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# Multiplying Impact for Smallholder Farmers

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Smallholder farmers around the world often find themselves at the nexus of poverty and environmental degradation. Promotion of savings groups has become a well-recognized strategy for addressing poverty. Evidence shows that while savings group promotion can result in positive impact, these results are often small. This paper examines a quasi-experimental (difference-in-differences) study of an integrated approach to savings group promotion, combining a savings methodology with participatory training in regenerative agriculture/agroecology techniques. After 2 years of participation, farmers who participated in both church-based savings group activities and regenerative agriculture training saw positive change across economic, environmental, and spiritual dimensions, with the treatment group experiencing a 39% decrease in poverty as measured by a multidimensional poverty index relative to the control group. Results support the integration of savings methodologies with agricultural training to multiply impact among smallholder farmer communities.

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## Introduction

Over 600 million smallholder farmers in the world (FAO 2023b) often find themselves living at the nexus of poverty and environmental degradation. They are also often located in some of the most ecologically critical zones in the world, and as such are positioned to be important stewards of not only food security, but above and below ground ecosystems, water resources, biodiversity, and carbon. Equipping smallholder farmers, who daily face urgent issues of deforestation, declining soil health, and farm productivity is a critical element in any global strategy to address environmental degradation and climate change.

Many strategies have been developed to help equip smallholder farmers and other households living in conditions of poverty under the umbrella of poverty alleviation (Lipton 1996). Promotion of savings groups has become a significant component of poverty alleviation strategies in the past 30 years (VSLA 2023). Reviews and meta-analyses of savings group literature show a link between savings and positive well-being outcomes (Annan, et al. 2013; Biscaye et al. 2015; Karlan, Ratan, and Zinman 2014; Stewart, et al. 2012; van Rooyen, Stewart, and de Wet 2012). One of the first systematic reviews of savings and microfinance studies (Stewart, et al. 2012; van Rooyen, Stewart, and

de Wet 2012) concludes that savings promotion can have a positive impact on health, food security, and nutrition outcomes, but that results are mixed, and authors found little consistent evidence of a positive impact on income.

A randomized control trial (RCT) of village savings and loans associations (VSLAs) conducted in Burundi (Annan, et al. 2013) shows a positive impact on food security indicators and a statistically significant reduction in poverty. The intervention studies combined training on VSLA group formation with training on entrepreneurship and financial literacy. A review that looks specifically at studies of savings (Karlan, Ratan, and Zinman 2014) indicates that access to savings opportunities has a positive long-term impact on poverty and income. This review study finds little evidence that additional training on financial literacy leads to increases in savings habits. An extensive review of over one thousand papers looking specifically at agricultural communities (Biscaye et al. 2015) references a wealth of data on the impact of credit on smallholder farmers but much less information on the impact of savings. Most studies of savings show at least some positive effect, but evidence of increased income and resilience is mixed. Authors note that context may play an important role in study outcomes, contrasting

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for example urban versus rural settings. Another large meta-analysis of thousands of titles—filtered to 24 studies that meet author criteria—shows that promotion of savings has a small but significant impact on poverty metrics such as expenditures, income, return on family business, and food security (Steinert et al. 2018).

A multi-sector approach, while requiring greater coordination, has been shown to have a positive impact on poverty. In particular, agricultural growth is strongly associated with poverty reduction (Lipton 1996). Integration of savings with other types of interventions has been examined in several studies (Entz, Kaarsgaard, and Salomons 2016; Gugerty, Biscaye, and Anderson 2019; Rippey, and Fowler 2011). A meta-analysis of self-help group studies (Gugerty, Biscaye, and Anderson 2019), shows that self-help groups often have multiple goals, and experience a wide range of beneficial outcomes in multiple areas such as maternal and childcare, reproductive health, savings, and agriculture. A review of studies of savings groups integrated with other initiatives (Gugerty, Biscaye, and Anderson 2019) reveals that integration can have positive outcomes. As these authors note, it also seems true that, with other organizations, in some instances, these outcomes appear to be more beneficial for the linked organization than for the savings group. Federations or apex models in particular represent a risk of reduced transparency.

