
Root Capital

Goldilocks Toolkit

Innovations for Poverty Action

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Right-fit monitoring and evaluation (M&E) systems embody the principles of Credible, Actionable, Responsible, and Transportable, or CART. In the Goldilocks case study series, we examine the M&E systems of several innovative organizations and explore how the CART Principles can work in practice.

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Root Capital: Measuring the Impact of Financing Small and Growing Agricultural Businesses

Agriculture accounts for one-third of gross domestic product and three-quarters of employment in sub-Saharan Africa, yet agricultural yields and productivity are the lowest of any region of the world.¹ While there are many efforts underway to improve the incomes of poor farmers, a number of market weaknesses hamper these efforts, including poor infrastructure, lack of agricultural support services and credit, and difficulty accessing international markets.

Root Capital is an impact investor that seeks to address some of the market problems affecting the rural poor. It provides loans and financial management training to small and growing agricultural businesses, which buy directly from smallholder farmers and sell to larger distributors. Root Capital's assistance is designed to help small and growing agribusinesses to buy better quality products at higher volumes, and with greater consistency from small-scale farmers. Since its founding in 1999, Root Capital has disbursed over \$900 million in loans to more than 600 rural businesses and worked with more than one million

rural households in 30 countries in Africa and Latin America.

To manage its large and growing portfolio, Root Capital has developed a right-sized monitoring system that reflects the CART principles. The organization collects action-oriented data to inform key decisions and demonstrates a commitment to high data quality. Continual refinement of the monitoring system, and the use of innovative tools that integrate financial, social and environmental performance into decision-making, reflect a commitment to using data for learning, action, and improvement.

The size of Root Capital loans and the nature of their work with small and growing enterprises poses a challenge for credible impact evaluation using a randomly selected comparison group. Value chain interventions like Root Capital's are typically designed to effect change at multiple stages along the agricultural value chain, and usually involve working with a limited number of organizations at a time with relatively large loan sizes. Randomized evaluations are often not feasible because

the sample size is too small to generate valid results.

This case study focuses on the Goldilocks principle of credibility and the challenge of measuring the impact of lending to small and growing businesses. Root Capital's current measurement strategy has utilized a quasi-experimental regression discontinuity approach implemented by an independent researcher. This study appears to validate important elements of Root Capital's theory of change.

Root Capital has also implemented farmer surveys with comparison groups to estimate program impact on businesses and farmers. However, since identifying a credible counterfactual for impact evaluation is probably not feasible, we recommend that Root Capital focus on analyzing the business case for farmers who work with the agribusinesses. If such an analysis found that farmers earned a larger profit after working with the business, it would help validate the program's theory of change, though it would not demonstrate that the program *caused* the change.

What They Do

Root Capital offers loans and financial management training to small and growing agricultural businesses in Latin America and Africa. These rural businesses include private enterprises, farmer cooperatives, and associations that typically buy crops like coffee, nuts, or staple grains from farmers and then sell the crops to international buyers, and increasingly, domestic buyers in the country of origin. Small and growing businesses are typically too big for microcredit but too small or too remote to access traditional commercial loans. Root Capital's business loans, ranging in size from \$50,000 to \$2 million, consist mostly of short-term trade credit² covering one harvest cycle. Approximately 80 percent of the loans are renewed annually.

The loans provide needed capital and allow small and growing businesses to pay farmers promptly at the time of harvest. If payments to farmers are delayed or uncertain, farmers are likely to side-sell their harvest to other buyers, reducing the likelihood that the business can fulfill its agreement with large international buyers, and precluding the farmer from accessing higher pricing through the agricultural business. As needed, Root Capital also provides financial management training to current and prospective clients to help them develop the financial management capacity to support a growing business and ensure that the loan will be repaid.

Root Capital conducts due diligence on all prospective clients to identify

rural businesses that are both credit constrained and have a high likelihood of improving farmer livelihoods if that constraint is removed. This due diligence process also identifies businesses that are likely to promote sustainable farming practices.

Theory of Change

Root Capital's ultimate goal is to grow businesses that increase earnings for low-income rural households in the regions where they work.

