each outgrower up to 3x a season to ensure that best practices are being followed. Through the support of Grameen Foundation, she is currently profiling her outgrowers to help with record-keeping. Faustina supports the agent with T&T and some additional support. Just this past year Faustina launched mobile payments with some of her outgrowers through MTN. It was a small start which she is looking to expand on in the future. Through the OB networking activity, Faustina is being linked to other OBs as well. The network of OBs in her area have begun to share information on weather and market prices. They also support each other in providing services to outgrowers, often sharing or coordinating their service provision. She is starting to mentor other up and coming OBs, including her former outgrower, Agyenim Boateng.

Investing Resources

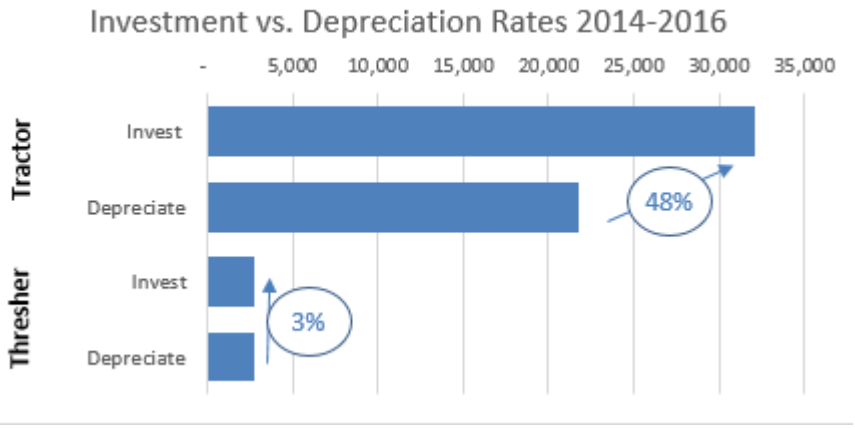
Between 2014 and 2016, 42% of OBs invested in a tractor worth 75,621 GHs, 31% of OBs invested in threshers worth on average 9,128 GHS, 41% of OBs invested in an office worth on average 5,461 GHs, 48% of OBs invested in vehicles worth on average 18,946 GHs and 20% of OBs invested in a warehouse worth on average 17,766 GHS. The average weighted investment per OB during the 2014 to 2016 period was 49,849 GHS or approximately 16,616 GHS per year. This is equivalent to $11,593 per OB between 2014-2016 or $3,864 per year. The highest investment costs are clearly tractors, followed by vehicle, warehouses, threshers and OB offices.

	Rate of Investment			Investment / OB (GHS)		Investment / OB (USD)	
	% OBs	GHs/invest	USD/invest	3-year	Annual	3-year	Annual
OB Office	41%	5,461	$ 1,270	2,234	745	$ 520	$ 173
Vehicle	48%	18,946	$ 4,406	9,186	3,062	$ 2,136	$ 712
Warehouse	20%	17,766	$ 4,132	3,535	1,178	$ 822	$ 274
Tractor	42%	75,621	$ 17,586	32,082	10,694	$ 7,461	$ 2,487
Thresher	31%	9,128	$ 2,123	2,812	937	$ 654	$ 218
			Total:	**49,849**	**16,616**	**$ 11,593**	**$ 3,864**

A key metric of sustainability cited by LEO Brief: Practical Tools for Measuring Systems Health is whether firms are investing in *maintenance* i.e. to replace their already existing assets or in *growth* i.e. to expand their operational capacity. Evidence from the Business Model section above indicates overall growth rates in provision of services of 20% CAGR for tractor services and 14.4% CAGR for threshing services. While this is an indicator of a growth strategy, it does not necessarily reflect whether OBs are investing to grow into the future. For that analysis, we need to compare the rate of investments between the 2014-2016 period with the depreciation of those assets during that period, as well as the depreciation of already existing assets. In the survey for threshers and tractors we captured data on the date of purchase of tractors and threshers, the total value of the equipment and how much the OB paid (note the difference would be due to a grant). We also

asked questions on depreciation. The reported average useful lifespan by OBs of a tractor is estimated at 7.5 years and the average useful lifespan of a thresher is estimated at 6 years per survey. We applied these average depreciation rates to all OBs, as not all OBs understood the question

