

Social Capital and Membership in Dairy Cooperatives in Kenya

---

A Dissertation

presented to

the Faculty of the Graduate School

at the University of Missouri-Columbia

---

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

---

by

REBECCA SAVOIE

Dr. David O'Brien, Dissertation Supervisor

December 2018

SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

© Copyright by Rebecca Savoie 2018

All Rights Reserved

SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

Social Capital and Membership in Dairy Cooperatives in Kenya

presented by Rebecca Savoie

a candidate for the degree of doctor of philosophy,

and hereby certify that, in their opinion, it is worthy of acceptance.

---

Professor David O'Brien

---

Professor Mary Hendrickson

---

Professor Jere Gilles

---

Professor Michael Cook

## ACKNOWLEDGEMENTS

This dissertation is dedicated to my grandmother, Mildred Rother, who passed away during the course of my PhD. I have never known a more persevering woman, whose wisdom, kindness and love have flowed down the generations to my mother, Jean Savoie, and to my daughter, Amina Savoie. How blessed I am to be surrounded by these amazing people.

I would like to first thank the fine team at Land O'Lakes International Development, where during my tenure managing their Cooperative Development Program, I met Dr. Cook and Dr. O'Brien. I would also like to thank my current employer, NCBA CLUSA, for the flexibility afforded during the past year.

The endline data used for this research was collected on a Land O'Lakes International Development Project in Kenya and Uganda—Dr. Cook and Dr. O'Brien were two of five consultants assisting with the baseline, and later, the endline. After a 10-day trip together in the field, countless hours of discussion as we moved between countries visiting various dairy cooperatives, and follow up visits to Missouri, they piqued my interest in how theory might inform the project, and how results from the field could contribute to academic literature. Our discussions continued for the next few years as my interest in their academic perspective began to influence my work. When the project in the field came to an end and my daughter and I were hoping to return to the US to be closer to family, Dr. Cook and Dr. O'Brien offered me the opportunity to study at Mizzou. With their support, and that of Dr. Jill Findeis, then Director of Department of Applied Social Science in the College of Agriculture, Food, and Natural Resources, we moved our belongings from Dar es Salaam, Tanzania to Columbia, Missouri. The coursework was overwhelming, and I regularly questioned the wisdom of starting a PhD

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

in my 40s. After a whirlwind few years, I am equipped with the tools to bridge international development to academic research, and vice versa.

My thanks, too, for Dr. Hendrickson and Dr. Gilles, who also sat on my committee. Dr. Hendrickson followed a similar path to mine as a field practitioner who moved into academia. Her practical approach to research and terrific course structure will be integrated into my future work. And, finally, Dr. Gilles taught me about international development from a historical and theoretical perspective, which will frame my future work.

A special thanks to our friends in Columbia, most all of whom are Grant Elementary All-Star families, my wonderful classmates, especially my stats buddies, who offered friendship, guidance, and support throughout our journey. And finally, it is true, a PhD is a family affair. My daughter has attended nearly all my classes with me at least once when daycare was not an option, my older sister, Collette, helped us to fully move into our home in 48 hours, my other sisters, Pam and Theresa, checked in regularly and they (and their families) were cheerleaders from afar. And finally, I thank my parents, Phil and Jean Savoie, who have driven from Minnesota to Missouri countless times during the past 3.5 years to take Amina to her various activities, help keep the household going when I was away or swamped with work, and always reminded me the finish line was just a few steps away.

TABLE OF CONTENTS

<i>ACKNOWLEDGEMENTS</i> .....	<i>ii</i>
<i>LIST OF TABLES</i> .....	<i>vi</i>
<i>LIST OF FIGURES</i> .....	<i>vii</i>
<i>ABSTRACT</i> .....	<i>viii</i>
<i>CHAPTER 1: INTRODUCTION</i> .....	<i>1</i>
1.1    General Problem .....	1
1.2    Specific Problem: Benefits of Membership .....	4
<i>CHAPTER 2: LITERATURE REVIEW</i> .....	<i>11</i>
2.1    Individuals and Collective Action.....	11
2.2    Cooperative Development in the US and Europe .....	15
2.3    Colonial Cooperative Organizational Structure .....	16
2.4    Cooperative Development in Post-Colonial East Africa .....	18
2.5    Cooperatives and International Development.....	21
2.6    Social capital and member choice.....	27
<i>CHAPTER 3: CONCEPTUAL FRAMEWORK</i> .....	<i>29</i>
3.1    Research Setting.....	29
3.2    Benefits of Membership.....	32
<i>CHAPTER 4: METHODS AND PROCEDURES</i> .....	<i>35</i>
4.1    Project Dataset .....	35
4.2    Study design.....	38
4.3    Statistical Models .....	41
<i>CHAPTER 5. RESULTS</i> .....	<i>46</i>
5.1    General Remarks .....	46
5.2    Results of the Logistic Regression: Test of Hypothesis 1– Predicting the Odds of Social Capital in Predict Membership in a Co-op vs. Non-membership .....	46
5.3    Data Quality and Model Fit .....	50
5.4    Results from Logistic Regression: Test of Hypothesis 2 - Social Capital as a Predictor of Membership in a More Economically Successful Cooperative .....	51
5.5    Data Quality and Model Fit – Hypothesis 2 .....	55

# SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

<b>CHAPTER 6: DISCUSSION</b> .....	<b>58</b>
<b>6.1 Contributions to Understanding Co-ops and Development in East Africa</b> .....	<b>58</b>
<b>6.2 Limitations</b> .....	<b>63</b>
<b>6.3 Future Research</b> .....	<b>65</b>
<b>CHAPTER 7: CONCLUSION</b> .....	<b>66</b>
<b>REFERENCES</b> .....	<b>69</b>
<b>APPENDICES</b> .....	<b>83</b>
<b>8.1 Appendix A. Description of Independent Variables</b> .....	<b>84</b>
<b>8.2 Appendix B: Correlation Tables</b> .....	<b>86</b>
<b>8.3 Appendix C: Endline Survey</b> .....	<b>97</b>
<b>VITA</b> .....	<b>111</b>

**LIST OF TABLES**

Tables:

1. Kenya by the Numbers
2. Cooperative Principles
3. Cooperative Values
4. Study Population: Cooperative Members and Non-members
5. Qualitative Changes in Key Indicators in Cooperative A and B from 2011 to 2015
6. Household Demographics of the Study Sample
7. Descriptive Statistics: Member and non-Member Comparisons
8. Descriptive Statistics: Cooperative A and Cooperative B Comparisons
9. Difference in Difference Estimation Model (Milkshed A and B)
10. Logistic Regression of Predictors of Membership vs. Non-membership in two Kenyan Dairy Milksheds
11. Logistic Regression of Predictors of Membership in a More Economically Successful Cooperative