Root Capital has identified two main drivers of increased income for the farmers working with the small and growing businesses they serve:

1. Farmers get access to premium (often certified) markets, and receive higher and more stable prices for their goods.

2. Farmers get agronomic training and credit to achieve higher yields and meet buyers' quality and sustainability requirements.

Root Capital expects that with access to these services farmers will be more likely to sell their product to the business rather than to other buyers. In turn, the agricultural business will be better able to fulfill its contract with the buyer(s) for the product, reinforcing a virtuous cycle, depicted in Figure 1.

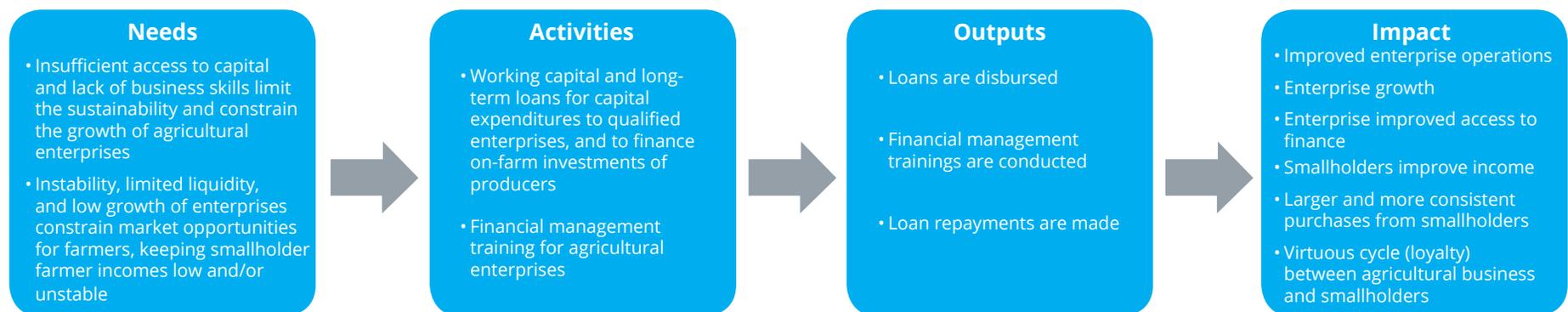


FIGURE 1. THEORY OF CHANGE* *Organizations use a variety of methods to present their theories of change. To standardize our discussion of these cases, we present our own simplified version of Root Capital's theory of change here. Please see Figure 2 in the Appendix for the organization's full version.

Activity Monitoring

Activity Monitoring at Root Capital is known as Social and Environmental Performance Management, and focuses on the due diligence process, which screens prospective clients and tracks the organizational practices of existing clients seeking loan renewals. During the due diligence process, Root Capital loan officers check to make sure that prospective borrowers are not engaged in pre-defined social and environmental 'exclusion practices' such as child labor and deforestation. Loan officers also collect a set of pre-defined indicators to assess the expected environmental and social benefits of the loan and of agricultural businesses towards rural households. Officers enter these data into an Excel-based scorecard and assign

an overall credit score (e.g., a letter rating like AA, A, B, etc.) before submitting them to a global credit committee. Root Capital's Impact team oversees this process, and the credit committee rates prospective clients to determine whether the business will receive a loan as well as the total amount when loans are approved. The due diligence process continues to change over time based on feedback from loan officers, who are the system's primary users, and based on the evolution of Root Capital's portfolio.

The Impact team at Root Capital uses a number of checks to ensure high-quality data. Loan officers are recruited for their extensive field experience and knowledge of the agricultural

context. However, because instincts and experience are not failsafe, the due diligence process also uses data quality safeguards such as technical training on social and environmental issues, standardized indicators (developed over time in consultation with field staff), and annual training on data collection and interpretation. The U.S.-based staff and field staff screen scorecards for completeness and conduct logic checks based on their knowledge of the regions and industries. Loan officer incentives are aligned with honest reporting, since the loan amount and pricing are not based on the impact scores (i.e., a higher score does not guarantee a larger loan).

In addition to social and environmental due diligence data, Root Capital collects standard financial data on clients' financial performance. Once the loan is disbursed, Root Capital's risk team tracks loan repayment and the financial performance of the business. Upon repayment at the end of the harvest cycle, the business can apply for another loan the following year, and the social and environmental due diligence process repeats again. In addition, regular tracking of monitoring information, independent from the social and environmental scorecard, allows loan officers to use repayment history to structure new loans.