Based on average lifespan of equipment from date of purchase, between 2014-2016 the calculated average depreciation per OBs surveyed was 21,733 GHS for tractor and 2,733 GHS for threshers. The OB network also reported investing on average 32,082 GHs in tractors and 2,812 GHs in threshers between 2014-2016 (see table above). Taking average investment of equipment divided by the average depreciation over this period, this gives a growth rate of 48% between 2014-2016 (or 21.5% CAGR) for tractor investment and 3% between 2014-2016 (or 1.4% CAGR) for thresher investment. While the growth strategy for tractors is clearly positive, the lower investment rate in threshers (1.4% CAGR) compared to growth in threshing services (14.4% CAGR) would suggest that two factors can have come into place 1) OBs had threshers which they were underutilizing 2) OBs were receiving discounts off the value from equipment grants program. In either case, there are still positive trends in investing.



"The agreement gave us confidence to invest in better farming practices" - Mary Azongo

As of 2016 Mary has grown her outgrower network to more than 250 farmers providing seeds, fertilizer and plowing services on credit. In 2016 minor crop season Agricare supported Mary's OG network with a contract arrangement to 200 farmers. Together with 3 of her outgrowers, Mary adopted minimum tillage practices on a total of 44.5acres the previous season by way of climate smart practices such as ripping. She saw the benefits including, improved moisture retention in the ground which led to better yields. Moreover, ripping saves time and makes planting and spraying easier. Now that her farmers are using the right seeds and inputs and are planting correctly, she sees ripping as the next big technology that will spread in her region. Mary plans to invest in a tractor and ripper next year. She sees such technologies as critical to address the impacts that climate change is having on her farming business. When Mary looks to the future she hopes to support others to realize the same benefits she did from farming

Investment should not be thought of as just equipment. Much of the business model of OBs requires pre-financing of inputs and services to OGs, and marketing can be capital intensive as well.

We therefore wanted to estimate the working capital required for the average OB to run their business. Working capital can be difficult to measure without complete accounts and financial statements. Through the surveys we were able to approximate working capital based on certain indicators. The principal drivers of working capital were 1) whether OBs provided tractor services on credit (67% of services were on credit-basis)2) the value of input credit provided (the average OB provided 18,000 GHs in inputs), 3) and volume and turnover[1] of marketing outputs. The table below provides information on how working capital was calculated. Note, for 2014 estimates we used 2016 assumptions for product mix, turnover and unit costs.

The average OBs invested 61,955 GHs in working capital throughout the season for marketing (37,208 GHS), input credit (18,000 GHS) and threshing (6,748 GHS). This is 9,332 GHS higher than what we estimated OBs to have invested in 2014, or an equivalent growth rate between 2014-2016 of 17.7% or 8.5% CAGR. Note that input credit and tractor services are repaid at harvest, and that money is reinvested in the business specifically to fund marketing working capital needs. Therefore, the net working capital needs are likely only 37,208 GHS, or the amount of capital needed for marketing (input credit and tractor WC combined are only 24,7478 GHS). Similar to capital investments, working capital illustrates a *growth* trajectory as well for the ADVANCE OB network.

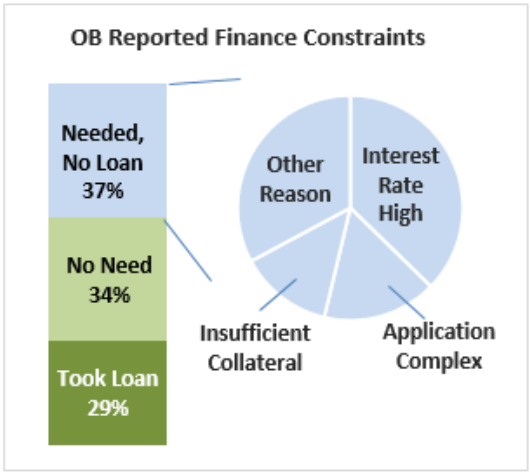
<table>
<tr>
<th>Tractor Services WC
(+2,065 GHs 2014-16)</th>
<th>Input Credit WC
(+4,019 GHs 2014-2016)</th>
<th>Marketing WC
(+3,248 GHs 2014-2016)</th>
</tr>
<tr>
<td><u>2016</u>
314 acres plowed per OB
67% of services on credit
<u>32 GHs cost per acre</u>
6,748 GHs WC needed