**LIST OF FIGURES**

Figures:

1. Cooperative Structure
2. Maps of Kenya and Cooperative Locations
3. Federated Cooperative Structure
4. Centralized Cooperative Structure
5. Horizontal Integration
6. Vertical Integration
7. Maps of Milkshed A and B
8. Photo of Pyrethrum in Limuru, Kenya
9. Photo of Woman near Limuru (Nakuru County), participating in government grant program to grow pyrethrum daisies

**ABSTRACT**

Dairy cooperatives in Kenya have been promoted for over 50 years as an important mechanism for providing collective bargaining power for the rural poor (Dobrin, 1970; Musalia, et al, 2007). The cooperative business model is meant to be democratic and autonomous, and features member-ownership, member-control and member-benefits. This research is centered around two vertically integrated dairy cooperatives in Kenya; the farmer members are owners of a cooperative that own their processing. The cooperative business model allows for families in Kenya's central highlands who own two cows to participate in the ownership, control and benefits from a dairy processing facility (Casaburi & Macchiavello, 2015; O'Brien, Banwart, & Cook, 2013).

The development and social capital model described by Woolcock and Narayan (2000), suggests that a certain mix of bridging and bonding social capital ties creates the network that can lift rural smallholder farmers out of poverty. Lin connects the investment of individuals in social capital with an expected future return in the marketplace, an economically viable firm (Lin, 2001). The current study uses social capital theory to examine the cooperative business, specifically vertically integrated dairy cooperatives in Kenya.

This research examines two questions. First, what social capital, economic, and demographic factors are predictors of membership in vertically integrated dairy cooperatives in Kenya. The second question examines what social capital, economic, and demographic factors are predictors of membership in Cooperative B, which scores higher than Cooperative A on all various dimensions of cooperative strength including leadership, governance, organizational structure, and investment. The dataset used for

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

this study includes 2228 household surveys of 1053 members of two dairy cooperatives and 1175 dairy farmers who are non-members of cooperatives in the same Milkshed Area collected as part of a 5-year USAID-funded Cooperative Development Project implemented by Land O'Lakes International Development.

The findings of this research indicate there is minimal difference between members of vertically integrated dairy cooperatives and non-members. The overall model that includes the entire sample (cooperative members and non-members) only correctly classifies 61.2% of the cases, 10% more than flipping a coin. However, the statically significant results support the hypothesis that social capital will be higher in cooperative members vs. non-members, specifically around trust in the community and investment in dairy cattle.

The second model that includes only cooperative members correctly classifies nearly 80% of the all cases and predicted over 86% of respondents from Cooperative B as such. The results also indicate that high levels of satisfaction with milk prices and satisfaction with training and technical support to the cooperative members is higher in members of Cooperative B. These findings indicate bonding social capital as evidenced by strength of the collective to identify and respond to the needs of the member-owners. The analysis also indicates that members of Cooperative B have a stronger belief that they are in control of the outcomes of events in their lives, also a predictor of higher levels of overall civic engagement.

Gender is also an important demographic in the findings. Cooperative members satisfied with the level of participation of women in cooperative management are 3.6 times more likely to be a member of Cooperative B, cooperative members who are satisfied with the relationship between cooperative members and management are 2.4

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

times more likely to be a member of Cooperative B. Both results are strong indicators of bridging social capital, specifically connecting groups, bridging the management team to the group of women interested in participating in management in the cooperative and the management to membership.

## CHAPTER 1: INTRODUCTION

### 1.1 General Problem

Dairy cooperatives in Kenya have been promoted for over 50 years as an important mechanism for providing collective bargaining power for the rural poor (Dobrin, 1970; Fischer & Qaim, 2012; Musalia, Wangia, Shivairo, Okutu, & Vugutsa, 2007). The cooperative model in Kenya has been a tool for international agriculture development since colonial times. Pre-independence, dairy production under colonial rule was mostly for export and managed by large dairy operations; post-independence, the government subsidized breeding services and other inputs to promote smallholder dairy farming and encouraged the formation of hundreds of smallholder cooperative societies (Dobrin, 1970; Segal, 1968). Cooperatives are unique among other business structures in that members are both owners and users and operate on the principle that the more members use the business, the more benefits they will receive via *patronage* dividends and services. The basic guiding principles are the same for both large and small cooperatives in terms of member ownership, member control, and member benefits (Cook & Chaddad 2004). This study focuses on vertically coordinated value chains that offer benefits from economies of scale via upstream coordination of input supplies and downstream efficiencies of manufacturing, wholesaling, and retailing. The central question addressed in this study is: why do some Kenyan small dairy farmers and not others become *active* members of a dairy cooperative that is engaged in vertical integration from smallholder production to collection and bulking to processing? The answer to this question will be addressed through a comparative survey of members and non-members in areas where vertically integrated dairy cooperatives that own processing facilities are operating.

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

There are several possible incentives for membership, or disincentives to not join this type of cooperative, and the relative weight of these variables in predicting membership will be analyzed.

Among the cooperative members, the central focus of this study is on measuring the impact of social capital on the decision of smallholders to become members of a dairy cooperative and differentiating between more and less effective cooperatives. The dataset includes 2228 household surveys of 1053 members of two dairy cooperatives and 1175 dairy farmers who are non-members of cooperatives in the same Milkshed Area. Survey data on a comparable sample of members and non-members in two Kenyan dairy cooperatives provides a basis of comparison to empirically predict who is likely to become a cooperative member versus someone who elects not to join. A logistic regression analysis will identify if social capital indicators can predict membership or non-membership, controlling for the effects of economic variables. In addition, a logistic model will test whether social capital variables can predict membership in the more economically successfully of the two cooperatives.

Cooperative A is a centralized cooperative located in the central highlands of Kenya in an area that is one of the best regions in the country for dairy. The cooperative was established in 1962 as a centralized service cooperative when Kenya was still under colonial rule. At the time of this study, the cooperative had 9,900 members, 300 of whom were active (delivering milk during the past six months). The cooperative society operates 30 collection centers within a 50 km radius of the town of Limuru.<sup>1</sup> The union procures an average of 32,000 liters per day (October 2010) and can receive up to 55,000 liters per day, but at the time of the baseline, the cooperative was overleveraged on the

---

<sup>1</sup> Table 1 lists general information about Kenya

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

processing facility, and the feed mill owned by the cooperative were operating at below break-even. By the time of the endline evaluation, many farmer members were focusing their efforts on other income generating activities such as poultry and pyrethrum.