Several studies have examined the linkage between savings and agriculture. A study in Ghana (Ankrah Twumasi et al. 2019) shows that farmers perceive that savings result in an increase in capital, and therefore in agricultural production. Participation in Village Savings and Loan Associations (VSLAs) in Tanzania results in increased farm productivity, food availability, increased diversity of income sources, and decreased school drop-out rates among smallholder farm households (Nyamaka 2019). Another study indicates that participation in VSLA results in 38% higher agricultural productivity compared with farmers who do not participate in VSLA (Dawuni, Mabe, and Damba 2021). This study suggests that acquisition of inputs is a key factor contributing to the increase in productivity. Households that are actively saving are more likely to adopt climate-smart agriculture techniques according to a study in Kenya (Gikonyo et al. 2022). This study notes that the majority of households actively saving are involved in community groups.

Some organizations, observing the benefit of combined savings with agriculture, have integrated savings promotion components to enhance their regenerative agriculture or agroecology intervention. A training program in Kenya combined sustainable agricultural land management practices with VSLA (Shames et al. 2015). Authors note that VSLA participation provides a source of funding that helps farmers implement sustainable agricultural land

management practices on a long-term basis. A four-year study of a training package integrating sustainable land management practices and VSLA in Kenya finds project farmers experiencing higher levels of savings and increased farm yields relative to a control group (Nyberg et al. 2020). A climate-smart agriculture program in Ghana observes that training programs can have a positive influence on adoption of climate-smart techniques, and that VSLA can positively influence farmer participation in such programs (Martey, Etwire, and Mockshell 2021). A financing model called community Ecofund credits utilizes a VSLA model and provides grants to groups who implement an environmental management plan—this program is being implemented in Uganda, Malawi, and Tanzania (Wild et al. 2021). A conservation agriculture research program in South Africa provides VSLA training to interested farmer groups and observes VSLA is key to the long-term application of conservation agriculture practices (Kruger et al. 2022). An agroforestry program in Ghana supports formation of VSLA groups which allowed farmers, especially female farmers, to access credit and diversify farming practices (Kusters, K 2023).

A smaller number of studies provide evidence of a causal link for the impact of integrated savings and agricultural training. A quasi-experimental study in Tanzania shows that combining VSLA with farmer field schools (FFS) helps increase adoption of climate-smart agriculture practices such as mulching, composting, and crop rotation (Pamuk et al. 2021; 2018). A difference-in-differences (DID) study of an integrated development model combining savings groups with regenerative agriculture training in the Democratic Republic of the Congo observes positive changes in household economic condition and ecosystem health (Sabin et al. 2019). A case study in Haiti and the Dominican Republic at the height of the COVID-19 pandemic (Sabin et al. 2022) indicates that smallholder farmers who participate in savings groups are resilient in the face of major shocks and continue to apply regenerative agricultural techniques. Another DID study of a combined savings and agricultural training intervention operated by World Relief in Rwanda shows that participating farmers are more likely to apply innovative farming techniques, have better food security, and improved economic conditions (Dent et al. 2020).

The evidence discussed above makes a case for complementary interaction between savings activities and agriculture, and in particular, support for agricultural training. Yet the number of studies providing rigorous quantitative evidence for this interaction is small. To contribute to the evidence being gathered on this topic, the remainder of this paper examines the effect of integrating a regenerative agriculture training component into an established savings group model using a quasi-experimental design



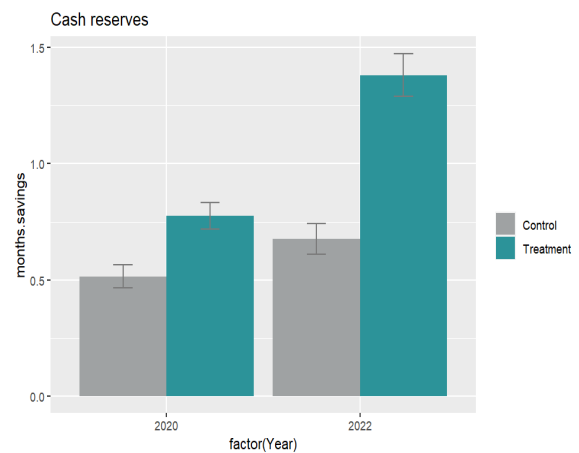
(MPI) is a robust approach to measuring poverty and has been tested in a wide variety of contexts. The MPI looks at poverty as not simply economic, but also having social, health, educational, and even spiritual components. This holistic approach aligns well with the model applied by both collaborating organizations in this study (Hope and Plant With Purpose) who see faith as a critical dimension of well-being or poverty. This approach/model therefore influences what is measured, the definition of impact, and what a flourishing life means. See Figure 9 below for the indicators included in this study.

