



Environmental and Conservation Agriculture Impact Study

September 2019



Contents

Acknowledgements.....	2
Introduction	3
Identifying Constraints in the agricultural Input Supply Market	3
Methodology	4
Customer profiles.....	5
Knowledge and Awareness of Available Agricultural Inputs	7
Satisfaction with Products Purchased	8
LIFT's Input Supplier-Retailer linkage Model Leads To Productivity Increases for Farmers	12
Conclusion & Recommendations	14
Annex 1 - ECA Beneficiary Estimate Model	16

Acknowledgements

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Introduction

Identifying constraints in the agricultural input supply market

The UK Aid funded Land Investment for Transformation (LIFT) programme works with the Government of Ethiopia to deliver Second Level Land Certificates (SLLC) to smallholder farmers and to improve the functioning of its Rural Land Administration System (RLAS). LIFT pioneers a unique, innovative strategy by applying a market systems approach to a land certification programme through its Economic Empowerment Unit (EEU) component. The EEU aims to accelerate and magnify the investment, productivity and income effects of land certification for rural landholders in selected markets, including the agricultural input market. The improved land tenure security for smallholder farmers is expected to lead to an increase in demand and more investment in sustainable agricultural inputs and practices.

The EEU's Environment and Conversation Agriculture (ECA) component focuses on improving access to agricultural inputs and technologies to increase productivity and incomes through wider use of environmentally sustainable and profitable inputs and practices. Since 2016, LIFT has worked with several Ethiopian input and technology suppliers that share a vision to diversify their distribution and sales models into Ethiopia's rural areas.

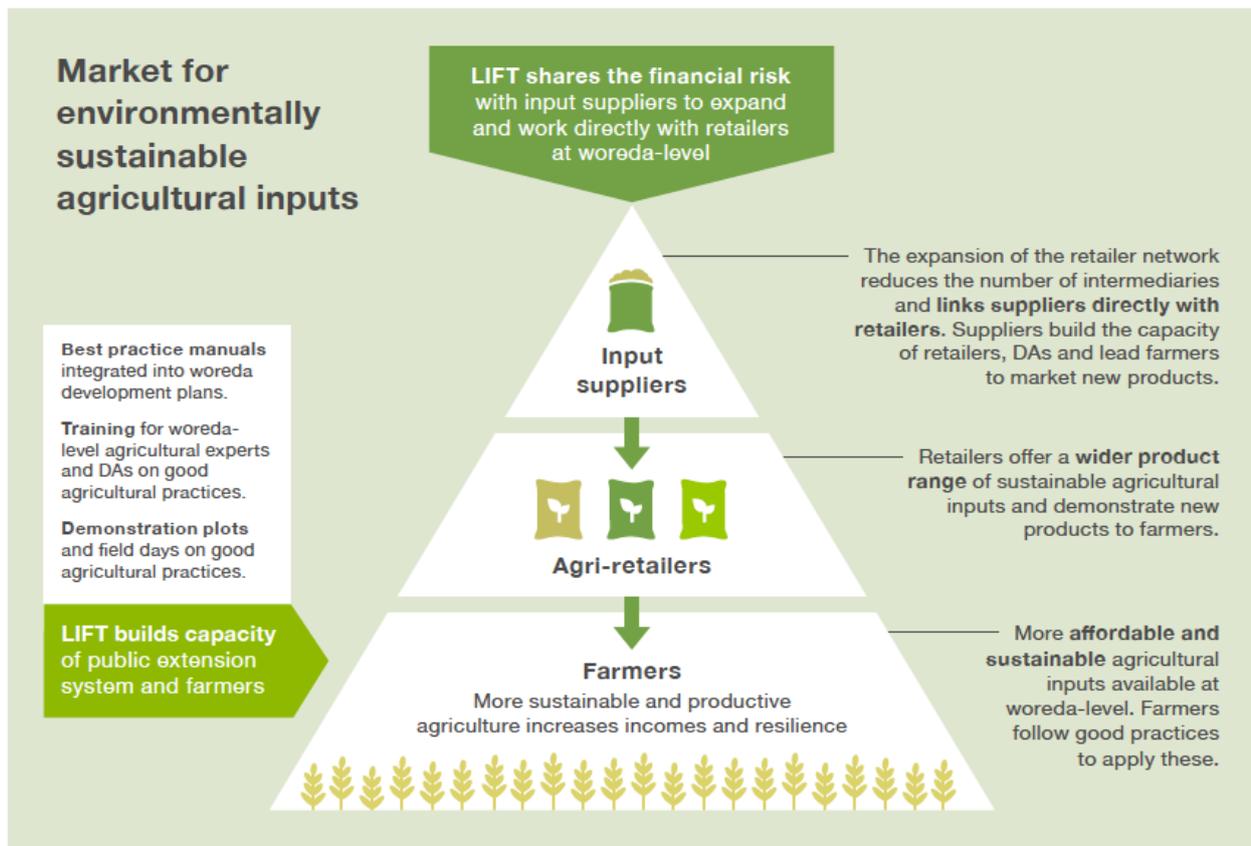
Two of the market constraints LIFT identified, through in-depth market assessments, are a lack of accessible improved inputs and limited offer of embedded services at retailers. Smallholder farmers currently rely on primary cooperatives, cooperative unions and, most significantly, informal markets to access agricultural inputs and seeds. Primary cooperatives and cooperative unions are often not able to deliver in a timely and efficient manner, while informal markets expose farmers to poor quality products in general and seeds in particular, which results in significantly low yields and even no yield in some cases. The informal markets may also introduce hazardous weed seeds. The use of informal markets poses a big challenge to the development of a competitive private sector that is able to develop distributions and sales networks across all rural areas. Additionally, most input suppliers usually market their inputs at government or NGO auctions where they can sell large quantities. As a result, many do not seek out opportunities to expand their market, leaving an untapped smallholder farmer customer base.

LIFT's market systems approach to innovating a new input supplier business model

The undeveloped markets for agricultural input supply at woreda level, mentioned above, remain a key challenge driving many of these constraints. To strengthen the input supply market, LIFT has innovated and introduced a new business model to existing input suppliers that involves developing local distribution networks. While many of these input suppliers currently sell most of their domestically manufactured or imported products through NGOs or government auctions, LIFT is incentivising them to develop direct relationships with retailers in woredas – thereby “cutting-out the middlemen”. In particular, LIFT has signed cost-share agreements with ten input suppliers, covering a wide range of woredas across the four target regions. These cost-share agreements include training of input retailers, woreda and kebele level agricultural staff and farmers, as well as demand generation activities such as demonstration plots and field days – thereby showcasing the potential of the business model for the input suppliers. The intervention aims for systemic change through showcasing the model to input suppliers and changing their future marketing behaviour and overall business model.