<u>2014</u>
same cost & % credit
<u>218 acres plowed</u>
4,684 GHs WC needed</td>
<td><u>2016</u>
20,000 GHs input finance
<u>11.1% markup</u>
18,000 WC needed

<u>2016</u>
15,519 GHs input finance
<u>11.1% markup</u>
13,981 WC needed</td>
<td><u>2014</u>: 93 Mt, <u>2016</u>: 102 Mt (see table for calc)
<table>
<tr><th></th><th>2016</th><th>None</th><th>Verbal</th><th>Contract</th><th>Stored</th></tr>
<tr><td rowspan="3">Maize</td><td>Turnover</td><td>4.2</td><td>4.9</td><td>2.9</td><td>1.9</td></tr>
<tr><td>Buy/Mt</td><td>931</td><td>920</td><td>1222</td><td>1258</td></tr>
<tr><td>MT/OB'16</td><td>16.0</td><td>26.2</td><td>39.3</td><td>7.1</td></tr>
<tr><td rowspan="3">Soybean</td><td>Turnover</td><td>3.0</td><td>1.4</td><td>2.3</td><td>1.0</td></tr>
<tr><td>Buy/Mt</td><td>853</td><td>1118</td><td>1444</td><td>1500</td></tr>
<tr><td>MT/OB'16</td><td>0.9</td><td>3.7</td><td>2.5</td><td>0.0</td></tr>
<tr><td rowspan="3">Rice</td><td>Turnover</td><td>5.7</td><td>4.9</td><td>14.3</td><td>0.9</td></tr>
<tr><td>Buy/Mt</td><td>842</td><td>731</td><td>788</td><td>900</td></tr>
<tr><td>MT/OB'16</td><td>1.6</td><td>2.1</td><td>2.5</td><td>0.1</td></tr>
</table>
</td>
</tr>
</table>

[1] The weighted average turnover for marketed goods by market channel were estimated 1.9x (stored), 2.7x (contract), 4.3x (verbal agreement), 4.1x (no agreement).

Sources of funds for investment is clearly an issue as financing was the noted the most significant constraint to the OB business model. Further, OBs reported ADVANCE's role in facilitating access to finance as one of the areas with less impact – with 42% noting some positive effect. At the same time, some of the most common linkages identified were through financial institutions, notable Sinapi Aba Trust, ADB and others. Further, 96% of OBs reported having a bank account and another 29% reported taking a loan in 2016, with 40% reporting for equipment, 34% for production and another 26% for working capital or aggregation. Additionally, nearly 34% of OBs reported no need for a loan which would suggest that 37% of OBs needed a loan and were rejected or otherwise discour aged for some reason. When asked why some someone did not take a loan, the most common reasons were (1) interest rates too high (2) application process too complex and (3) collateral requirements too high and (4) a variety of other reasons which were not stated. There is progress to be made on financial services. Despite the linkages that exist and experience many OBs have borrowing, there still appears to be a sense that this level of financing is not adequate. Oftentimes, this can be the case for small and growing businesses which may require different types of financing to grow. This is an area for further study.



"Farmers are just one link – you should consider the entire chain" - Joyce Owusu-Dabo

SASL approached agricultural lending with a value chain strategy. This meant that it was a mistake to just consider the enterprise only when doing loan analysis. Their ability to repay a loan was as dependent on how well their suppliers and buyers did as well. For this reason, SASL would often finance multiple stages of the value chain. This included production credit for producers, equipment loans for tractor service providers and working capital for buyers. Through this strategy SASL was able to reduce "systemic" risks that often make agricultural lending unattractive for lenders. Since SASL launched their agricultural finance initiative their total portfolio has grown from GHS 8.3million in 2012 to over GHS 37.8million in 2016. Over the past four years Sinapi Aba has reached more than 17,000 farmers. In 2016, SASL served over 5,000 farmers alone providing more than GHS 7million in credit facilities.