Table 1. Kenya by the Numbers

- Land area: 580,367 km<sup>2</sup>
- 80% of the land is arid or semi-arid
- Population 47.6 million, 40% are under the age of 15
- GDP averaged 5% per year over past 10 years as of 2014 is considered a lower middle-income country according to a World Bank measure
- GDP per capita (PPP) \$3,500
- Labor force 61.1% agriculture
- GDP by sector: 35.3% agriculture, 17.2% industry, 47.9% services

*Source: CIA Factbook, Kenya (August 2018)*

Cooperative B has a federated cooperative structure whereby the dairy farmer is a member of a primary cooperative that bulks and chills raw milk, and a series of primary cooperatives are members of the union which owns a dairy processing facility.

Cooperative B was originally founded in 1967

and since its formation has been associated with other cooperatives in the area including savings and credit cooperative organizations (SACCOS), the multipurpose cooperative, and a coffee cooperative. The farmers are members of collection centers, and those collection centers are members of the federation, which is the level that owns the processing facility. Key informant interviews were conducted with board members, management, and members of Cooperative A and Cooperative B in 2011 and in 2015 along five cooperative dimensions: leadership, governance, organizational structure, investment, and overall performance. Both cooperatives were given information from the baseline survey, key informant interview, and focus group discussion. A comparison between the baseline and endline for Cooperative A and B along the dimensions assessed is listed in Table 5 in the Methods section.

Dairy is a great fit for cooperatives because of the high temporal asset specificity of milk. The highly perishable nature of milk requires that it be consumed, boiled, or chilled soon after the cows are milked. In East Africa, many of the smallholder farmers

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

do not have refrigeration available at their homes, so the local bulking centers offer an important opportunity for value addition. Supply chain management, quality control systems, and identifying and growing marketing channels are all areas of business that require technical expertise. A classic cooperative problem in Africa is when cooperatives are unable/unwilling to hire professional management (Hammond, 2016).

The general hypothesis to be tested is that, after controlling for income and other material benefits, the key element in differentiating members from non-members is the *bonding social capital* linkages between cooperative members and leaders, as well as *bridging social capital*, (Woolcock and Narayan, 2000) that is manifested in the members' expectation and *trust* that investing in vertical structures, such as processing facilities, will bring about *future* gains for their farms that otherwise would not be available to them (Fukuyama, 2001; Lin, 2001).

### **1.2 Specific Problem: Benefits of Membership**

The limited liability company model was developed in the mid-1800s in which benefits of ownership accrued to the shareholders and not to those who worked in the firm, unless, of course, they owned stock in the firm (Micklethwait & Wooldridge, 2003). The cooperative business model was developed as a mechanism to allow for the benefit of ownership to accrue to member-owners based on usage or their patronage. The earliest cooperatives were purchasing cooperatives where goods could be purchased by members. Generally, the goods would be cheaper at the cooperative than at the nearby sole proprietorship merchant or company. The cooperative business model has evolved to include consumer, producer, purchasing, retail, and other types of collectives, all with the



## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

fundamental structure of member-owner, member-control, member-benefit intact.<sup>2</sup> In 1995 at the 100-year anniversary of the International Cooperative Alliance (ICA), the 200-member organizations from 70 countries, agreed to update the cooperative principles and include a set of cooperative values listed in Tables 2 and 3.<sup>3</sup>

Cooperatives generally follow the cooperative principles and always follow the structure of member-owner, member-control, member-benefit (USDA, 1997). The principles are meant to be the values in action. There are examples of long-enduring

cooperatives in various parts of the world that have been in existence for hundreds of years with the purpose of collective management of limited natural resources (Poteete, Janssen, & Ostrom, 2010) and several in the US that have proven to be resilient business

Table 3. Cooperative Values:

1. Self-help
2. Self-responsibility
3. Democracy
4. Equality
5. Equity
6. Solidarity

Source: Retrieved from ICA

<https://www.ica.coop/en/whats-co-op/co-operative-identity-values-principles> Aug 2018

structures that evolve over time as evidenced by those that are nearly 100 years-old or more.<sup>4</sup> The cooperative business structure has many benefits as a democratic form of business with a mission to serve the interest of its members. This is different than investor-owned firms which operate to maximize returns to their shareholders (Hansmann, 1996). Cooperatives exist to serve the needs of their members. When cooperatives are grassroots in origin and follow the tenets of the cooperative principles to guide the business structure, results are strong user-owned and user-

Table 2. Cooperative Principles:

1. Voluntary and open membership
2. Democratic member control
3. Member economic participation
4. Autonomy and independence
5. Education, training and information
6. Cooperation among cooperatives
7. Concern for community

Source: Retrieved from ICA

<https://www.ica.coop/en/whats-co-op/co-operative-identity-values-principles> Aug 2018

<sup>2</sup> USDA: Cooperatives 101. June 2018. Retrieved from <https://www.rd.usda.gov/files/publications/CIR55.pdf>

<sup>3</sup> And then there were seven: Cooperative Principles Updated. Retrieved June 10, 2018 from <http://www.uwcc.wisc.edu/staff/hoyt/princart.html>

<sup>4</sup> The 100-year history of NCBA CLUSA. Retrieved September 15, 2017 from <http://ncba.coop>

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

managed organizations that serve the needs of the members and are successful to the extent the members are doing business with them.

Because the organizational design of cooperatives maximizes member-owner input, there inevitably will be considerable discussion of business strategies as markets and government policies change over time. The cooperative lifecycle framework, for example, suggests there will be times when tension arises among cooperative members; therefore, the cooperative needs to have strong member engagement to ensure managers are accountable, and cooperative bylaws should reflect the needs of the current membership (Cook, 2018; Munkner, 1976; Laidlaw, 1978).