The primary aim of this intervention is to boost agricultural investments amongst farmers with environmentally sustainable products and practices. Since farmers now will have increased tenure security as a result of the SLLC and a wider variety of inputs as well as greater supply available in their proximity, increased use of inputs or a shift to more productive inputs should result in improved yields. The model reinforces itself as increased training and quality products are supplied to retailers who then continue to offer improved products to farmers, together with embedded advisory services. This increases the application of improved inputs by farmers and the knowledge base of farmers to correctly apply these inputs. As farmers apply inputs correctly, leading to improved yields, customer loyalty will increase creating greater demands for the inputs. This will sustain the relationship between the supplier and retailer and make for a sustainable model where retailers experience increased sales through more attractive products, input retailers cut costs and expand their outreach, and farmers increase their yields and eventually incomes. As retailers and suppliers experiencing increased sales, the successful model will crowd-in replication by other actors active in the inputs market.

Figure 1. A depiction of the supplier-retailer business linkage model Theory of Change



Methodology

Objective and Research Questions

The objective of this study was to assess the impact of the new distribution model on both farmers and input retailers through a comprehensive quantitative assessment. The specific objectives of the study can be summarised as:

- Acquire an understanding of the impact of new products on input retailer businesses, including whether overall customer numbers have gone up and whether revenue has increased.
- Gather evidence to estimate the number of farmers that have purchased the new products since its introduction
- Identify the additional effect of the newly available products on beneficiary farmers' practices, including farmers' awareness of the new products, knowledge of how to apply these, as well as their benefits in comparison to conventionally available inputs.
- Any changes in the overall purchasing behaviour of inputs as due to more availability, affordability, quality, and variety of products, as well as improved service provision and trust through retailers.
- Assess the impact of LIFT activities on beneficiary farmers' investment in agricultural inputs and the contribution of increased investment and/or practice change to any increases in productivity, as well as if these changes are different between male and female farmers.
- Capture synergy and complementarity with other EEU interventions, such as the SLLC-linked loan or the application of the formal land rental contract (SLRC).

Listing Exercise

The primary challenge in completing this study was in identifying a sample of beneficiaries. The primary point of contact for beneficiaries is via woreda-level input retailers. However, due to the low capacity of these input retailers, there is very little record keeping of customers. As a result, it was very difficult to identify who the customers are that are purchasing inputs facilitated by LIFT partner suppliers. Due to this constraint, LIFT replicated the model demonstrated by the Katalyst programme in Bangladesh, and built a sampling frame by

listing all customers of input retailers for one week and then followed-up with a subset of those customers who had purchased LIFT-facilitated products for more in-depth interviews at the household.

A team of 2 enumerators were placed across eight woreda level input retail stores, selected purposively for the survey, during the peak of input purchasing. They were stationed in the stores for one week, where they attempted to interview every customer that purchased a LIFT facilitated product with a short customer survey and requested permission to enlist the customers to be part of the follow-up survey at the household. 1,003 customers were listed. In the case of the Farmer Service Centres, of which there were three out of the eight sampled retailers, they had some records of customers and enumerators were able to randomly list from the records available. This process of listing was initially planned for a total of two weeks as there were no more than two market days in a week. However, due to the high volume of customers who came to purchase inputs, the listing was completed within one week.

Household Survey

After the listing exercise was completed a sample of 480 out of the 1,003 customers listed were selected to be interviewed as part of the more in-depth household survey. Customers for in-depth interviews were chosen at random from the 1,003 listed customers. For ease of logistics, customers who were able to gather at kebele centres did so for the interviews, while many were interviewed at the household level. Prior to conducting the interviews, the enumerators made sure that the respondent was indeed the same customer who was enlisted during the first phase of data collection. This was done by confirming some characteristics such as name, age, gender, and where they purchased their agricultural input. The household survey assessed each customers household profile, in terms of family size, education levels, and so forth. It also explored the household's economic status through a set of questions addressing these topics. Lastly, it asked a range of questions regarding the customers' experience with purchasing an input at a retailer and the benefits they incurred.

Limitations

Although, the team of enumerators were supposed to list customers entirely at random from those who came to purchase inputs during the week and they were present, in some cases, such as SNNPR, the enumerators had to go through the kebeles and list customers door to door. Unfortunately, in those areas there were not many customers coming to the store on market days as the peak purchasing season had passed. This meant that the enumerator teams had to consult with the local Development Agents (DA) of the Ministry of Agriculture to identify farmers who had made the input purchases relevant for this study. This has the potential to bias some of the findings as most of the customers would have been in close proximity to the retail store potentially making the more likely to adopt new practices.

Another challenge that the enumerator teams faced was accessing farmers during the household survey. Due to some delays in early planning, the second phase of the data collection fell during the primary planting season for most farmers. Therefore, it was very difficult to get a hold of the farmers identified for the survey. Many were in their fields conducting various farming activities, which made them unavailable even at the household. As a result, the selected sample had to be increased in order to improve the chances of finding the selected farmers. This constraint only affected the woredas in Amhara and Tigray region. Although this increasing of the sample is not ideal, the effect on the findings is minimal as the listing already followed a random process.

Customer Profiles

During the data collection for the survey, it was important to also look at socio-economic demographics of the customers. Due to not having a customer list from the institutions involved, the information available to LIFT regarding to the ECA beneficiaries is limited. Therefore, as part of the data collection, the enumerators inquired about their general socio-economic characteristics.

Socio-Economic Demographics

Household Information

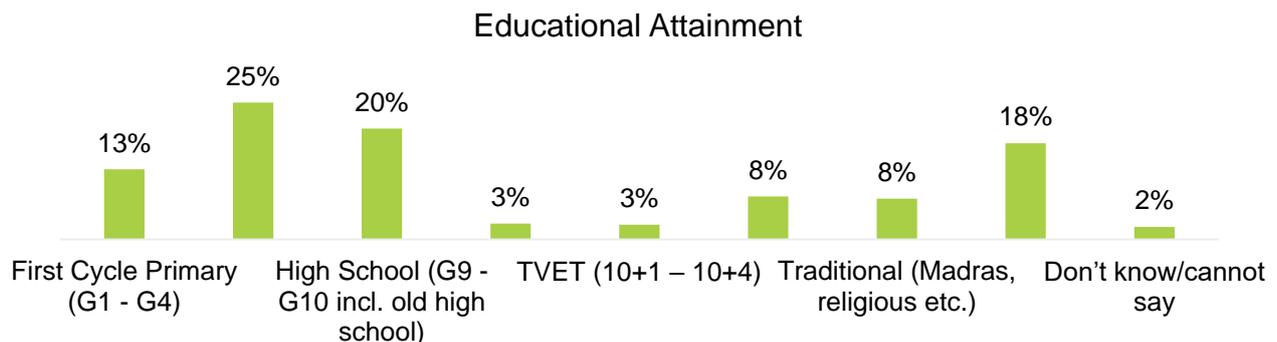
Since the objective of the study was to understand the behaviour change in the household regarding input purchases and application, it was important that enumerators interviewed either the heads of the households or other decision makers. Therefore, in this study, all 480 customers sampled identified themselves as heads of households. This allowed the enumerator teams to better gauge the expected practice changes in the household. The sample interviewed was also predominantly male headed households because only 41 out of the 1003 customers listed were female headed households. Thus, they also represent only 3% of the sample interviewed for a more in-depth survey. Although it is not yet clear why the gender distribution is so lopsided, it is reasonable to assume that male head of households are the primary purchasers of agricultural inputs for