Rules and Norms

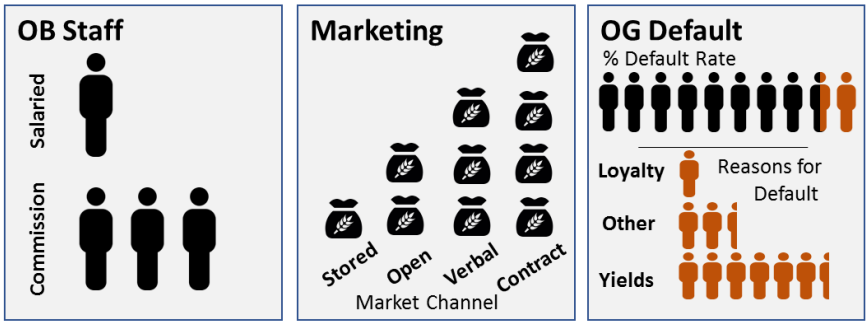
The formalization of OBs is a good indicator of sustainability. Importantly, formality is tied to increased ability of firms to access finance, enter contracts with buyers and provide decent work and protections to employees. Informal firms by contrast are often characterized by lower levels of technology adoption and productivity which constrain growth. 86% of OBs have formally registered their businesses. 40% have use of a computer with 21% using an Excel spreadsheet and another 18% using software to keep records. 70% of OBs reported that ADVANCE had positively contributed to the formalization of their business. On average, in 2016 OBs employed 0.8 persons on a salaried basis and another 3.1 persons on a commission basis for at least 6 months of the year. Commission based staff largely included equipment operators and technical agents. 51% of all staff were reported as youth, likely in commission-based roles. Only 18% of salaried positions were women and this level dropped to 7% for commission-based staff. To note, overall 9% (32 women) of OBs are women themselves. 63% of OBs reported providing some form of on-the-job training for staff. 63% of OBs reported that ADVANCE had positively contributed to the training of their staff and 71% of OBs reported ADVANCE's support had contributed to improved operational performance.

Closed contracts are definitive and binding agreements between buyers and farmers for the exchange of a specified quantity of produce at a specified price within a specified period.

Purchase and supply agreements are non-binding contracts between buyers and farmers with key terms like quantities, price, and delivery period to be agreed between the parties later.

The degree to which OBs enter marketing contracts is a further indicator of the implementation of a set of rules to guide transactions. The survey collected marketing data disaggregated by market channel. The channels include product that is stored for sale in off-season, or sold to the open market, through a verbal agreement or a written contract. Contracts provide a guaranteed market which is important for coordinating production, providing security to help OBs and OGs invest with greater confidence. An estimated of 43% of all product sales were guided by a written contract with another 31% through a verbal agreement. Only 18% of product was marketed without any form of agreement. The remainder 7% was set aside for storage and off-season sale. While the survey didn't specify the type of contracts; quantity and quality requirements are common – some contracts also establishing price (see text box). The Year 3 annual report of ADVANCE indicated directly facilitating 223 contracts covering 34,552.91 MT of maize, paddy, and soybean between 48 buyers and 135 OBs and farmer groups.

Measures of OB Formalization



The team acknowledges that many contracts and relationships previously established no longer require direct assistance and facilitation. Overall, there is strong evidence that contracting has become the norm for transacting in maize, rice and soybean systems within the OB model. The

extent to which such contracts have impacted quality is mixed. 36% of OBs reported providing some price premium for better quality and 44% of OBs implemented some system of standards with grading of maize that they received. OBs on average reported a buying price premium to OGs of 31% for product with a contract than to the open market. This is an area for further investigation as to which grades, standards and grading are becoming norms in the system.