In 2013, Root Capital launched an analytical exercise called the "Balanced Portfolio Dashboard" to help lending staff visualize the social and environmental performance of their portfolios alongside the financial performance. The dashboard integrates financial information on expected loan profitability with data from the social due diligence scorecards, predictions of an enterprise's ability to access finance through commercial markets, and the number

of farmers reached for each business in the portfolio. Credit managers are just starting to use the data, presented in the form of balanced dashboards, to inform portfolio planning. [See Figure 3 in the Appendix for an illustration of this approach.]

Measuring Impact

Root Capital attempts to measure impact in two stages:

1. Impact of the loan and financial advisory services on the rural enterprise's business operations, profits, and purchases from smallholders

2. Impact of the rural enterprise on the farming practices, crop yields, and income of small-scale farmers

Impact on Businesses

The size of Root Capital's loans makes randomized evaluation extremely

challenging. For most financiers, randomizing loan amounts of \$50,000 to \$2 million to create a valid treatment and control group is not an operational possibility. Most lenders who lend to small to medium-sized businesses do not have a sufficient number of acceptable loan applications to create a treatment and control group, so the sample size would not be large enough to generate precise estimates of impact.²

An impact evaluation of Root Capital's lending on client enterprises used an alternative design called regression discontinuity. Working with Rocco Macchiavello, an economist from the University of Warwick, the organization evaluated the impact on business

outcomes of giving clients a larger loan. The evaluation was conducted among 200 of Root Capital's coffee-processing clients across 18 countries.

The regression discontinuity design involved comparing outcomes for businesses that fell just above and just below a predetermined cutoff credit score for a larger loan. Because the threshold is an arbitrary cutoff between credit scores, eligible firms just above and below the cutoff for larger loans should be very similar on average. However, those with scores above the cutoff received a loan approximately \$120,000 more than those below the cutoff. The cut-off point allowed the researcher to compare a treatment group that received

a larger loan to the comparison group that received the smaller loan size. Any differences in outcomes between the two groups were likely to be the result of Root Capital's loan.

The findings from the study appeared to validate important elements of Root Capital's theory of change. Firms receiving an extra \$120,000 in loans from Root Capital saw, on average, a 33 percent increase in the value of coffee cherries purchased from farmers and an 18 percent increase in sales to the international buyers. Larger loans also led to a 12 percent increase in prices for farmers supplying the coffee-processing businesses.³

The findings are limited because they applied only to a \$120,000 increase in loan size, conditional on receiving a loan in the first place, rather than measuring the overall impact of receiving a loan. However, a reasonable assumption is that the impact of extending a loan would be at least as large, so the results may be interpreted as a lower bound of the impact of receiving a loan (versus not).

A benefit of this approach is that it was fairly low cost, using previously-collected operational data rather than new survey data.⁴

Impact on Farmers

Answering the second impact question—whether small-scale farmers benefit from the loans Root Capital gives—is even more challenging. While increased sales and agricultural prices are promising indicators, understanding the overall impact on farmers requires a more complete picture of farmer livelihoods and welfare.

Root Capital has conducted studies of farmer outcomes since 2011. The studies involve comparing outcomes between farmers who worked with Root Capital clients and a comparison group of farmers who did not work with Root Capital clients, but who may have worked with other similar businesses or cooperatives, or may be independent farmers. One important purpose of these studies has been to generate useful data about the farmers in the area for Root Capital and the agricultural

business. These studies use mixed methods to collect uptake data on which farmers are affiliated as suppliers to the agricultural business and how they are benefiting, drawing upon farmer surveys and interviews with enterprise managers, as well as information from focus groups that explore gender-related issues, farmers' costs of production, and adoption of sustainable production practices.