the households. Additionally, from previous qualitative assessments, retailers report that 15-20% of their customers are female. However, the male heads of households may be purchasing the inputs but 66% of the respondents reported that decisions regarding inputs are made either jointly between the male and female heads of the household or between all the members of the household. This contrasts with only 23% reporting that decisions are usually made solely by the male head of household. Additionally, the customer beneficiaries have an average age of 42 with an average family size of 5.6.

Education Levels

The customers exhibited a wide range of educational attainment. Figure 2 shows the breakdown of educational attainment among the sample.

Figure 2. Distribution of educational attainment



As depicted in Figure 2, most of the customers have at least some form of formal education. Overall, 63% of the customers stated that they can read and write which is similar to the rates amongst male headed households of access to finance and rentee beneficiaries. Additionally, 35% reported to being able to cover all the related costs of sending their children to school and 63% stated that they were able to cover minimal up to most costs of education. Thus, only about 1% reported not being able to cover any costs.

Economic Status

When it comes to assets, 88% of respondents reported to owning a plough for their agricultural work. In terms of the household assets, almost all (98%) use firewood, saw dust, and crop/residue leaves as their main source of energy for cooking. Yet, 69% of the respondents stated that they do have access to some form of electricity in their home. While for a water source 72% use a private or public tap outside their homestead and a protected well or spring. Out of the customers, 93% reported that they are generally able to meet their basic needs or more, while only 7% stated that they were unable to meet their basic needs without support. Plus 84% of the respondents had a functioning mobile phone in their household.

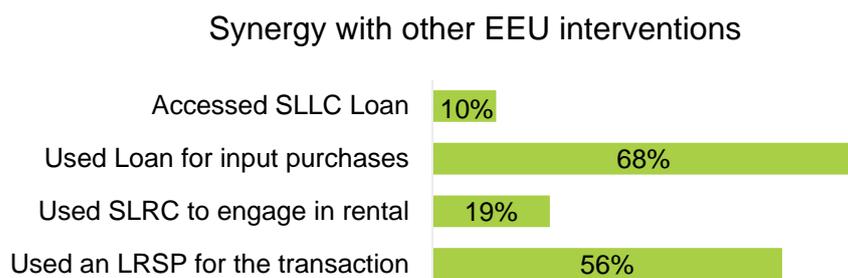
Disability/Illness

Most customers report that they do not have any case of disability or protracted illness. Out of the sample interviewed, 8% stated that they have some kind of disability. More specifically, about half of those who report disability state it is trouble with their vision. In addition, 11% of the customers reported to having a protracted (for at least 3 months) illness in the past year. As a household, 82% responded that they never had issues covering medical expenses when illness occurred. Yet, about 18% stated that they have had trouble covering medical costs at least once.

Integration with other EEU Interventions

Another important lesson that the LIFT-EEU team wanted to learn was if there is any complementarity among the three intervention sectors of access to finance, rural land rental, and environment & conservation agriculture. As a result, the questionnaire probed if these sampled customers also interacted with the other interventions. The below figure depicts what proportion of the customers have accessed an SLLC, after which they can access the other EEU interventions.

Figure 3. Synergy with other EEU Interventions



Access to Finance

A few ECA beneficiaries did have experience with the SLLC-linked loan. 89% of all customers have accessed an SLLC for their parcels. Out of those that had an SLLC, 10% of the respondents stated that they had used their SLLC to access individual loans from Microfinance Institutions (MFIs). Additionally, out of the 10% that took out these individual loans using their SLLC, 68% of them reported they used some of the loan funds to purchase agricultural inputs from their local input retailer.

Rural Land Rental

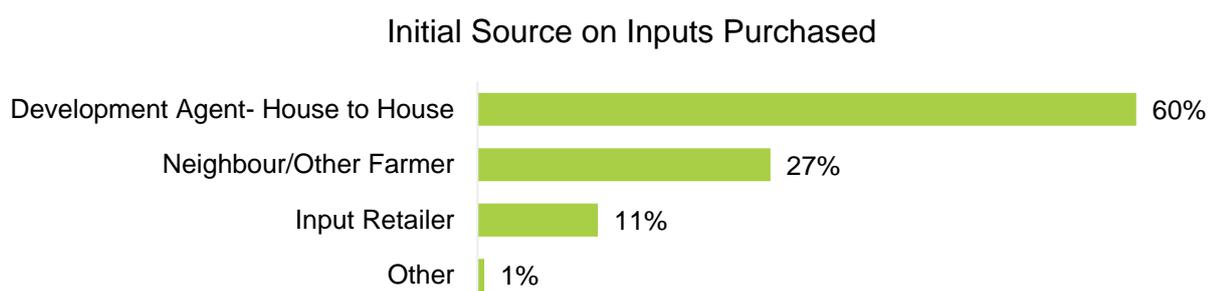
In the case of land rental, 19% of the ECA beneficiaries reported having used the standard land rental contract (SLRC) to rent in or out land. However, almost half of these respondents claimed that they conducted the land rental agreement without the support of an LRSP. This was especially true for the respondents from Amhara and Oromia.

Knowledge and Awareness of Available Agricultural Inputs

An integral part of the supplier-retailer model piloted by LIFT is increasing knowledge and awareness on the agri-inputs and their application. Suppliers and retailers make an effort in conducting demonstrations, farmer field days, promotional materials, as well as training the agriculture office experts and development agents (DAs). All this effort is to make sure that farmers are aware of the product and have the know-how on its application. At the same time, this creates the demand for the product offered by suppliers. The results suggest that these efforts are having an impact and perceived positively.

Sources of Information Regarding Agri-Inputs

Figure 4: Depicts the reported first source of information for the input purchased



As part of the promotional efforts of the suppliers and retailers, DAs are very involved in raising awareness about the newly available products. DAs participate in the trainings by the suppliers and are involved in ensuing demonstrations and field days. Since DAs are also the primary source of agricultural related information for most farmers, it is no surprise that, for 60% of the respondents, DAs were the first to inform them about the new inputs. The second most common source of information regarding the inputs were other farmers at 27%, while input retailers were the first source for 11% of respondents. These findings highlight the important role DAs play in widescale awareness raising and demand creation for these high quality agri-inputs. It also highlights that input retailers are doing their part by promoting the relevant products to visitors of their stores.