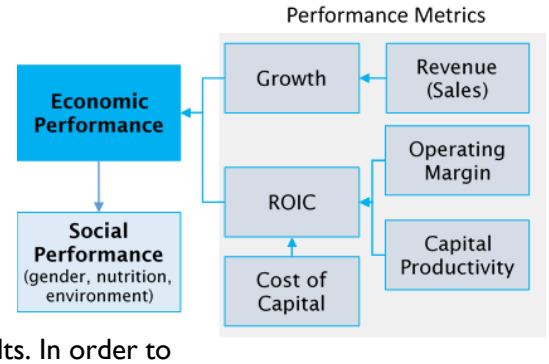
In addition to marketing, OBs enter into contracts with OGs when they supply plowing services and input credit at the beginning of the season with an expectation to repay harvest in-kind at the end of the season. 67% of tractor services overall is provided on a credit basis and OBs on average provide 20,000 GHS of input credit to OGs. For outgrower services to continue to grow, OGs must respect this agreement. It should be noted that in 2016 OBs recovered about 85% of tractor service credit and 79% of input credit. However, at the time of survey recovery was still ongoing, particularly for input credit, so such recovery rates were expected to increase. Discussions with staff and interviews with OBs suggest anticipated recovery rates of 85-90%. This would suggest that 10-15% of OGs normally are expected to break their contract with OBs. OG loyalty is the 3rd most cited barrier to growth of OBs with 42% of OBs reporting it among their top 3 constraints. However, only 13% responses among OBs indicated that OG loyalty was a major cause of default while another 65% of responses indicated OGs had poor yields and were unable to repay and 22% citing other reasons. This suggests that that frequency with which OGs are defaulting due to an unwillingness to honor contracts is low. Overall, default rates of 10-15% appear to be viable for the OB model. The reason for default appears to not be unwillingness to abide by contract terms but an inability to fulfill the contract terms. Weather volatility (cited in 42% of OB responses as a top 3 concern) occurred as frequently as outgrower loyalty (also 42% of responses) and the two are likely related.

"The key to success is to deliver quality services that your farmers need" - Enoch Akisiba

Enoch believes that customer service is one of the most important criteria to making your business successful. If you deliver quality services, you will be paid back in full. Enoch hosts quarterly meetings for all his outgrowers where he gets feedback and shares information and places advance orders. He works together with his outgrowers to sponsor demonstrations using his own funds. The groups will offer the land and labor and he will provide the seeds, fertilizers and chemical inputs. When his outgrowers complained about not being able find certified rice seed, Enoch became a seed grower. Enoch also aggregates on behalf of his outgrowers to offer them a better market. Through a linkage by ADVANCE, he has a contract with AVNASH, a large rice mill.

Return on Invested Capital (ROIC)

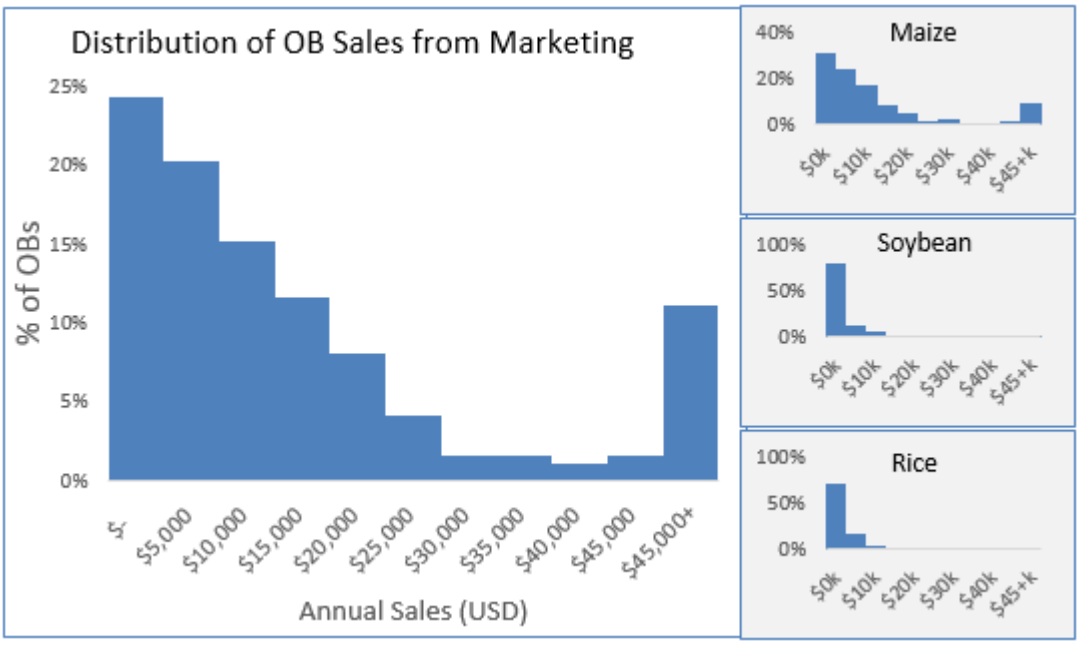
Return on Invested Capital (ROIC) is a measure of how well a business is investing its money to earn an above market return (which is the cost of capital). In other words: "Is the business creating or destroying economic value?" should tell us whether the OB should be able attract commercial investment. As mentioned in the introduction, it should be noted the strong social return that an OB provides as well – notably the incremental gross margin returns to smallholders, with the average OG doubling their yield and tripling their gross margin. This analysis only focuses on the OB unit, ignoring all social or spillover considerations.