Root Capital embraces a client-centric approach in its M&E activities, meaning that it works closely with clients in every stage of data collection, from survey design to data collection and analysis, to ensure that the data are useful and actionable for business decisions. Root Capital provides agricultural businesses with data from the farmer surveys to inform decisions about how they work with farmers and what services to offer. The organization also uses farmer survey data for its own analyses, including informing revisions to Root Capital's client targeting and social and environmental due diligence processes.⁵ Farmer studies also collect detailed

endline data on farmers' incomes, agricultural practices, socioeconomic characteristics, and interaction with the agricultural businesses, and compare the difference in outcomes between farmers working with Root Capital clients to outcomes for independent farmers. Root Capital does not claim that these results demonstrate causality, but instead asserts that farmer affiliation with agricultural businesses is associated with the observed outcomes.

Indeed, Root Capital cannot claim causality because farmers affiliated with Root Capital's clients are likely to be different from independent farmers. The critical assumption necessary to demonstrate that the enterprises truly caused a change in farmer outcomes—that member farmers and non-member farmers are very similar on average—is unlikely to hold. For example, members may be more entrepreneurial or wealthier than non-members, which means that revenues or productivity for members may be higher. Indeed, anecdotal evidence suggests that members and non-member farmers are different in many ways, both in terms of personal characteristics like entrepreneurship,

and economic status. While the farmer studies collect information that provides useful and actionable information for client businesses, Root Capital, and international buyers of agricultural products, the studies do not demonstrate that the business or Root Capital caused the observed difference in farmer livelihoods.

Root Capital's impact team recognizes the selection bias issues and proactively communicates to external stakeholders that its comparison groups do not demonstrate causality. The team is exploring alternative methods to identify a comparison group with less bias, though these methods may pose other technical and practical challenges. One method that's being used in a subset of studies is difference-in-differences estimation, which can control for unobserved characteristics (such as entrepreneurial abilities or ambition) by comparing groups before and after the intervention. This approach also assumes that the difference between the participant and comparison groups is constant over time (i.e. that both groups experience the same trends without the intervention). Root Capital is pursuing this option for eight upcoming studies

with clients in Latin America and three studies in West Africa.

However, there are likely to be other drawbacks to this approach. First, collecting baseline data (before the loan from Root Capital is disbursed) may be logistically difficult—for example, enterprises may be reluctant to share a list of their members prior to receiving a loan from Root Capital. More importantly, the validity of the difference-in-difference method rests on the crucial “equal trends” assumption mentioned above, which will be difficult to confirm without some historical data.

Similar to the difference-in-difference approach, Root Capital may explore the possibility of finding an external shock or other factor, such as a geographic barrier, that effectively creates two groups of farmers that one would expect to be similar on average but who differ in their access to enterprise. To work, the external factor driving farmers to join or not join cannot be correlated with farmer outcomes. Cases that make this method possible are rare, and Root Capital has not yet identified such a scenario.

Goldilocks Recommendations

Given the challenges in measuring impact at the farmer level, **we recommend that Root Capital focus its analytical resources on better understanding the business case for the farmers who sell to Root Capital businesses.**

Credible: Collect high quality data and accurately analyze the data.

Root Capital will continue to explore whether the challenges in the difference-in-difference estimation can be overcome through the new impact studies they are designing. In the meantime, conducting an analysis of the business proposition for farmers working with Root Capital

would help validate the theory of change.

Root Capital businesses generally incentivize farmers to use certain agricultural practices that increase yields, which should increase volume for the business and income for the farmer. Estimating the return on investment would consist of gathering data on the specific costs farmers face in adopting new practices or changing their operations in order to sell to the Root Capital business, and the income they received from the agreement (or total production as appropriate).

While the analysis is straightforward, data on farm-level profitability, such as input and labor costs, yields, and prices or

revenues, are often challenging to collect, which is why many agricultural programs cannot say whether farmers are better off when they adopt new practices. The proposed analysis is essentially a type of process evaluation that would be a one-time or limited evaluation rather than a regular part of Root Capital's monitoring efforts.

Actionable: Commit to act on the data you collect.

Root Capital's data collection and due diligence process is a good example of the Actionable Principle. Root Capital uses the data as a regular part of its operations to identify agricultural

businesses that meet social and environmental criteria, have a high potential to benefit the farmers, and lack access to credit from formal sources. Moreover, Root Capital has embraced innovative approaches to using its operational data to make decisions about its portfolio and strategies for targeting agricultural businesses (see Appendix).