DAs are the Most Influential Source for Adoption

Although DAs play an influential role in raising awareness amongst farmers regarding the availability of inputs, it is important to understand who are the actors that play the pivotal role of influencing farmer's decision

making. In general, the findings show that DAs again are the most common actor affecting the input purchasing decision at 56%, similarly other farmers account for 25% of respondents, while input retailers for 16%. While these follow a similar pattern as the initial source of information, it is important to note that input retailers are the only group that are over represented in comparison to being the first source (11% vs 16%). This implies that input retailers play a larger role in influencing farmer’s adoption of the input than raising awareness.

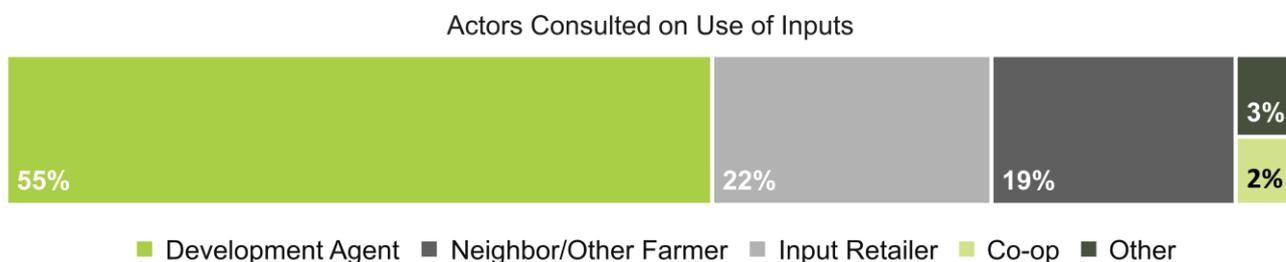
Input Retailers are Instrumental in Organising Training Events Including Demonstration Plots and Farmer Field Days

In addition to general information about the inputs being shared by DAs, other farmers, or input retailers, some farmers had also attended specific training activities such as demonstration plots and field days organised by the supplier, retailer, and woreda agricultural office. From all the respondents, 38% had attended either a demonstration site or a farmer field day. Out of these events, the most commonly attended were the demonstration site making up 84% of the training attendees. From all the organised training events, input retailers were reported as primary organisers for 35% of them, while the woreda agricultural office accounts for 37% of the events. This confirms LIFT’s approach of engaging the woreda agricultural office and input retailers as part of the knowledge transfer on the application of inputs as well as promotion of its efficacy, as outlined in the intervention’s Theory of Change in Figure 1 above.

Input Retailers Play an Important Role in Consulting Farmers on Applying Inputs Correctly

Training and awareness raising activities are supposed to lead to increased knowledge on the application of inputs. 87% of farmers responded to having received information on how to apply the inputs purchased. This high proportion affirms that the training component of the model is permeating through all the actors down to the farmer level. When it comes to who are the actors offering the instruction on application of inputs DAs solely account for 26% of the respondents but they are involved in this activity for 59% of respondents with other actors. Input retailers are also a key player in knowledge dissemination as they solely account for 14% of the respondents, but they are involved in this activity for 42% of respondent alongside other actors. Therefore, reinforcing the crucial role played by both DAs and input retailers in offering valuable instruction on the use of the inputs.

Figure 5: Distribution of actors consulted when farmers have issues with the inputs purchased



Additionally, 91% of farmers reported that the trainings were either somewhat or very helpful. Furthermore, 67% of the male farmers also shared it with their spouse. This data helps us identify the key players in offering instructions on the input application and how effective it has been in supporting farmers apply the products. DAs and input retailers are also key in addressing any challenges faced during the application of the input. Farmer state that they are the top two resources they consult for issues during application with 55% citing DAs and 22% reaching out to input retailers. Other farmers and neighbours also play an important role as they account for 19% of whom farmers consult for challenges with the purchased inputs.

Satisfaction with Products Purchased

Once farmers have a clear understanding on the quality and application of the inputs, their level of satisfaction with input retailers is assumed to increase. It is important that retailers provide advisory services along with the products they sell. This ensures that farmers apply these correctly and experience the expected benefits on productivity – ultimately increasing customer satisfaction and customer loyalty. The following section takes a closer look at experience that farmers are having with retailers as well as retailers’ satisfaction with input suppliers.

Retailers are Satisfied with Consistent and Timely Supply, Higher Quality Products, and Benefit from Credit and Sales Commissions

When LIFT supports the input suppliers by buying down their risk via a cost-sharing grant, the next level market actor impacted by this model are the input retailers. Therefore, to comprehensively assess the model's efficacy, retailers were assessed through key informant interviews.

All the surveyed retailers indicate that they have increase sales as a result of their links with input suppliers, with most of them (75%) estimating that their sales have increased **by more than half**. A few other key findings stand out: 90% of retailers report that the supply of products is very consistent; all of them believe that the products supplied are of better quality than those from their previous sources; most also report to attaining better prices with these products that previously offered; and they all identified the trainings as very helpful in promoting the products.

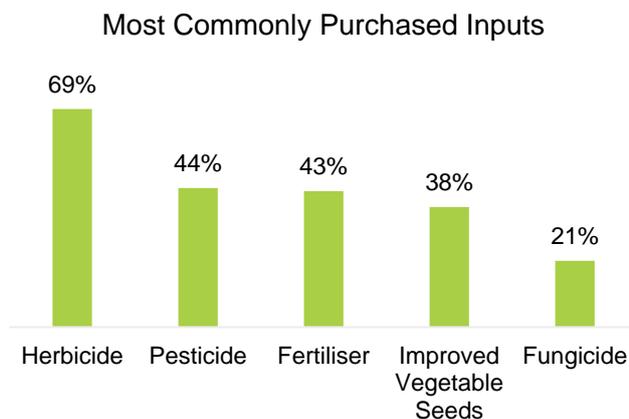
Box 1: During the listing exercise, LIFT also conducted interviews with retailers to estimate the number of total beneficiaries that have purchased partner supplier's inputs (See more in Annex 1). The retailers reported that on **average 44%** of their customers purchase LIFT partner suppliers' products.

In addition to being able to market higher quality products, retailers have benefitted from their partnerships with LIFT input suppliers in numerous ways. Some input suppliers offer (partial) credit to their retailers when they put in their orders, as well as commission for sales. Others offer discounts to the retailers: many input suppliers believe this helps them to create demand and get farmers interested in their products. In addition, promotional materials are provided to showcase in retailers' shops. Lastly, once their products have been ordered, most input suppliers offer free transportation and are able to deliver quickly (1–3 days on average).