Table 1: Metrics linked to desired MPI outcomes

Indicator	Metric
Cash Reserves	Amount of emergency cash available, months
Land Protected	% of farm protected with trees or soil conservation measures
Technique Diversity	Number of regenerative agriculture techniques applied on farm
Soil Health	Evaluated health of soil on farm, Likert scale
Nutrition Index	Estimated nutrition diversity based on frequency of consumption of key food groups
Crop Yield	Estimated yield in current season relative to previous seasons, Likert scale
Spiritual Support	Estimated support received from fellow group members, Likert scale, (measured by support through prayer or the sharing of prayer requests – not included in the MPI summarized in figure 9)

techniques applied per farm, soil health, nutrition diversity measured as an index, crop yield, and spiritual support provided by other group members. Difference-in-differences analysis looks at the relative change from baseline to endline—his means the absolute difference at endline is less important if the change over time indicates a difference between treatments. For example, spiritual support remains relatively flat for the treatment group from baseline to endline, but declines for the comparison group, resulting in a relative positive change (the difference in the differences) for the treatment group. Note that all these differences are statistically significant at a p value of 0.01. Each of these outcomes is summarized separately in figures 2-8 on the following pages:

Figure 2: Cash reserves measured in months



## Results

Using the difference-in-differences approach, a series of key metrics linked to the indicators in Table 1 shows a positive difference in the treatment group relative to the control group from the baseline data collected in 2020 to the endline data collected in 2022. These consist of an increase in cash reserves, percentage of land protected with regenerative practices on farms, diversity of regenerative agriculture

Figure 3: Percent of land on farm protected with trees or soil conservation measures