Root Capital also shares the farmer survey data it collects with agricultural businesses to help them make decisions about the services they offer to farmers. The proposed assessment of farmer profits would provide a critical supplement to the existing surveys and help businesses better understand the most important constraints or more profitable services to benefit farmers' production.

Responsible: Ensure the benefits of data collection outweigh the costs.

In this case, the Responsibility principle is closely linked to Credibility. Like most organizations, Root Capital has to carefully consider how it will use its

monitoring and evaluation resources. The regression discontinuity study provided an opportunity to assess elements of the theory of change at a low cost to the organization. Our recommendation to end data collection on comparison groups for impact analysis should free up resources for collecting data on farmer costs and revenues.

Transportable: Collect data that will generate knowledge for other programs.

Developing an approach for Root Capital to estimate the return on investment for farmers that adopt new agricultural practices would be very helpful for evaluating the business proposition of this investment, and also for other impact investors and funders who invest in agricultural programs.

Root Capital Responds

We commend Innovations for Poverty Action for bringing forth the Goldilocks Principles of credible, actionable, responsible, and transportable monitoring and evaluation. We believe that these principles provide valuable guideposts for organizations such as Root Capital that are dedicated to making a difference, and to measuring that difference even when doing so is challenging.

We are grateful for IPA's partnership in thinking through how these principles can inform our own monitoring and evaluation. We look forward to exploring opportunities to increase the degree to which the comparison groups in our impact evaluations can serve as true counterfactuals, for instance through

difference-in-difference techniques.

The Goldilocks recommendation that we should endeavor to understand the economic costs and benefits to farmers of shifting production practices makes sense and is a high priority for us. Indeed, it is a priority for the smallholder agricultural development sector, due to the implications not only for farmer livelihoods but also for environmental sustainability and supply chain resilience. These findings are likely to be highly actionable and transportable and we look forward to pursuing this research agenda further. We outline some of these plans in our recent Issue Brief: "Investing in Resilience: A Shared Value Approach to Agricultural Extension."

At the same time, changing production practices is only one of the several ways in which an agricultural business might impact farmer livelihoods. Other ways include access to markets that pay higher prices, access to business-administered microcredit, support in crop diversification, shifting norms of gender inclusion and equity, and access to social services and other public goods. We believe our assessment of enterprises' impacts on farmers will be more complete to the extent that we continue to address these other impact mechanisms as well, even as we dive deeper on costs and benefits to farmers of changing production practices.

Lessons for Others

1. Know when not to measure impact.

Credible data analysis involves understanding when to measure impact—and also when not to. Even if high-quality data are available, identifying a valid counterfactual to measure impact is not feasible for all programs. A comparison that suffers from selection bias is not credible proof of causality and may not be the best use of scarce analytical and financial resources – meaning it would not adhere to the Responsibility principle of CART.

2. Avoid complex evaluation methods when possible.

Quasi-experimental impact evaluation methods can sometimes be a good alternative when a randomized controlled trial is not feasible, but these methods are complex and also have a number of limitations, including technical challenges and potentially high costs. Implementing organizations should avoid investing a lot of resources in methods that require a large number of assumptions, a great deal of additional data collection or require a high level of statistical knowledge to validate them. Simpler methods of operational research, such as using regression discontinuity to examine the effects of different treatments, can yield evidence of impact as well as useful program learning at a reasonable cost.

3. Consider evaluating the business model, rather than measuring impact.

When measuring impact is not feasible, a social enterprise organization could consider evaluating the business proposition of an investment. While such an estimate cannot attribute any positive return on investment to the program or investment (i.e. it cannot show the program caused the change), negative returns may be an indicator the program is not working as intended. Such data, especially when combined with uptake and engagement data from end-users, can shed light on how the model can be strengthened.