Cooperatives in the United States and other countries with advanced agricultural economies were formed, in part, by smallholder farmers seeking to gain leverage against large companies that had monopolies in transportation, storage, and processing (Kebebe, Oosting, Baltenweck, & Duncan, 2017; Staatz, 1989). The formation of these cooperatives was facilitated by state and federal government legislation, but a critical factor, especially at the beginning, in providing the incentives for smallholder farmers to form these cooperatives was the *bonding* social capital, in the form of trust and supportive social networks, that was found among rural residents who interacted with one another in churches, schools and other civic activities (Mooney, 2004). For more than 20 years, USAID has been investing in cooperative development programs as part of bilateral relationships with governments of low and middle-income countries including Kenya. The cooperative development programming has largely focused on leveraging economies of scale by increasing production, minimizing post-harvest losses, and improving drying and storage. Cooperatives are encouraged to horizontally integrate to

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

collectively buy inputs, store, and sell product.<sup>5</sup> This kind of collective activity, whereby a farmer stores grain, for example, in someone else's warehouse and expects those managers to get the best price for their grain, and pay them in a timely manner with transparency in the transaction requires a very high level of trust. Bonding social capital, those trusted relationships that allow for successful collective action, is based on village-level trust and social networks (Putnam, 2000) and has also played a critical role in the development of these cooperatives.

Cooperatives in the US have evolved throughout their lifecycles and business longevity can be attributed to, in part, the business decisions to buy up and down the value chain, or vertically integration (Burrell, Cook, & Klein, 2008; Cook, 2018). The goal of vertical coordination<sup>6</sup>, is to have control of a great portion of the upstream supply chain and downstream value addition as to return a higher portion of the adjusted gross margin earned from each step of value addition to the cooperative member. The vertical ownership structure is when the ownership of the product, in this case dairy, remains within the cooperative structure. However, this is not without a unique complication of ownership within the cooperative, in that the allure of higher returns for milk sold into the cooperative can be offset by the challenges of residual claim and control rights in collectives, especially in weak systems (Grossman & Hart, 1986). In other words, one of the issues within the cooperative model is non-transferability.

Another perspective is the benefit of strong horizontal coordination that can ensure quality and quantity needed for any value addition. In the case of dairy, members

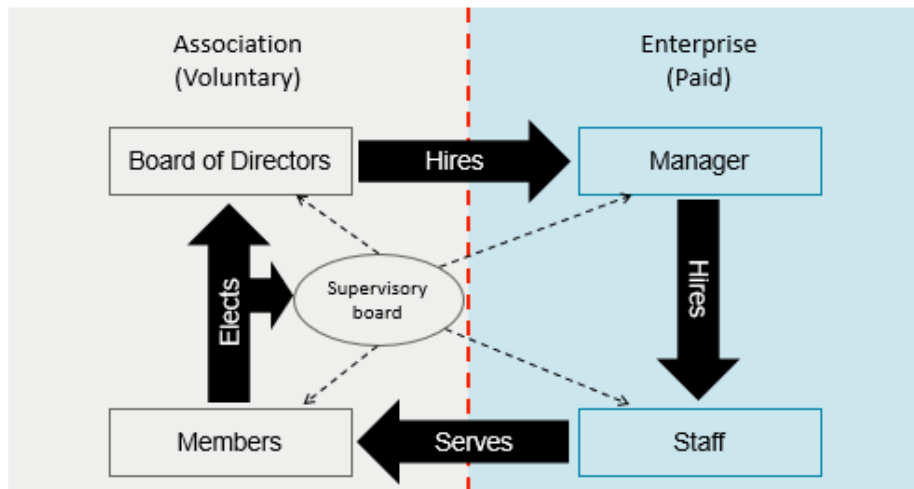
---

<sup>5</sup> USAID Bureau of Economic Growth, Education and Environment. August 2018. Retrieved from <https://www.usaid.gov/who-we-are/organization/bureaus/bureau-economic-growth-education-and-environment/office-local-sustainability>

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

can coordinate to maximize the production per cow and return on investment per cow while building trusted and important horizontal relationships before making substantial downstream investments.<sup>7</sup> As cooperatives invest in scale and scope, there is a greater need for skilled personnel with substantial management and technical experience. See Figure 1 which outlines a traditional cooperative structure.

Figure 1: Cooperative Structure



Source: IFC training materials prepared for NCBA CLUSA, June 2018

Most important, in terms of this study, vertical coordination requires that cooperative leaders and members build *bridging social capital* as evidenced by need for increased levels of trust and communication to overcome the risk involved in moving outside of familiar spaces. Granovetter (1973) describes this as the strength of weak ties. Despite the advantages of vertical integration, there are risks involved, both in the short- and long term, which suggests that “trust” in the cooperative is the key element, both in terms of bonding social capital and bridging. The central question of this study, which will be empirically tested, is which economic and social capital variables predictors of membership in cooperatives are and if these indicators plus a set of cooperative trust

<sup>7</sup> Personal interview, Githungiri board chair, February 2012, Nairobi, Kenya.

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

indicators can predict membership in Cooperative A vs. Cooperative B. The entire study population, both cooperative members and non-members are in two geographic areas, or milksheds. *Milksheds* are geographic areas that share milk marketing channels and are geographically bound. Milk from smallholder dairy farmers is transported in small containers and delivered to the point of sale (or purchased at farm gate) via local transport which could be on foot, by bicycle, motorbike, or, less frequently, by pickup truck. The sample for this study were members of dairy cooperatives, the cooperatives provided lists of active members.<sup>8</sup> The non-members were dairy farmers in the same geographies, who occasionally sold milk to the cooperative bulking facility if they were buying non-member milk. The lists of these non-member dairy farmers were collected from local administrative offices, specifically the dairy extension agents. The sample for the survey was selected from random number lists created for both cooperative member and non-members. The two milk processing centers are over 100 miles apart, so the dairy farmers could not be members of both cooperatives.

Cooperative A is in the central highlands of Kenya in the town of Limuru 35 km (22 miles) from Nairobi. Cooperative B is also located in the central highlands, approximately 225 km (140 miles) northeast of Nairobi in the town of Meru in the shadow of Mt. Kenya. Driving routes between the two locations vary, one common route is 290 km (180 miles) and 5 hours of driving time, not factoring in traffic or other obstacles. See study area in Figure 2. Maps of study area.