Most Customers are Purchasing Agro-Chemicals for Staple Crops

Farmers also value the high-quality products that are now available in their proximity. As depicted in Figure 6, it is clear to see that the most common products purchased are herbicide, pesticide, fertiliser, fungicide and improved vegetable seeds. This is in alignment with our expectations as Harvest General Trading (improved vegetables seed supplier) and Hamlin (agro-chemical supplier) are two of our larger and wide-reaching partner suppliers. Additionally, the data displays that many farmers (68%) are purchasing a combination of inputs from the retailers further enhancing the resulting benefits.

Figure 6: Identifies the most common purchases from the sampled respondents.

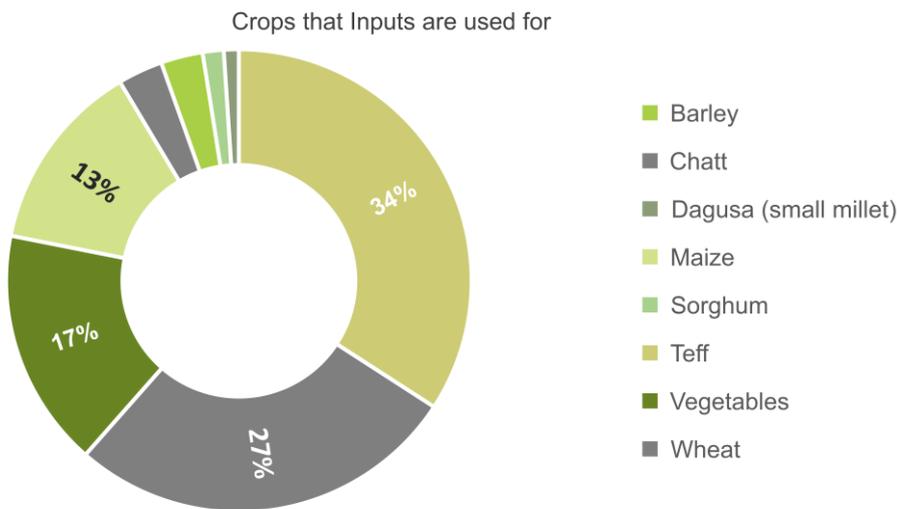


What Crops are Inputs Used For?

Most of the farmers applied the inputs for cereal crops such as teff, wheat and maize. Since most farmers in Ethiopia produce cereals as their primary crop for both consumption and sales, it shows that these inputs are supporting their primary agricultural production. Another set of crops worth mentioning are vegetables, which were identified by at least 17% of farmers. It is important to note that most vegetable crops can be classified as cash crops while cereals are staple crops.

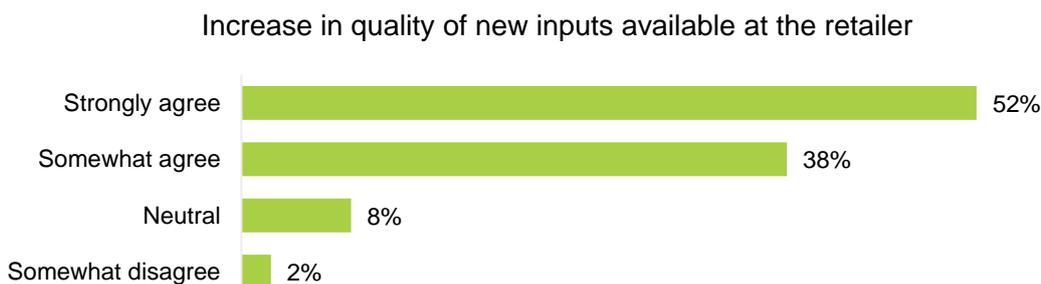
Farmers Confirm Higher Quality of LIFT-Facilitated Inputs

Figure 7: Crops that inputs are used for.



The respondents are overwhelmingly in agreement with the retailers when it comes to the quality of the inputs purchased. 89% of customers reported that their confidence on the credibility of the inputs and the retailer has increased. This has also led to 90% of customers reporting that they somewhat or strongly agree that the quality of inputs is higher than what was previously available at the retailer.

Figure 8: Identifies the scale of how customers reported on the change in the quality of inputs



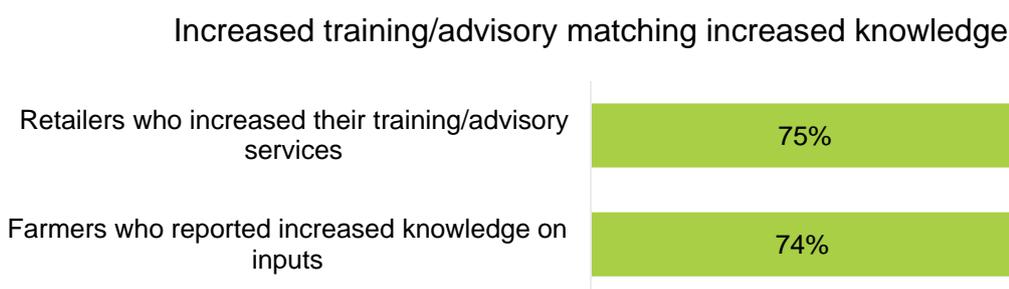
The data displayed in Figure 8 emphasises the increased quality of the inputs now available at the retail stores, which has a significant impact on the productivity on the farmers agricultural produce. It also affirms that the suppliers selected for partnership do indeed provide high quality inputs to the market.

Retailers Provide more Quality Advisory Services to Farmers as a Result of LIFT Facilitation

Besides increasing the quality of the inputs available, retailers have also improved their general service offering at their stores. The primary improvements include the additional training and advisory services now made available to customers as well as the accessibility and affordability of the inputs.

Additional Training and Advisory Services

Figure 9: Increased training/advisory matching increased knowledge.