Appendix

Detailed Theory of Change

The Theory of Change maps out agricultural business' impact on producer households and on the environment

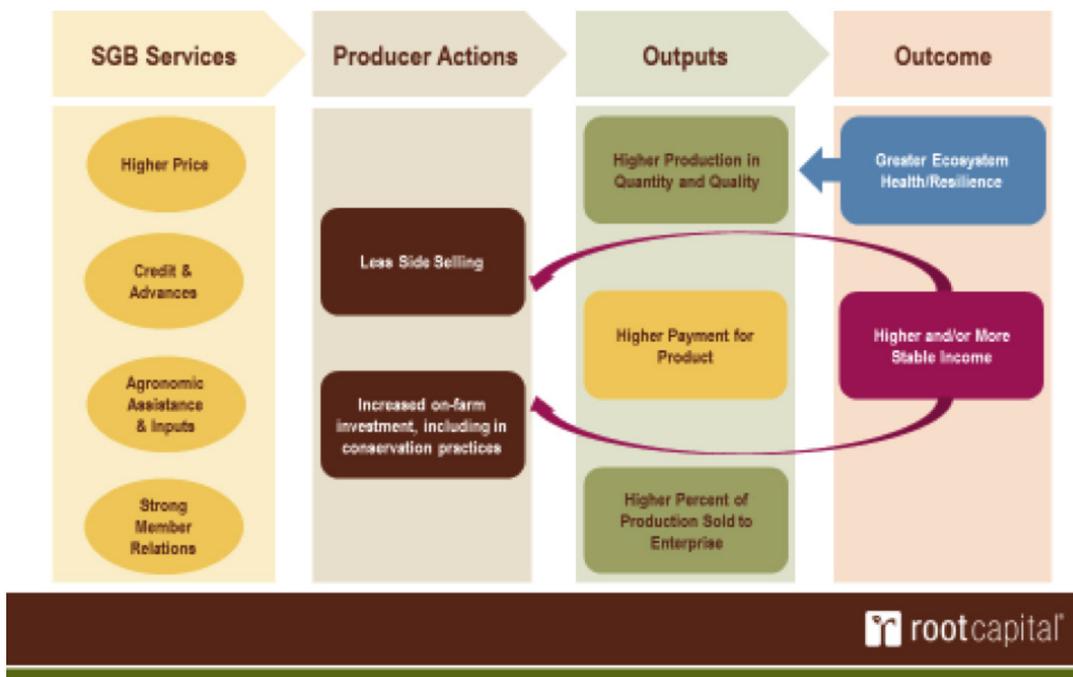


FIGURE 2. ROOT CAPITAL THEORY OF CHANGE

Decision-Making from Operational Data

Root Capital has found innovative ways to integrate the financial, social, and environmental performance data they collect from agricultural businesses into decision-making. An example is Root Capital's "Balanced Portfolio Dashboard" which compares social and environmental performance with expected financial performance of each loan (i.e., profit or loss to Root Capital of making the loan).