As expected there were challenges with reporting on profitability given the lack of records, time to conduct survey, challenges in recall, estimating non-cash expenses (ex. depreciation) and lack of segmentation of business units. Information on **revenues** was better quality, so we could illustrate the distributions of those results. In order to determine **operating margin** we came up with unit averages for prices and costs to estimate the % margin by core business activity (tractor service, input credit, threshing and marketing). Similarly for **capital productivity** we looked at timelines of investments for capex and approximated working capital by asking certain ratios (ex. sales turnover, % credit sales). For **cost of capital** we used borrowing rates on local financial markets.

Revenue/Operating Margin: Marketing

Revenue: The average OB reported 118,182 GHs or $27,484 sales from marketing activities. The sales distribution is highly skewed with the median OB earning only 25,723 or $5,982 in sales from marketing. Top tier OBs are driving overall marketing returns, with less than 20% of OBs earning above average sales[2]. While more than 70% of OGs are marketing maize, less than 30% are marketing rice and less than 20% are marketing soybean.



[2] Weighted average prices were used to calculate revenues: 116 GHs/100kg Maize, 90 GHs / 100 Kg rice and 134 GHs/KG soybean. The average prices varied based on market channel also. See second table for detail.

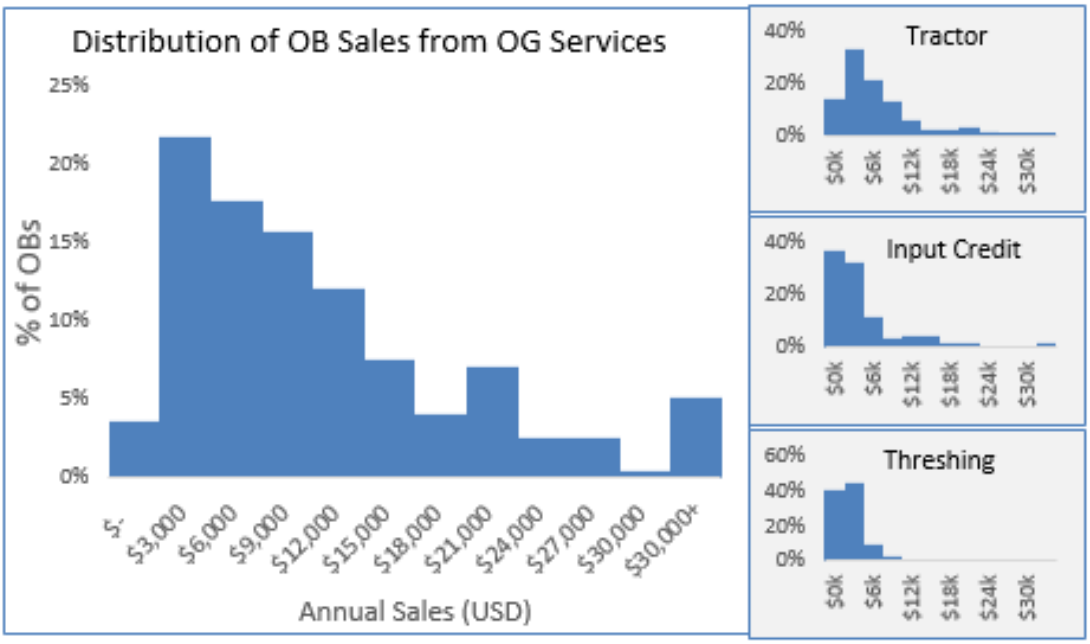
Operating Margin: Contract selling generated the most profit for OBs (40% of total profits) while having a lower unit margin (4.5% of unit price). While the bulk of volume sales were maize (87%), its share of total profits was only 78% - both soybean and rice though lower volume traded commodities had higher profit margins. Farm-gates prices were significantly better through a formal contract than through a verbal agreement or no agreement at all. This would suggest that contracting provides a strong win-win for both OBs and OG farmers. Note that in the calculation of unit margin, cost estimates for transport are included based on the average reported transport cost by commodity and channel. These transport costs were 24 GHs per Mt on average.