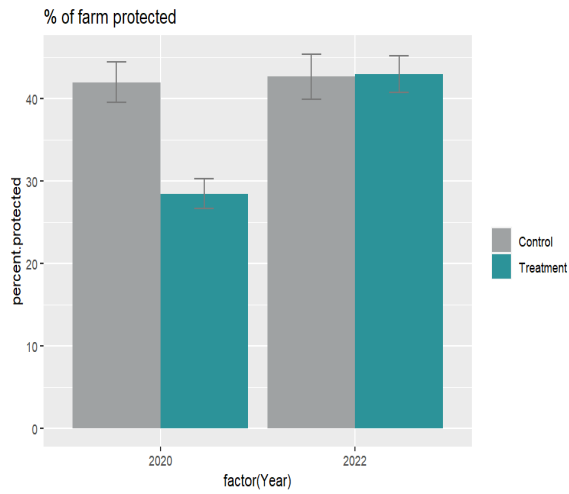


Figure 5: Soil health

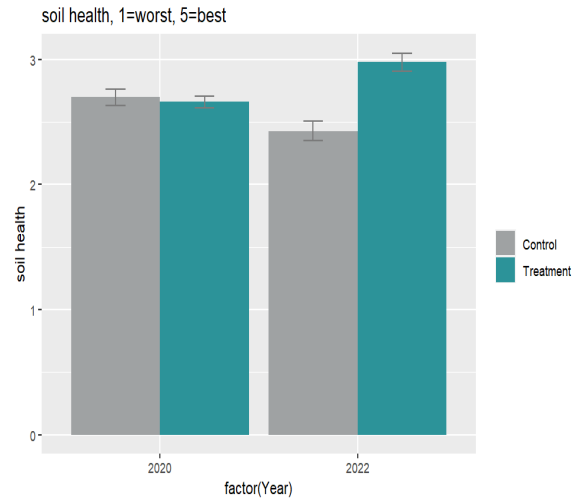


Figure 4: Regenerative agriculture technique diversity per farm

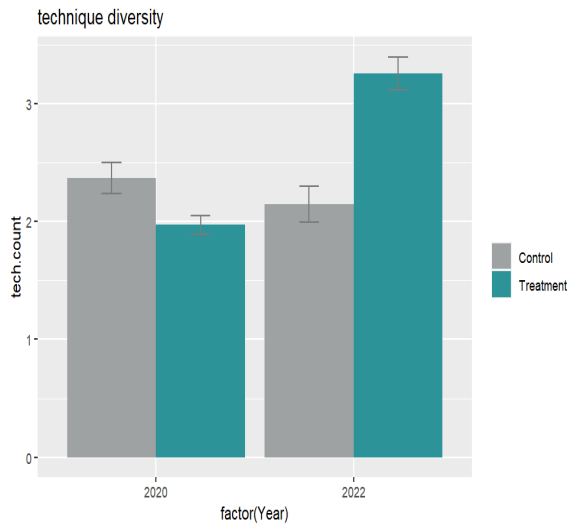


Figure 6: Nutrition index

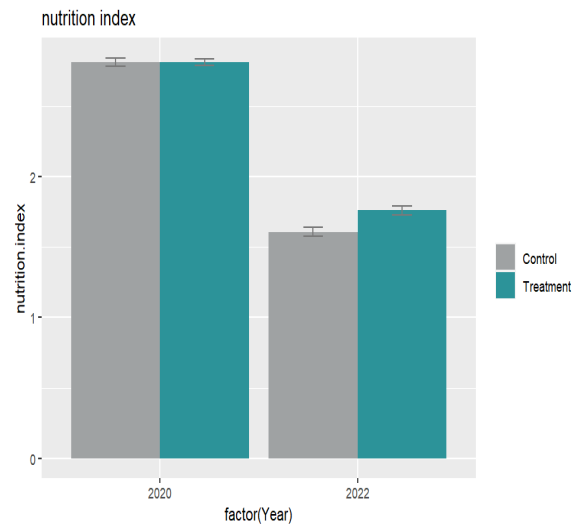


Figure 7: Crop yield

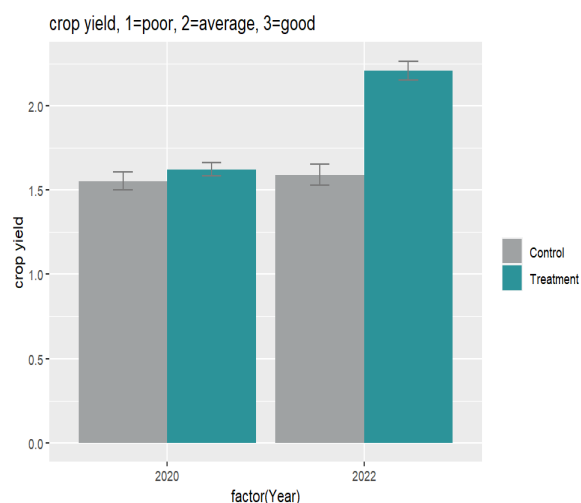


Figure 8: Spiritual support

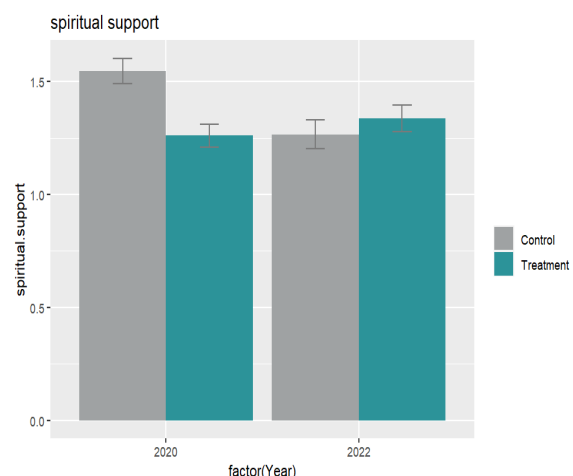


Table 2: Results of statistical tests of difference-in-differences

Indicator	Baseline		Endline		DID value	p-value
	Control	Treatment	Control	Treatment		
Cash reserves (months)	0.51	0.78	0.68	1.38	.43	0.00292
Land protected (% of farm)	42	28.5	42.7	43	13.8	0.00273
Technique diversity (per farm)	2.4	2	2.1	3.3	1.6	1.59E-09
Soil health (1-5)	2.7	2.7	2.4	3	0.6	9.94E-06
Nutrition index (1-4)	2.8	2.8	1.6	1.8	0.2	0.00859
Crop yield (1-3)	1.6	1.6	1.6	2.2	0.6	3.08E-07
Spiritual support (0-3)	1.5	1.3	1.3	1.3	0.2	0.00288

In addition, a multidimensional poverty index (MPI—See Figure 9) is estimated using a series of 12 indicators across 6 dimensions. Households are evaluated for level of deprivation based on the 12 indicators in the index. Household size is also considered in order to estimate both the poverty headcount and intensity of poverty. By considering

multiple dimensions such as education, and access to water, MPI reflects a perspective that poverty is about more than cash scarcity. The MPI analysis in this study shows a decrease in levels of multidimensional poverty among the treatment group by 20% from 2020 to 2022, and an increase in levels of multidimensional poverty among the control group of 19% (See Figure 10).