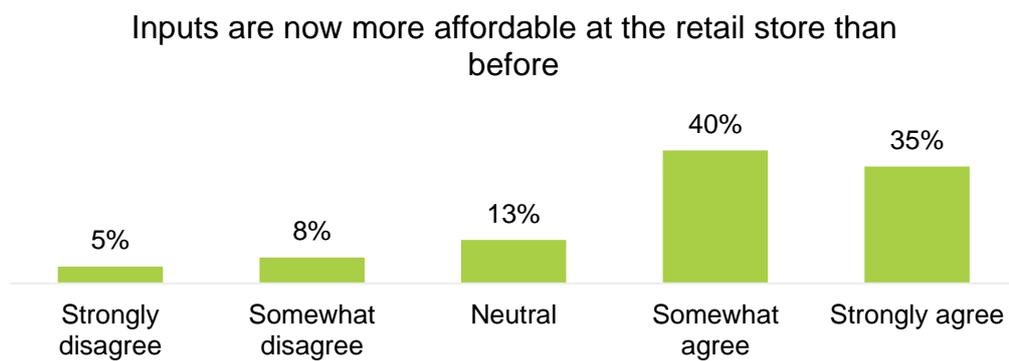


75% of interviewed retailers reported that they have now increased the training and advisory service they provide to customers. As a result of LIFT’s facilitation, these trainings have shifted from informal dissemination to more organised demonstrations. The changes made by retailers corresponds with statements made by farmers – 75% of which stated that they are now receiving more training on the application of inputs from the retailer than before. Furthermore, 74 % of farmers also agree that they are now more knowledgeable on the use of inputs due to the support from retailers and 77% also report that even their spouses and family members have increased knowledge on inputs as a result. The alignment of findings from both retailers and customers provides a clear picture of how increased training/advisory has significantly enhanced farmers’ knowledge on the application of inputs, thereby increasing the trust between farmer and retailer as well as farmers’ agricultural practice. The outcome of this increased trust is sustained demand from the farmers resulting in rising sales for the retailers

Inputs are More Accessible, and Prices are More Affordable

Although, increased knowledge is pivotal to improving farmers productivity, if accessibility is not addressed, the benefits are limited. Therefore, the other area of retailer service probed was the accessibility and affordability of the inputs on offer. Retailers reported that they are getting better prices than before as well as timely deliveries from the partner suppliers. Farmers again confirm this finding as mentioned above. From the sampled farmers, 89% reported that they are now accessing a wider variety of inputs at the retailer than before. Additionally, 85% reported that they can access inputs in a timely manner during the peak seasons. This is in contrast with many complaints farmers voiced regarding the more conventional supply channels such as coops, unions, or kebele offices. More importantly, farmers also report that they are attaining better prices for inputs than before.

Figure 10: Displays the number of farmers who stated they experience a price advantage than previous inputs



As shown in Figure 10, 75% of customers agree that there are price improvements compared to products available before. Thus, increased access, variety, and affordability allows farmers to increase their investments in agricultural inputs.

High Customer Satisfaction is Leading to Increased Sales and Customer Loyalty, Indicating the Sustainability of LIFT’s Input Supplier Model

All these improvements in the retailers’ service offering results in increased customer satisfaction and boosed sales for input suppliers as reported in EEU monitoring data. This was evidenced in three ways through the survey. Firstly 87% of respondents reported that they are now purchasing more inputs at the retail store than before. Secondly, 78% of farmers stated they would prefer to purchase inputs from the retail store in the future instead of other sources such as coops and unions. Ultimately, this is cemented by 85% of customers expressing their overall satisfaction with the totality of services offered at the retailer. Due to these high levels of satisfaction most customers also proposed that essential inputs such as chemical fertilisers (DAP, Urea, etc) and improved cereal seeds/varieties be offered through retailers. There is strong evidence that these two inputs used in combination can have a drastic impact on productivity, yet at the moment their supply is almost completely channelled through government or government affiliated entities.

Outcome 2B Finding:
 This is further affirmed by **83% of farmers reporting an increase in investments in inputs** as a result of the improved services at the retailer.

LIFT’s Input Supplier-Retailer Linkage Model Leads to Productivity Increases for Farmers

The benefits of LIFT’s supplier-retailer model, including improvements in retailer service, higher quality inputs made accessible for rural farmers, and increased knowledge on applications, should eventually lead to a positive impact on the quality and productivity of farmers’ agricultural output. Findings from this survey suggest significant increases in both quality and productivity of agricultural outputs by customers who purchased LIFT-facilitated products.

Improved Crop Quality and Time-Savings in Production Process

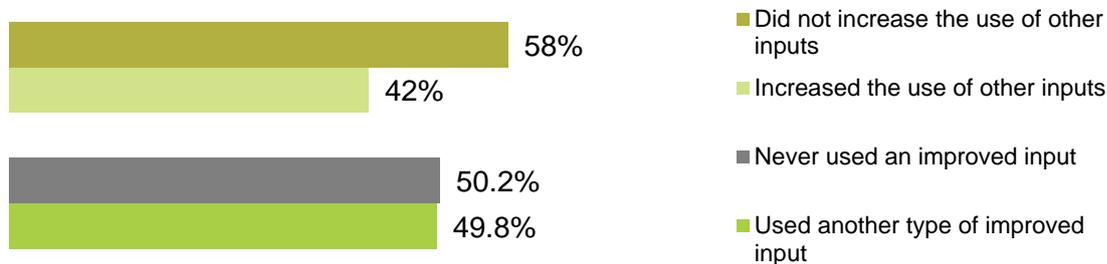
One of the key advantages of using higher quality inputs in agricultural production is improved crop quality. As many crops have various gradings to measure quality, the superiority of the input used affects the grading of the output. That is why it is important that 95% of farmers interviewed stated that they noticed a quality improvement in their produce due to the input applied. These increases in quality improve the leverage that farmers have when negotiating prices in the market. It also allows them to access higher value markets in larger towns if they can offer enhanced quality produce.

Farmers also reported time savings due to the higher quality-efficiency of the inputs applied. Since the inputs are of higher quality, they serve their purpose in a much more efficient manner. For example, in the case of an herbicide, it minimises the amount of time farmers must spend weeding. The data further emphasises this point as 96% of the customers reported having time savings as a result of the improved input use.

LIFT-Facilitated Inputs Lead to Significant Yield Increases

Beyond improved quality and time savings, farmers also reported that their yield of produce has increased as a result of the new inputs used. The yield results from the survey are disaggregated between those who had never used these types of inputs before and those who had used other types of improved inputs in the past. As seen below, 50% of customers are first time users of improved inputs displaying how this improved accessibility of agricultural inputs is drawing a new customer base for input retailers.

Figure 11: New input users and those who increased the use of other inputs



Additionally, to add a layer of attribution, farmers were asked if they had increased the use of other inputs. When analysing the yield, only farmers who stated that they did not increase the use of other inputs were included. This is to isolate the effect of the LIFT partner supplier products since that would be the only change made by the farmers in terms of input use. Across these farmers, **93% reported an increase of yield** due to the use of the improved input.

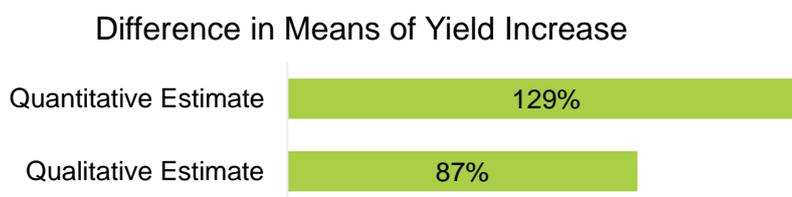
The Yield Increase for Farmers that had Never Used Improved Inputs Before is Significant

For the customers who had never used inputs before, the expectation was that their yield increase would be much larger than for those who had previously used improved inputs. The qualitative and quantitative findings are presented in Figure 12.