Margins Earned from Marketing by OBs

100 KG	% Total	Buy	Sell	Margin	% Margin	% Total
Maize	87%	108	116	5.6	5.1%	78%
Soybean	7%	120	134	11.8	8.8%	13%
Rice	6%	79	90	8.7	9.5%	9%
Total/Avg	***100%***	***107***	***116***	***6.2***	***5.6%***	***100%***
None	18%	92	102	8.1	7.9%	24%
Verbal	31%	93	103	7.5	7.3%	38%
Contract	43%	121	129	5.7	4.5%	40%
Storage	7%	125	125	-1.2	-1.0%	-1%

Revenue/Operating Margin: Tractor Services, Input Credit and Threshing

Revenue: The average OB reported 49,178 GHs or $11,437 sales from marketing activities. The sales distribution is skewed with the median OB earning 28,969 GHs or $6,737 in sales for OG services (tractor, input credit and threshing. Top tier OBs are driving overall marketing returns, with less than 30% of OBs earning above average sales[3]. The median OB is plowing 190 acres, providing 4,775 GHs in input credit and threshing 15 Mt.

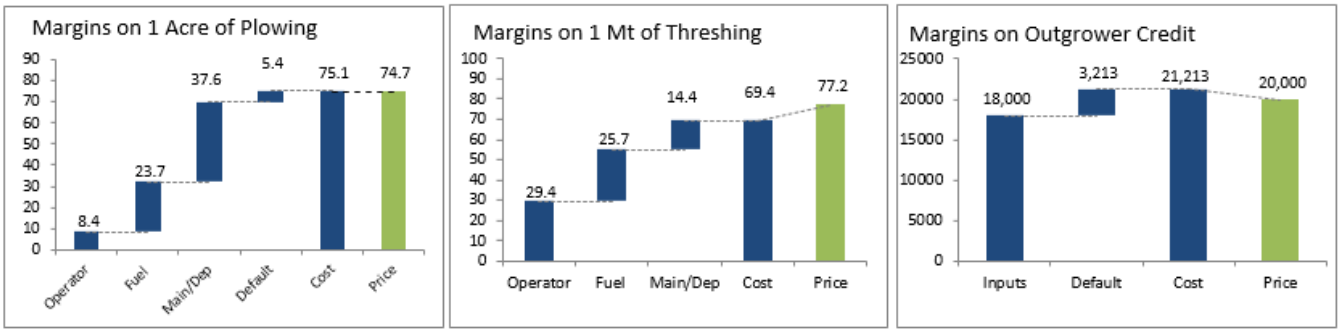


[3] Weighted average prices were used to calculate revenues: 116 GHs/100kg Maize, 90 GHs / 100 Kg rice and 134 GHs/KG soybean. The average prices varied based on market channel also. See second table for detail.