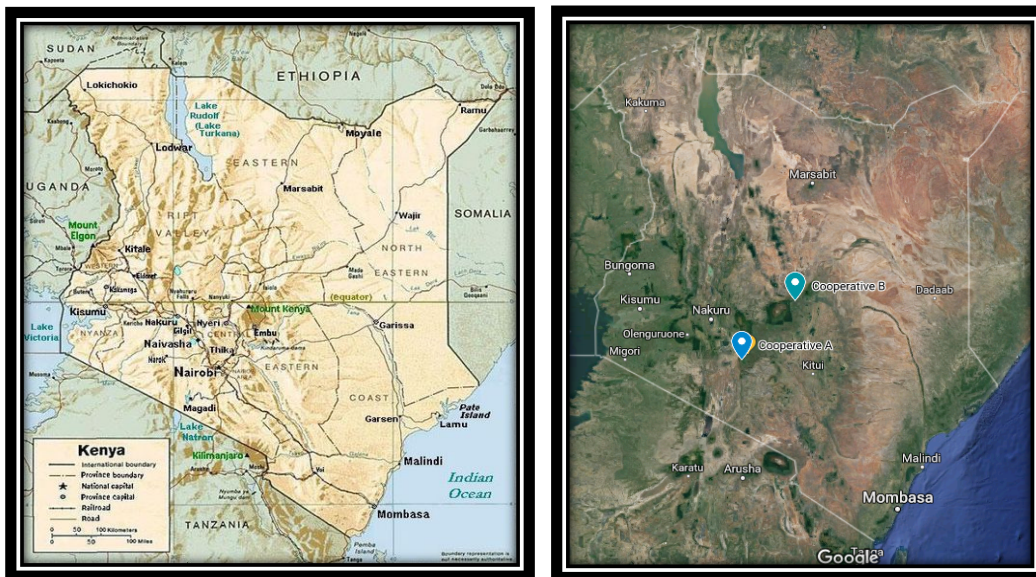
---

<sup>8</sup> 'Active' members were those who sold milk to the cooperative within the last 12 months

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

**Figure 2. Maps of Kenya and Cooperative Locations, Google Maps, September 2018**

The farmer members in these cooperatives have access to a cooperatively owned cold chain and can get their highly perishable raw milk into a cold chain within hours of milking. The bulking centers also provide quality control services to ensure milk has not been outside of the cold chain for too long or adulterated in some other way. Depending on unused capacity, non-members can also sell milk to the collection centers. The bulking facilities often also offer other services to farmers; some services may be



exclusive to members while other services are offered to members at a discount, i.e., dairy feed or other inputs. Members of a dairy cooperative may also have access to vet services and artificial insemination. Cooperatives can also employ extension staff that work with farmer members to identify on-farm practices that may be affecting the quality of the milk, coordinating collection points. In Kenya, most dairy cooperatives, even those cooperatives that are horizontally integrated (see Figure 6) at the bulking level have access to electronic weigh scales that link to payment systems and can offer check-off services where a portion of their earnings from the milk can be automatically sent to pay

liabilities such as school fees, loan repayments, and insurance payments (Chagwiza, Muradian, & Ruben, 2016; Fischer & Qaim, 2012) .

The rationale for members' support of vertical integration is that by leveraging the horizontal integration – i.e., the quantity of milk that members sell to the cooperative, the next step in development is to vertically integrate, through processing facilities, that will then bring value-added products to the market, and, in turn, bring higher margins to cooperative farmer-members. Cooperative A is a centralized cooperative, a governance structure where farmers are member-owners of the apex organization and the apex organization has a majority holding in the processing facility (Figure 4).<sup>9</sup> Cooperative B is a federated cooperative (Figure 3) whereby the farmers are members-owners of the bulking centers and the bulking center is a member of the apex organization which collectively owns the processing facility. The farmer is an owner of the bulking facility, and the bulking facility is a member of the apex cooperative.

## **2 CHAPTER 2: LITERATURE REVIEW**

This chapter will include a literature review on cooperatives in international development beginning with a review of research on individuals and membership (O'Brien, Banwart, & Cook, 2013). The review will also include research specific to the choice of individuals to become a member, vertical integration of cooperatives in low and middle-income countries, and in the international development literature (Bernard & Spielman, 2009; Bernard et al., 2008).

### **2.1 Individuals and Collective Action**

---

<sup>9</sup> Cooperative terminology can vary by geography, definitions in this paper are largely taken from the USDA cooperative development materials. Retrieved on September 3, 2017 at <https://www.rd.usda.gov/files/publications/CIR55.pdf>.

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Collective action can be broadly defined as any action (social or political) conducted by a group to address needs specific to that group. Mancur Olson was among the first to talk about collective action in his seminal work “The Logic of Collective Action” (Olson, 1971) where he detailed issues such as the free-rider concept and its effect on “latent” groups. Producer groups and associations are types of collective action that have some type of selective incentives; that is, in addition to the collective benefits of these groups, i.e., better prices, access to markets, and access to inputs. The group also provides selective or individual benefits that can be accessed only if the individual member of the collective organization contributes to the costs of the group effort. Cooperatives are a subset of collective action; this unique and complex form of business is meant to subscribe to a set of cooperative principles that connects the cooperative to community, governance principles, shared values, ethics and democratic principles (Hansmann, 1996). Cooperatives currently include more than 3 billion members worldwide.<sup>10</sup> The owners of a cooperative are members and users of the business, which provides for members to directly benefit from the organization they use. The more the members use the organization, in general, the more benefits they will receive (Dobrin, 1970; Draperi, 2000).

International development programs and implementors often work with groups of producers, groups of women, or groups of entrepreneurs because the group is a way to facilitate technology transfer (Kumari & Malhotra, 2016). Training the trainers can be conducted to a group of dairy producers, for example, and those newly minted trainers may be tasked with training several groups. The result of this model is that more people can be trained and, in theory, will have a measurable impact on specific outcomes such as

---

<sup>10</sup> International Cooperative Alliance. Retrieved on 20 September 2017 from <https://ica.coop>.



## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

income generation, improved product quality, or increased market access. The US Agency for International Development's Cooperative Development Program (CDP) has focused specifically on the cooperative business form of collective action. The program includes a substantial learning component, designed to provide evidence for the benefits of the cooperative business model as a development instrument. CDP funds have been used for cooperative development programs in 24 countries over the past 18 years in Latin America, Asia, and Africa with a focus on cooperative development in financial services (primarily credit unions), agriculture, health, and rural electrification.<sup>11</sup> The CDP goals align with the scholarship; among sociologists, collective action has been described as one alternative to an unfettered market (Schneiberg et al, 2008). African smallholder farmers face some of the same challenges experienced in rural America in the early 20<sup>th</sup> century with the expansion of industrialization of agriculture as seen by pressures of consolidation, production systems that favor large mono-cropping, and increasing barriers to entry such as less inherited land and high land prices (Alonso-Fradejas, Borrás, Holmes, Holt-Giménez, & Robbins, 2015). Collective action is a mechanism by which the smallholder farmer can be part of a sustainable entity with unique tensions that arise because of necessary trade-offs and the owner-member relationship as described in sociological terms by Mooney & Gray (2002).