Figure 9: Multidimensional Poverty Index metrics

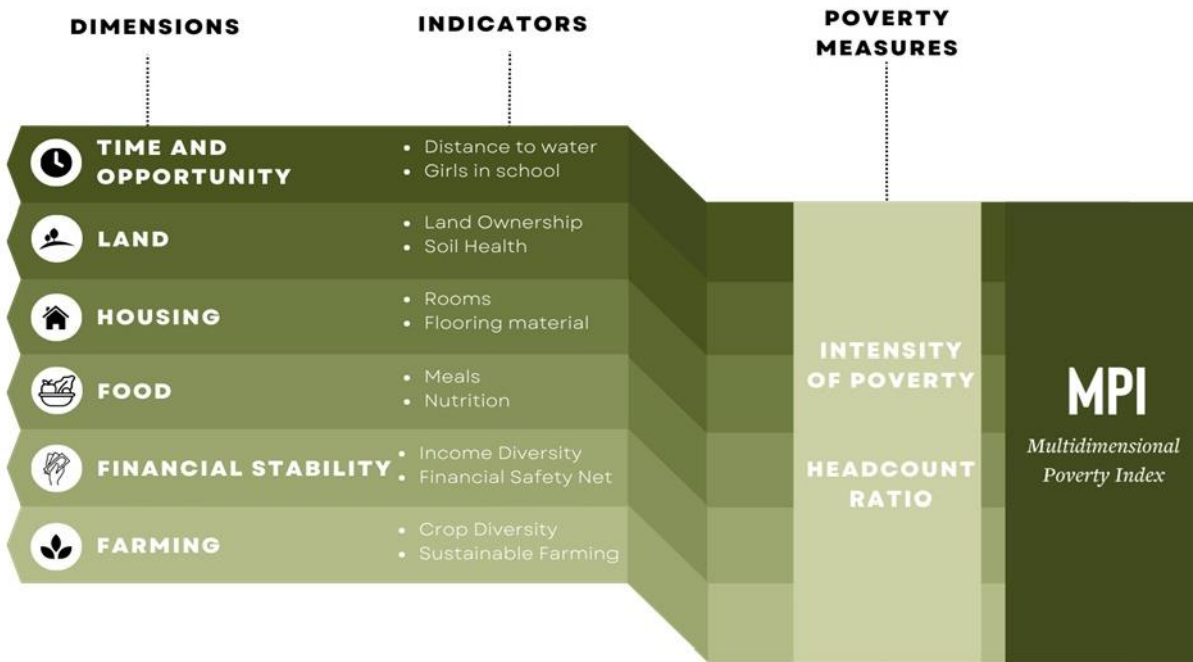
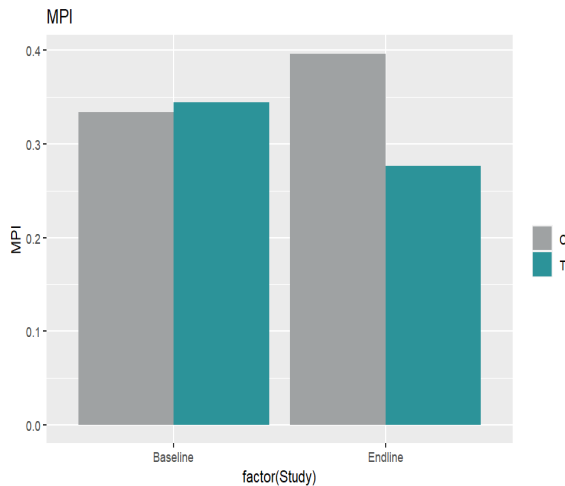


Figure 10: MPI results (note: no error bars provided on MPI as an aggregate value)



### Discussion

This study was implemented among well-established and well-functioning savings groups. The treatment group received training in regenerative agriculture techniques while the control group did not. At baseline, the control and treatment cohorts were similar based on the indicators measured. After two years of training and application of techniques, the treatment group showed significant improvement in a variety of dimensions, including soil health, crop yield,

cash reserves, nutrition, and spiritual support. Simple transfer of knowledge was likely not the only factor in this change. Traditional lecture-style training was provided to farmers, but this was integrated with more participatory training methods. In particular, FFS was promoted among the treatment group allowing farmers to share indigenous knowledge, prioritize, and test regenerative techniques locally and appropriately. At baseline, approximately 10% of the treatment group reported involvement in FFS while at endline participation in FFS had increased to 40%.