Operating Margin: Unit costs are averaged across OBs and presented in the graphics below. The average OB earned a loss of -132 GHS in 2016 (0.42 GHs/acre) from tractor services, a loss of -1,213 GHs from input credit, and a gain of 579 GHs from threshing (7.76 GHs / Mt). Note that there is significant variability in reported line items such as maintenance and depreciation. The average calculated depreciation for tractors was 8,912 GHS per OB while the median depreciation was only 3,491 GHS per OB and the standard deviation of depreciation was 13,759 GHS. Similarly, while the average calculated maintenance costs for tractors were 2,879 GHS per OB, the median maintenance cost was 0 GHS per OB. For tractor services, the information on charge per acre and operator, fuel cost was more normal and we have greater confidence in results that OBs are earning roughly 37 GHs per acre in ***cash margins***. It is also likely that much of that cash margin is diminished with depreciation and maintenance costs.

These non-cash costs are likely to vary significantly by OB. More support might be given to OBs to help them maintain records and improve their understanding of topics such as depreciation, asset productivity, etc. Whether OBs earn a slight loss, break-even or a slight gain from tractor services, it is unlikely that this is a significant profit driver behind the OB business model. This follows in general the idea that OBs make their money from marketing, providing services to OGs at break-even, or near break-even, for the right to market the OG's produce.

Average OB Margins from OG Services



Cost of Capital / Capital Productivity

The table below illustrates the invested capital requirements of an OB across the season. In general, we anticipate that working capital needed for tractors and inputs is locked up in the OB for about 7 months, starting in June and freeing up in January. Working capital for marketing is needed started in December and lasting about 4 months until March. This puts the average working capital requirement for an average OB at 26,839 GHS. In a previous section, we noted that the average OB invested 16,616 GHs in 2016 as well in capital expenditures (capex). This puts the total invested capital requirement at 43,455 GHS per OB. We know that banks in Ghana have a required rate of return of 36% APR. This would mean the average OB should be making 15,644 GHS per year to earn a normal return. The financial system in Ghana however is not normal, and this rate would seem high. Venture capital firms aim for at minimum a 20% rate of return on invested capital, while impact investors will generally accept returns in the range of 5-10%.

Month	Tractor	Inputs	Market	Total WC
Jun	6,748	18,000	-	24,748
Jul	6,748	18,000	-	24,748
Aug	6,748	18,000	-	24,748
Sept	6,748	18,000	-	24,748
Oct	6,748	18,000	-	24,748
Nov	6,748	18,000	-	24,748
Dec	6,748	18,000	37,208	61,955
Jan	-	-	37,208	37,208
Feb	-	-	37,208	37,208
Mar	-	-	37,208	37,208
Apr	-	-	-	-
May	-	-	-	-

Working Capital	26,839
Capex	16,616
Invested Capital	43,455

Economic Value:

In 2016, we estimate that OBs earned on average 6,201 GHs ($1,442) based on an investment of 43,455 GHS ($10,106) or an approximate return on investment of 14.3%[4]. This rate of return is less than half the commercial rate of banks in Ghana, just 5pp under what a venture capital firm would require, and above what impact investors would look for. As mentioned earlier, due to challenges in reporting cost data, it is not possible to look at distribution of those returns. On average, we can say that average OB is likely earning a rate of return above what social investors would require but not yet what commercial financial institutions would require, either venture capital or bank. That is not to say that there are specific business activities for which it would not make sense to borrow, such as working capital for marketing or the purchase of equipment assets.

Outgrower Business Return on Invested Capital (ROIC)

Business Unit	Sales (GHS)	Margin (GHs)	Sales (USD)	Margin (USD)
Tractor	23,419	(132)	$ 5,446	$ (31)
Input Credit	20,000	(1,213)	$ 4,651	$ (282)
Threshing	5,760	579	$ 1,339	$ 135
Marketing	118,182	6,967	$ 27,484	$ 1,620
Return	**167,360**	**6,201**	**$ 38,493**	**$ 1,442**
Invested Capital		43,455		$ 10,106
ROIC		**14.3%**		**14.3%**

[4] This includes a conservative adjustment for ongoing tractor and input credit recovery of +5pp at the time of survey, and an average margin applied to goods in storage. Without these adjustments the ROIC would have been 8.3%.