Box 2: Analysing yields through quantitative and qualitative methodologies

In order to estimate the yield effect from the use of the improved inputs purchased at the retailer, the survey utilised both quantitative and qualitative measurements. For those farmers who stated that they did experience a yield increase as a result of the improved input used, a follow-up question was asked to estimate the proportion of the yield increase with options such as, a quarter, half, three fourths, double, more than double, etc. The quantitative approach asked farmers to report how much they produced in year zero and then year one after using the improved input purchased at the retailer. Additionally, it was assessed on what size of land farmers produced the crop in both years. This allows to calculate the yield per hectare before and after LIFT-facilitated inputs were applied. To further understand the additionality of the new inputs applied, respondents were grouped by those who had used improved inputs before and those who did not use improved inputs before.

Figure 12: Estimates for differences in the average yield increase for both quantitative and qualitative estimates.

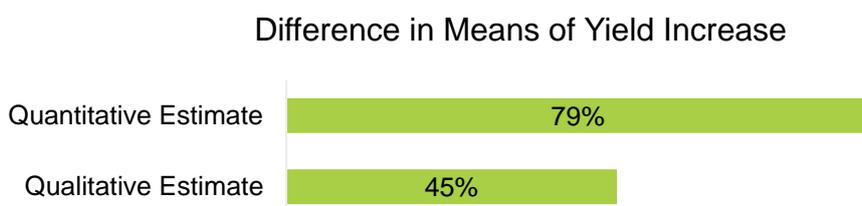


As depicted in figure 12, there are drastic changes in the yield of the primary crops on which the improved inputs were applied. When utilising the qualitative estimate, the average increase in yields is approximately 87% from the year prior to the improved input use. While the quantitative estimate depicts an even greater change at approximately 129% more than the previous year's production. For the quantitative estimate, a t-test was conducted to assess its significance and the below table shows that it is significant at the 99% confidence interval. This means that this effect on yield is immense. While other factors are at play, the fact that these farmers apply inputs for the first time is likely to largely contribute to the yield increase.

The yield impact for farmers that used other inputs before is also high, showing the additional effect of using LIFT-facilitated products as compared to other available products

Although the yield increases for those who had previously used improved inputs is expected to be lower than the first group, the average increase was still determined as significant. The table below depicts the estimate using the qualitative and quantitative methodologies.

Figure 13: Quantitative and qualitative estimates for yield increase



The findings for this group are in some ways even more impressive as this shows the effect of the higher quality inputs used on the primary crops. Since these farmers had used improved inputs previously, the primary change is the input purchased at the retailer. Thus, the quantitative estimate of the average yield increase is approximately 79%, while the qualitative is 45%. Whether the qualitative or the quantitative is employed, both

indicate an undeniable impact on yields due to the use of the improved inputs. Furthermore, a similar t-test was done to test the statistical significance of the quantitative estimate.

Overall, the estimate that LIFT accepts as the most reasonable change due to the improved input use is the qualitative approximation. This estimate follows a more conservative logic and results. It is more in line with the expected change from the inputs according to existing agricultural research. Yet, the primary finding still stands in how much these improved inputs contribute to a significant impact on the yields of the crops on which they are applied. This also highlights the importance of the input quality and the improved knowledge of the farmer on the appropriate application. Furthermore, this impact on yield is likely to affect household income as 91% of customers reporting that they, on average, sell 45% of their agricultural produce.

Conclusion & Recommendations

Key findings and Implications for the Input Supply Market

Key learnings and implications for the input supply market can be summarised in three points:

Important to invite extension agents to drive up demand of improved products

This finding was made clear when it comes to the initial source of information for farmers to learn about inputs. The most frequently mentioned source for farmers are DAs, who provide awareness creation through their regular door-to-door visits. Additionally, the various woreda agriculture offices play a role in organising the demonstration sites and farmer field days which both farmers and retailers have identified as valuable to appropriate application and increased knowledge of inputs. As a result, the involvement of DAs is key in allowing for a wider reach of information regarding inputs. Therefore, as retailers and suppliers conduct promotional activities it will be crucial to include due to their access to farmers to create demand for improved inputs.

Farmers are increasing their level of confidence and trust in the input retailers' products and services

One of the key reasons that is boosting farmers' confidence in retailers is the increased training/advisory service provided by the retailers, which was also deemed pivotal by farmers. Not only do farmers report to receiving more training but they also attest to the increased knowledge that they have gained. Furthermore, the improved training/advisory service has a multiplier effect as most farmers pass on the learning to other members of the family, spouses in particular.

In addition to increased training and advisory, farmers have witnessed a noticeable improvement in the quality and variety of inputs available at the input retail stores. This allows a wider segment of customers to be served by the retailers. The quality also ensures that customers become repeat purchasers engendering loyalty.

Lastly, the affordability of the inputs resulting from the direct linkage with input suppliers, allows retailers to pass on the price advantage they have gained to the farmers. This helps dissuade the fears of price gouging practices that farmers cite as a reason they avoid private input retailers.

The combination of expanded retailer advisory services and the provision of improved inputs results in substantial increases in productivity for customer farmers, both by crowding-in farmers who did not use inputs before, and by offering better inputs to farmers that did use other inputs before

The combination of increased knowledge and quality regarding inputs is allowing farmers to maximise the benefits of the newly available inputs. These gains in productivity are much larger than expected as the baseline for input knowledge and quality available to farmers in the past was very low. This further highlights the value of the embedded advisory services offered by retailers in addition to the strength of the linkages with suppliers ensuring timely deliveries. Therefore, as these high-quality products are funnelled directly to retailers to whom farmers have better access, further improvements in productivity can be expected. The improved yields will reinforce the model as farmers will sustain demand of these productivity boosting products as well as the advisory services. This increased demand will feedback to retailers purchasing more inputs from partner suppliers.

Next Steps to Improve Intervention and Expand Benefits

The learnings documented in this report add to the body of evidence regarding the efficacy of the supplier-retailer linkage model. Findings from both retailers and farmers indicate that the model is working in making a wider variety of inputs available to farmers as well as increasing the market of the input retailers. Furthermore, it is boosting the productivity of farmers in a significant manner. Therefore, LIFT should explore the following next steps to ensure these benefits are replicated:

- Share the findings on the impact of the model to past and present partner suppliers, retailers, and relevant government stakeholders so they may promote a similar model with similar impact.
- Encourage existing partners to continue expanding their reach of input retailers through whom they can market their products and thus scale the benefits. Additionally, ensure they invite the agriculture extension agents to enable wide scale demand creation of improved inputs.
- Explore ways in which input retailers can offer an even wider range of products to farmers as their general service offering and credibility among farmers is improving.