---

<sup>11</sup> Cooperative Development Program overview. Retrieved on May 20, 2017 from: <https://www.usaid.gov/partnership-opportunities/ngo/cooperative-development-program>.

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Figure 3. Federated Cooperative Structure  
Producers are members Collection Cooperatives  
Collection Cooperatives are members of the Processing Cooperative

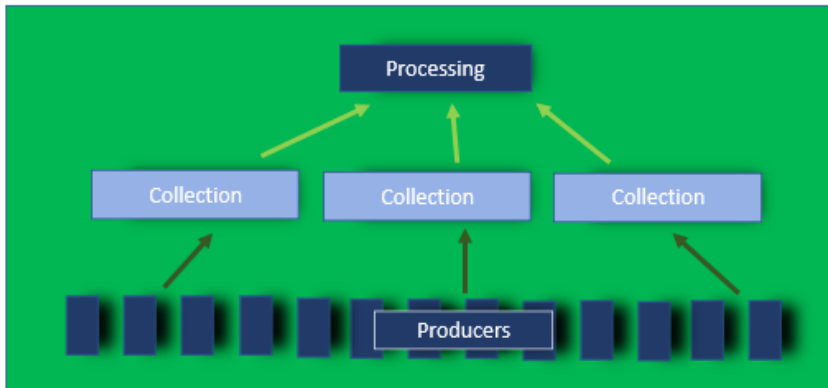
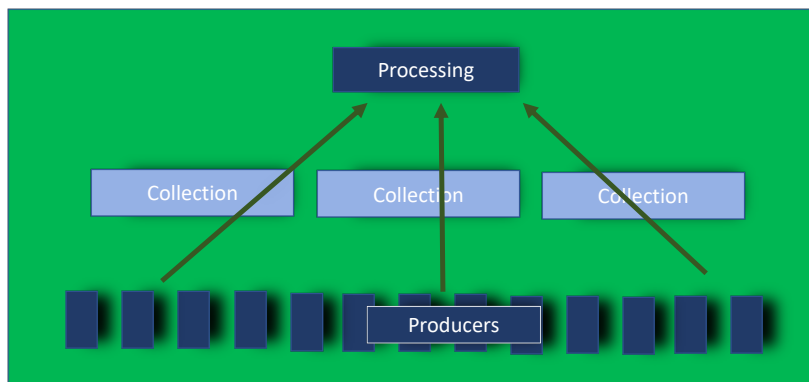


Figure 4. Centralized Cooperative:  
Producers are members of the Processing Cooperative



Producer organization projects include a variety of actors in landscape level programs, including various economic and non-economic activities and involving a range of on and off-farm actors. Some projects are designed with a focus on resource management and how groups in communities interface with protected areas (Markelova et al, 2009), while other groups manage agriculture production, natural resources management, and culturally important areas (Hart, Milder, Scherr, & McMichael, 2016).

This study will focus on two types of cooperative businesses, both are agricultural marketing cooperatives, one is a federated structure and the second is a centralized

structure. Farmers in federated systems are members of a primary cooperative and those primary (milk collection) cooperatives are members of the top tier organization, a federated cooperative, see Figure 3. In a centralized cooperative, the farmers are directly members of the top tier organization, see Figure 4.

The data for this study is from the endline of a 5-year project, the baseline for this project included four cooperatives that were vertically integrated and processing their member milk (Cooperatives A, B, and C) and one cooperative union that was meant to be close to processing, Cooperative D. During the 5-year project, Cooperative C had a set of organizational and financial issues and data could not be collected for the endline. Cooperative D is also not part of the current study but had been working with Land O'Lakes for some time, had strong leadership and some strong primary cooperative societies. The expectation was that this union was on a 12-18-month track to production and planned to be operational in 2012. The leadership was committed to engaging with the donor community to seek support to achieve the goal, at the expense of managing their own internal systems of member engagement, production support, and more. The primary cooperatives, the member-owners, were not committed to this approach and in July 2016, the board chair of that cooperative, Cooperative D, confirmed the processing facility was still not operational. In this case, the cooperative could have focused on maximizing production and coordinating collection at the farm level, and once the supply was consistently available to the cooperative, the experience with successful collective action could be sufficient incentive for the members to support vertical integration.<sup>12</sup>

## 2.2 Cooperative Development in the US and Europe

---

<sup>12</sup> Personal interview, Chairman George (surname withheld), Mbarara, Uganda, July 2016.

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Cooperatives developed out of the industrial revolution; the first worker cooperatives began in England in 1844 and the basic principles of cooperatives are still used today (Fairbairn, 1994). The cooperative principles are meant to be the cooperative values in action and are integrated into the business operations of large cooperatives like Land O'Lakes, Inc, a Fortune 250 company, as they are in smaller cooperatives like Meru Dairy Cooperative Union in Kenya. The cooperative business model is complex, and there are unique issues around ownership because the owners bring equity into the company via delivering product or buying services. The residual claim rights for equity investors in an investor owned firm is capital, which is transferrable (Srinivasan, 2003). The member-owner model creates other tensions within the cooperative structure and this complex model requires informed leadership who understand their role within the governance structure of the cooperative business. The ability for cooperative leadership to diagnose governance issues within their cooperative or use graduated sanctions or positive incentives such as bonuses to ensure adherence to contracts, policies, or bylaws can be predictors of cooperative longevity (Casaburi & Macchiavello, 2015; Poteete et al., 2010). Cooperatives in the US have access to a range of cooperative service providers such as cooperative development centers, cooperative training programs at land grant universities, private cooperative service providers with expertise in tax, legal, and accounting.<sup>13</sup> The UK has similar cooperative development structures to support cooperatives.<sup>14</sup>

### 2.3 Colonial Cooperative Organizational Structure

---

<sup>13</sup> List of cooperative support organizations and cooperative service providers. Retrieved from <http://www.co-oplaw.org/co-op-basics/support-organizations/> and <https://usworker.coop/service-provider-directory>.