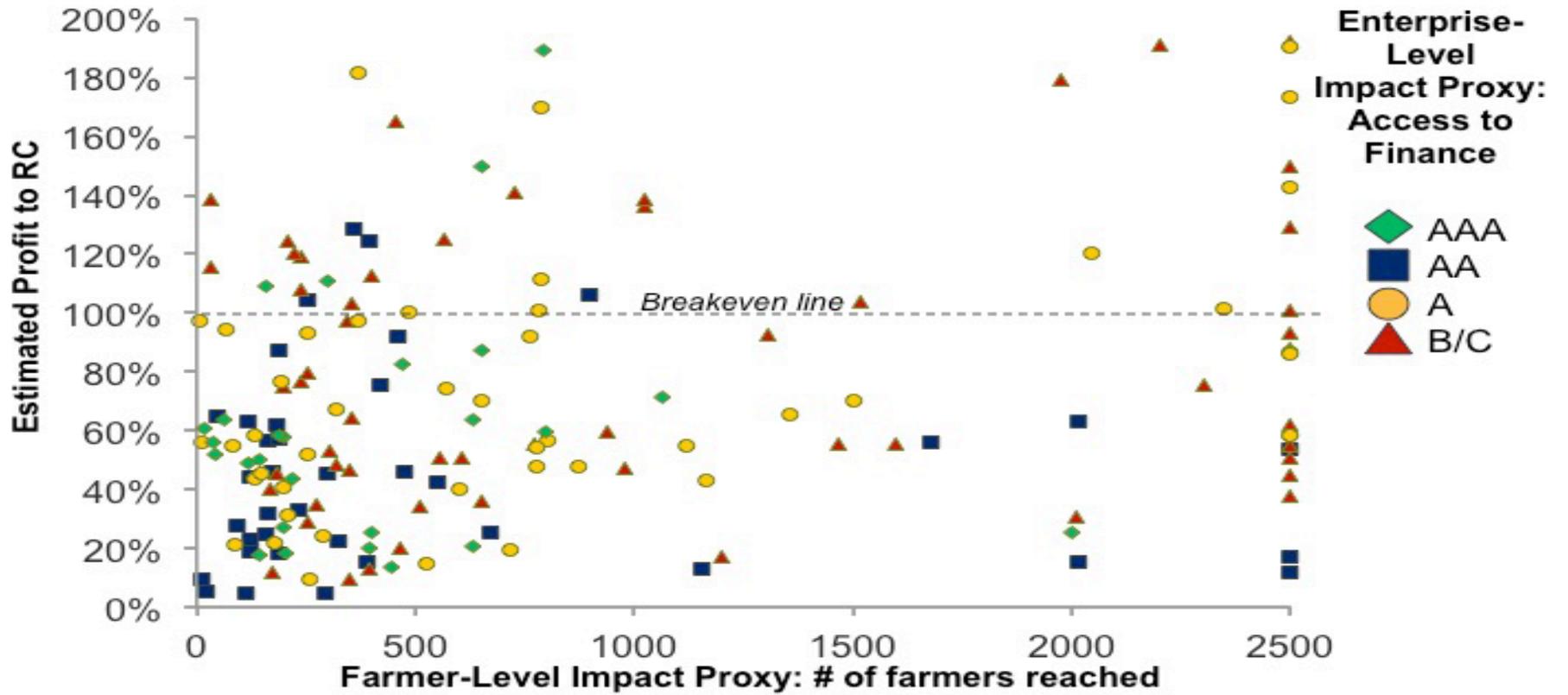
Figure 3 is one example of the dashboard output, showing the relationship between the size of the enterprise (the number of farmers reached) and projected profitability, broken down by the different ratings for access to finance. The scatter plot reveals substantial variation along these three dimensions. There are several relatively small businesses with limited access to finance that are nevertheless profitable for Root Capital to serve – these clients offer both financial returns and impact. The portfolio also includes some small clients that have access to alternative

sources of credit, and are not expected to be profitable for Root Capital. Arguably these clients offer little financial return or impact and Root Capital should explore other uses for this capital.

Many clients, however, lack access to finance and reach hundreds of farmers, yet are not profitable to serve. Root Capital's approach hinges on the fact that these small businesses tend to grow and take out successively larger loans. The revenue from growing their client base (represented in the upper right quadrant of the graph) cross-subsidizes loans to the next round of early-stage businesses (represented in the lower left quadrant of the graph).

Presenting these data visually showed that there is generally a tradeoff between profitability and reaching businesses with limited access to credit, but there are some exceptions. Using this dashboard allowed Root Capital to have a conversation with its senior management about the portfolio and targeting of

businesses. The analysis contributed to an important conversation about who Root Capital serves and how to align operations with mission.



■ FIGURE 3. BALANCED PORTFOLIO DASHBOARD

Endnotes

1. World Bank. (2008). Fact Sheet: The World Bank and Agriculture in Africa. Available at: <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/0,,contentMDK:21935583~pagePK:146736~piPK:146830~theSitePK:258644,00.html>.
2. Even if there were enough demand to generate a sufficient sample and enough capital to supply the loans, financiers may not have the capacity to conduct due diligence for both the treatment and control groups.
3. Root Capital signs an agreement with the international buyer and disburses a loan to the agricultural business, which is guaranteed by the purchase agreement between the agricultural business and the buyer. When the business delivers the product, the buyer notifies Root Capital and repays the loan. For an example of how Root Capital uses its operational data to make management decisions, see the Appendix.
4. A reasonable assumption is that the impact of extending a loan would be at least as large, so the results may be interpreted as a lower bound of the impact of receiving a loan (versus not).
5. Administrative data from the Credit Bureau that collects key business outcomes (revenues) and other business data would be cost-effective. In addition, some enterprises may also collect administrative data on quantity purchased from farmers and/or prices paid and may be worth exploring, especially if time-series data (before and after receiving a loan from Root Capital) are available.