Conduct further research to verify these findings and assess what specific attributes of the model are resulting in the high yield impact. Additionally, probe why female headed households are not widely accessing the improved inputs at the retail stores.

Annex 1 - ECA Beneficiary Estimate Model

This is a step by step instruction that details how the number of beneficiaries was estimated using the data gathered through the ECA survey. The ECA survey provided us the following relevant data that was used to calculate the estimate of beneficiaries.

- - Average number of customers that visit the retail stores during peak and off-peak months (300 FSC, 83.4 for Retailers)
- - Average number of months that are peak and off peak for purchasing inputs for retailers (3.6 peak, 8.4 off-peak)
- - Average number of market days in a month for retailers interviewed (5/month)
- - Average length of partnership with LIFT suppliers for the retailers interviewed (21.75)
- - Average proportion of customers who purchase LIFT supplier products from all visitors (44%)
- - Proportion of customers who had purchased these products in the past (86%)
- - Average number of times a customer buys these input products in a given year (1.77)

Once these data points were collected from the different actors involved the following calculation were undertaken.

1. Since the Farmer Service Centres (FSCs) and Retailers were quite different when it came to how many visitors they had coming to their store on a daily basis, I averaged daily customers separately so that FSC (300 for peak) don't skew the average for all retailers (83 for peak).
2. To calculate the average daily customers who purchase LIFT products from either FSC or Retailers, I first multiplied the number of daily customers during peak months by the average number of market days in a given month (5) which gives us the total number of customers in a given month during peak months.
3. This product of the two data points was then multiplied by the proportion of customers who purchased LIFT partner supplier products (44%). This then makes it particular to the customers we are interested in.
4. The next step is to get how long these products have been available at the retailer which is the amount of months that customers have been buying this product. So I took the result of the previous calculation and multiplied it by the result of the average number of peak months (3.6) by the average length of partnership (21.75) then divided by 12. This calculation gives us the equivalent of the average peak months in a year to the average length of partnership.
5. The outcome of these calculations gives us the average number of customers during peak months that have purchased LIFT partner products in the past 22 months from a single FSC or Retailer. Therefore, we multiply this result with the number of FSCs/Retailers interviewed which is 3/4 respectively.
6. The result of this calculation gives us all the number of purchases of LIFT partner products from the 7 interviewed FSCs/retailers. Since we know that a farmer on average purchases these products 1.77 times in a year, we have to then calculate what the equivalent number would be for 21.75 months. So we multiply the average purchase in a year (1.77) by the average length of partnership (21.75) and divide by 12, however we only do this for 86% of the customers as the other 14% have just now purchased it for the first time. Therefore, the final calculation is a weighted average using a different calculation for the 14% and the one mentioned earlier for the 86%.
7. The outcome then estimates the number of unique customers that have purchased LIFT supplier products from the 7 FSCs/retailers interviewed.
8. Now that we have developed the model for estimating beneficiaries, we can then extrapolate these averages to estimate customers for the other 65 retailers. However, we have to split old and new retailers/FSCs as we don't have an average for how long they have been selling LIFT supplier products.
9. Looking through old IMTs, I found that an additional 24 retailers were selling LIFT products as of July 2017, so I used 24 months as the length of partnership to extrapolate the survey finding to these retailers. Additionally, since some of these older retailers could now be less active than the 7 selected for the survey, I halved the proportion of customers who would purchase LIFT supplier products, making it 22%. Besides the change of the average length of partnership and proportion of LIFT supplier's product customers, the rest of the calculations follow the same formula as described above using the daily customer averages of the retailers.
10. For the rest of the 41 FSCs/retailers, I utilised 4 months as an average length of partnership to have a more conservative estimate as about half of them were selling LIFT supplier products prior to 4 months.

For the 35 retailers, I used the daily average customers of retailers, and the daily average customers for FSCs for the remaining 6 FSCs.

11. Since the length of partnership is 4 months, we did not discount these results by the portion of customers who would have bought the product more than once.
12. I then summed all the outcomes of the various calculations to get the estimate the total number of ECA beneficiaries from the 72 FSCs/Retailers in the past 2.5 years.
13. As an additional conservative scenario, I discounted the total by 15% with the assumption that maybe only about 85% of customers who come to the store would actually make a purchase.

	Daily Peak Customers	Daily Off Peak Customers	Peak Months	Off Peak Months	Length of Partnership (months)	Proportion of LIFT customers	Market Days on Avg/month
FSC Average	300	23.33	3.6	8.4	21.75	44%	5
Retailer Average	83.4	14					
<i>Calculations derived from multiplying the daily customers with the average market days per month, then multiplied by the proportion of customers purchasing LIFT products, which is then multiplied against the number of peak/off peak months by the months of partnership divided by 12</i>							
FSC Customers - Peak Months	4312		Retailers Customers Peak Months	1199		Avg Yearly Purchase	
FSC Customers - Off Peak Months	775		Retailers Customers Off Peak Months	465		1,774684874	Source: Product purchased dataset from listing exercise
Average Number of FSC Customers	5087		Average Number of Retailer Customer:	1664		Avg times purchased for 21.75 months	
Total FSC Customers From Sample	15260		Total Retailer Customers From Sample	8318		3,216616334	
				Discounted for repeat purchasers			
Total Number of Customers from Sample FSC & Retailers (7)				23577		9605	
<i>Same calculations as above with adjusted proportion of customers purchasing LIFT products as well as the length of partnership</i>							
		Length of Partnership	Only for Older Retailers Proportion of LIFT Customers Discounted for Low Activity			22%	
Older Retailers Peak	24	24	Number of Retailers	Estimated Customers/Retailer	Total Estimated Customers	Discount for Previous Purchase	
Older Retailers Off Peak				661	15872	6068	
				256	6156	2353	
				Total Estimated Customers for Older Retailers		8421	
<i>Same calculations as above with adjusted length of partnership</i>							
		Length of Partnership	Number of Retailers	Estimated Customers/Retailer	Total Estimated Customers		
Newer Retailers Peak	4	35		220	7716		
Newer Retailers Off Peak			Number of FSCs	85	2992		
Newer FSCs Peak		10		793	7930		
Newer FSCs Off Peak				142	1425		
				Total estimated customers from newer retailers		20063	
<i>Same calculations as above with adjusted length of partnership</i>							
		Length of Partnership	Number of Retailers	Estimated Customers/Retailer	Total Estimated Customers		
August Retailers Peak	1	20		55	1102		
			Number of FSCs	1	198		
				Total estimated customers from August retailers		1300	
Scenario 3				Total Discounted ECA Estimated Beneficiaries (including WER)		46,124	