<sup>14</sup> Co-operatives UK. Retrieved from <https://www.uk.coop/>

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

The cooperative model was brought to Kenya during the colonial era when the commonwealth countries were providing resources to England, and the structures stayed in place after independence. The history of Kenya explains the origins of the current cooperative administrative structures that provide legal and regulatory oversight. Kenya is a commonwealth country that was created because of the Berlin Conference of 1884-1885 where the countries of Africa were divided among the powers of the day.<sup>15</sup> The European leaders at the time were focused on nation building that required expanding their land ownership to include new areas with useful geographies and resources. Kenya was under British rule from 1888-1962. During the colonial era, the countries were led by British governors, and the governing documents of the country and associated administrative structures were influenced by the British system, but designed to ensure the Colonial government would ultimately have full control of resources and the final decision on any disputes (Fay, 1908; McMichael, 2000; Young, Sherman, & Rose, 1981). Kenya had a Ministry of Cooperatives that was modeled from the British system, once difference being that the Registrar of Cooperatives had substantial central authority to ensure select commodities produced by cooperatives were exported to the UK.

During these early days of colonialism, England was enjoying incredible success with the cooperative model; the first cooperative was formed in 1844, and within 100 years there were nearly 1000 cooperative societies, mostly worker cooperatives. The British colonial rulers in Africa facilitated the development of cooperatives for commodities such as coffee and tea, labor intensive high value crops that were meant for export to the UK. The colonial government leadership in Kenya was interested in some

---

<sup>15</sup> Berlin Conference. Retrieved from <http://www.oxfordreference.com/view/10.1093/acref/9780195337709.001.0001/acref-9780195337709-e-0467>.

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

level of collective benefit, but largely skewed to the interests of the colonial elites. This attitude was expressed by the British economist C.R. Fay in 1920:

Cooperation at home and abroad – as association for the purposes of joint trading, originating among the weak and conducted always in an unselfish spirit on such terms that all who are prepared to assume the duties of membership share in its reward in proportion to the degree in which they make use of their association. (Fay, 1908)

The British colonies (and others) were administratively structured for successful extraction of goods and resources and not necessarily with the intent of building robust local cooperative structures that served the interest of the member-owners, although these cooperative societies act gave the Registrar of Cooperatives substantial control over the cooperative. Organizationally, the colonial cooperatives in Africa were operationalized from the colonial model that was well established in India and brought to Kenya (Strickland, 1933).

### **2.4 Cooperative Development in Post-Colonial East Africa**

International development models have recycled over the past 50 years and continue to include technology transfer, institution building, strengthening the enabling environment, central government budget support, and policy. The resulting development projects range from sector specific such as public health, to sub-sector specific such as stunting of children under the age of five, and geographic such as Horn of Africa, to specific regions in a country that often have higher levels of poverty and malnutrition. Results on the ground are important for all involved with a project, including the host government, the local community, and the donors. The international development model to achieve these results on the ground has focused on technology transfer as a primary

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

goal with which to improve the lives of individuals in less developed countries.

Cooperatives were seen as a useful mechanism with which to accomplish this transfer (Staatz & Eicher, 1998).

The emphasis on cooperatives, however, began to wane in the 1960s as development professionals from industrialized countries became committed to the concept of thinking ‘big’, and ‘fast’ is better. This development model was to take knowledge from the West and fast track it to the developing world. Calculations were made as to what was needed to ‘jump start’ these developing economies, many of which were on the verge of independence from the colonial owners. Investment in developing countries, according to the economist Rostow (1963) would need to grow from <5% per year to 12-15% per year to achieve the levels of “take-off and sustained growth”. This was described in the 1960s and further supported by Leibensten (1960) who wrote that a few of these big investment jumps are needed to support a massive increase in capital accumulation to steady the economy. At that time, the big projects that were considered for the development world were based on the giant infrastructure and agriculture promotion businesses in America such as steel and fertilizer that also had large US markets to match the supply. Many believed that without this substantial investment, the development goals would likely fail (Mellor & Dar, 1968; Rostow, 1960). During the 1960s and 1970s, the emphasis on grassroots cooperative building waned as attention shifted from nation state building to a focus on trade and the multinational firm (McMichael, 2000). The end of the 1960s and 1970s were desperate times for many developing countries; for instance, the OPEC crisis with oil embargos in 1973 and 1979, high commodity prices, drought in parts of East Africa, and International Monetary Fund (IMF) structural adjustment programs being offered to countries. The consequence of

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

this approach was a marked shift away from a focus on cooperative development programs as an overarching practice for international development programming. The Cold War may have also influenced the shift away from formal cooperatives that were perceived to have an association with the communist model; what emerged were more producer association and other forms of collective action that focused on the democratic engagement, i.e., collective bargaining and less on the specific allocations of equity and retained earnings that are integral to cooperatives.

Following independence in 1963, Kenya and many former colonies in Africa struggled to develop national platforms from which to address issues around education, health, and the economy. The development economists and technocrats of the 1960's promoted industrialization and mechanization that would use the surplus labor from agriculture to build industry, following the western industrialization model. Scholars predicted that Africa would leap ahead because of the vast natural resources, including land. Kenya was a good example with the increase in landownership among Africans post-independence, which was an important factor in creating an economic middle class (Bebe, Udo, Rowlands, & Thorpe, 2003; Mellor, 1973). The emphasis on macroeconomic policy, however, shifted the focus away from nation building to programs that linked domestic productivity to the global marketplace. This shift was supported by research suggesting that outward focus was a catalyst for economic growth on the ground. Because the new Kenyan government was challenged with several coups attempts and civil unrest due to concerns about suppression of the opposition, it aligned itself with the west which assisted with economic growth and helped to build a world stage for the Kenyan government. In the 1980s, Kenya was an early recipient of World Bank SAP loans with conditions, including clear guidance for unfettered private sector



development. This era was marked by a bloated government with many low-level civil servants, and massive parastatals that controlled the monopoly on infrastructure and agriculture (cereals, produce, and dairy). The government was calling for a renewed focus on cooperatives, but there were few resources to support that mandate, and ultimately, this structure resulted in limited room for cooperative development.

New reforms in the 1990s tied foreign assistance to political and economic reforms, and the operationalization of these reforms included removing any policies that might impede trade. The international development system changed strategy to focus on niche development initiatives targeting discrete geographies and populations segments (Peet & Hartwick, 2015; Ruttan, 1997).