It is worth noting the larger context in which this study took place. The timing of the study, 2020-2022 was a period of considerable upheaval—a global pandemic, supply chain disruptions, and rampant inflation. Regionally Burundi was also experiencing drought. As a result, some indicators, such as nutrition, show a decline in the comparison group. This is not evidence for declining program effectiveness as much as it is evidence of the greater global and regional context. The treatment group over the same period for nutrition for example, also showed a decline, but one that was less drastic—providing some evidence of greater resilience.

Several extensive reviews of savings studies (Biscaye et al. 2015; Karlan, Ratan, and Zinman 2014; Steinert et al. 2018), report positive impacts of savings promotion, but these impacts are often mixed or small. It is worth remembering that mature savings groups in this study were formed out of, and participated in, a HOPE International church-based savings group ministry that has been associated with significant change. In a previous study of HOPE International savings groups from Zambia using the same curriculum and methodology (Hope International 2024), 73% of group members changed something about the way they lived because of discipleship training, and were 3 times more likely to enjoy increasing trust in relationships than a comparison group. The results of this current study provide strong evidence that integration of savings promotion goals with regenerative agriculture promotion can multiply impact and support the results of other similar studies (Dent et al. 2020). Farmers in this study who participated in both savings group activities and application of regenerative techniques saw a 39% decrease in levels of poverty as measured by a multidimensional poverty index relative to the control population farmers who were involved only in savings group activities. This impact is large and supported by a rigorous quasi-experimental design building on the limited number of quantitative studies that add to the understanding of the interaction between savings groups and regenerative agriculture training.

This study shows positive, statistically significant change across a suite of indicators using a quasi-experimental design. Where the control population remained unchanged or even showed declines in key indicators, the treatment population showed measurable improvement. These changes were not only economic, for example increases in cash reserves, but also environmental, specifically increase in the amount of land protected per farm, technique diversity, and soil health. Furthermore, the treatment group showed improvement in spiritual support provided by other group members, indicating that the overall impacts are truly multidimensional. Use of the quasi-experimental design, difference-in-differences, and

clear, statistically significant differences between comparison savings groups and treatment savings groups permit a high level of confidence in attributing change to the influence of the regenerative agriculture/agroecology training component.

In addition to reduction in levels of economic poverty, positive changes in other dimensions such as improved soil health, increased amount of land protected with trees or soil conservation measures, and increased spiritual support among participants suggests that change is not economic only, but truly multidimensional. It further suggests possible drivers of change—improved soil health for example, can lead to healthier crops, increased production, and greater ability to earn income. Gender is also a consideration—the regenerative agriculture training component is inclusive for both men and women. Typically, female participation is between 60-70% of all participants. In many contexts, including Burundi, women do at least as much farming as men. While beyond the scope of this paper, inclusion of women is likely another driver of change. Further studies should be conducted to better understand the possible drivers of change observed in this study.

This study considers two treatment plans: church-based savings groups as the control, and church-based savings groups plus regenerative agriculture training as the treatment. A future study could consider four treatment regimes:

- 1) No training (control)
- 2) Savings groups alone
- 3) Regenerative agriculture training alone
- 4) Combined savings and regenerative agriculture training.

This would allow a clearer understanding of change and how each component may contribute to change. A larger study could look at 3 key components—environment, economics, and spiritual factors. Such a study might have 8 treatments plans:

- 1) No training
- 2) Savings groups alone
- 3) Regenerative agriculture training alone
- 4) Spiritual renewal training alone
- 5) Savings groups and regenerative agriculture training combined
- 6) Savings & spiritual renewal training combined
- 7) Regenerative agriculture and spiritual renewal training combined
- 8) All three components combined.

## **Conclusion**

Savings groups, in particular the village savings and loan methodology (VSLA 2023), are well established as



an effective community development intervention, although the impact has been shown to be mixed or small (Biscaye et al. 2015; Steinert et al. 2018). This study demonstrates that the integration of complementary interventions, in this case regenerative agriculture training, can multiply the impact of savings groups. In this study, farmers who participated in both church-based savings group activities and regenerative agriculture technique application saw higher levels of savings reserves, improved soil health, increased household nutrition levels, and decreased levels of multidimensional poverty, when compared to savings groups with no participation in regenerative agriculture training. These results were not small or mixed, with the treatment group seeing a 39% relative decline in levels of multidimensional poverty over a two-year period. This outcome builds on the growing body of evidence from other practitioners such as World Relief (Dent et al. 2020) and suggests that an integrated approach to savings can multiply impact, result in significant reductions in multidimensional poverty among smallholder farmers, and achieve multiple goals of both poverty alleviation and environmental restoration.

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