### **2.5 Cooperatives and International Development**

Scholars compare the success of foreign aid in Asia to the failure of foreign aid in Africa, and consistently identify several factors that center around leadership in assistance programs at the national level to advocate and support successful implementation. The Asian development success story can be described by the ‘multipliers’, the rapid scaling of improved agricultural practices that grew from a more robust agriculture sector to impact the overall economy, the commitment of central government and supportive public policy and institutional structures to advance agriculture, and the clear focus of agriculture and a poverty alleviation instrument (Mellor, 1988; Staatz & Eicher, 1998). Africa has been on a different path and the enabling environment is different with layers of corruption throughout the administrative systems have derailed development. For example, large investments by donors in staple crop production that may be designed to provide market access for thousands of small-

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

holder farmers can be undermined by a national trade policy that benefits a few large actors.<sup>16</sup>

Kenya has a long history of tribalism that has been used by politicians during elections, but the tribalism does not so easily just end post-election.<sup>17</sup> The great social experiment of Ujamaa in Tanzania, did, in fact, unify the country and to date, tribalism is not a major factor in the functioning of the nation-state. Conversely, tribalism in Kenya is very strong and is not diluted in urban areas, resulting in deep divides in many parts of society (Lal, 2015). There was insufficient attention to supporting strong national agriculture development platforms addressing various structural needs of agriculture development before shifting to very targeted special interest programs. Foreign aid in Africa is not as restricted to or tied to macroeconomic policy, but rather to special interest groups or programs that design insular projects and activities targeting specific issues including malaria, microcredit, or maternal health (Mellor, 1998). Governments often accept these large programs because the topics are areas of need in the country, but the funding is narrowly focused, and the special interests do not necessarily help the local governments fund the slower development of sound agricultural growth plans. The special interest projects can be successful in a small geography, but not necessarily move the national strategy forward. They are often easier to fund because donors work on a limited scope with visible results of targeted programs vs central government institutional building projects. These same special interest projects are more successful in Asia because they are built on successful national programs and can consider the impact of

---

<sup>16</sup> SERA Policy Brief: Rules-Based Transparent Systems for Emergency Food Imports. Retrieved from [https://land-links.org/wp-content/uploads/2018/03/USAID\\_Land\\_Tenure\\_SERA\\_Policy\\_Brief\\_Rules\\_Based\\_Transparent\\_System.pdf](https://land-links.org/wp-content/uploads/2018/03/USAID_Land_Tenure_SERA_Policy_Brief_Rules_Based_Transparent_System.pdf)

<sup>17</sup> Fellow Kenyans: Our Obsession with Tribalism is Destroying Us. Retrieved from: <https://brightthemag.com/fellow-kenyans-our-obsession-with-tribalism-is-destroying-us-4d7b1bad4e8>

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

development programming at the household level with competing resources or time and limited human capital (Mellor, 1998; Ruttan, 1996).

International development is cycling back to locally owned initiatives and cooperatives are again part of the development discourse (Pennington, 2014; Wanyama, 2009). The technology transfer programs were well suited for local partnership and by the late 1990s and 2000s, USAID began to engage with private sector organizations to fund programs such as Global Development Programs in the 2000s and USAID Forward in 2008. This includes both local and international development procurement instruments. In the most recent initiative, USAID LocalWorks, initiated in 2015, has been interested in local organizations operating as the lead development partner, going back to the development project described by McMichael (2010) as a pre-globalization period when nation-states had the power to create their own development pathways. The current focus of USAID's LocalWorks, USAID Forward, UK Department for International Development (DFID) Markets for the Poor (M4P) and many other bilateral programs is on building local institutions. The focus is not to stop globalization, but rather to build up local, social, and material infrastructure to create sustainable business models, developed and managed by local organizations such as farmer unions, accounting firms, or others (Stiglitz, 2004). A detailed description of bilateral procurements is beyond the scope of this paper, but it highlights the renewed focus on local institutions.

The locally-owned development model responds to the many criticisms about the international development model that has historically included a litany of failed development projects that over the past 30 years have become increasingly very narrow in focus. They often only supported very specific interventions such as maternal health, or orange flesh sweet potato, or water systems that do not operate in isolation of other

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

elements within society. For example, projects that focus on producing orange flesh sweet potatoes may not have the mandate to address another shock in the community such as depletion of fisheries in coastal areas that could also have a negative effect on nutritional status in a community. These very targeted initiatives with ambitious deliverables can distort markets and leave the local community in an arguably worse condition than before the project began (Moyo, 2012; Peet & Hartwick, 2015). Dambisa Moyo in her provocative writing on the negative impact of development aid in Africa suggests that development actors should leave the developing world and allow the local institutions to struggle and find a way to build the necessary structures to independently govern the country without the substantial support from the outside (Moyo, 2010). In countries where nearly 40% of the operating budget come directly from foreign governments, local governments become managers of donor funds and it is difficult to return to the post-independence goals of building a nation-state.

In Kenya, like in many developing countries in Africa and elsewhere, there are large numbers of smallholder farmers who are poor and food insecure, despite decades of programs attempting to lift them out of poverty using market forces alone. Institutional structures and policies are not sufficient to support the agricultural development for the smallholder farmer. The cooperative administrative structure in Kenya, under the Ministry of Industry, Trade and Cooperatives has continued to promote cooperative development since independence from the British in the 1960s, but with increasingly limited extension staff to support this activity. The structural adjustment programs created massive debt in many East African nations that sparked the privatization of many government owned entities. In Kenya, this shifted much of the dairy processing sector into the hands of a few elites. Smallholder dairy processors have had a difficult time

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

securing market share against the low cost, high volume producers of the elite-owned dairy processors. As a solution, dairy farmers joined together to create marketing cooperatives resulting in a value-added sales channel for their milk. The vertically coordinated cooperative structure allows a smallholder dairy farmer to be an owner-member of a dairy processing facility, which is something she could not achieve on her own. This supports research on the positive economic non-farm returns to a community by improving smallholder farm income. Moreover, cooperatives provide a set of benefits to farmer-members such as leveraging economies of scale, and creating demand for other quality services (Mellor, 2014; Mellor & Malik, 2017)

### 2.5.1 Horizontal Integration and Vertical Coordination in Development

Figure 5. Horizontal Integration

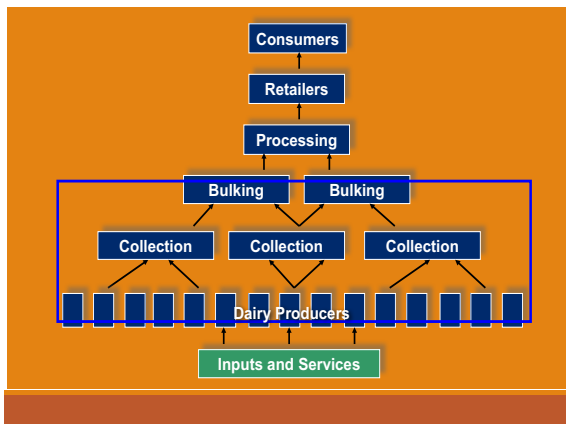
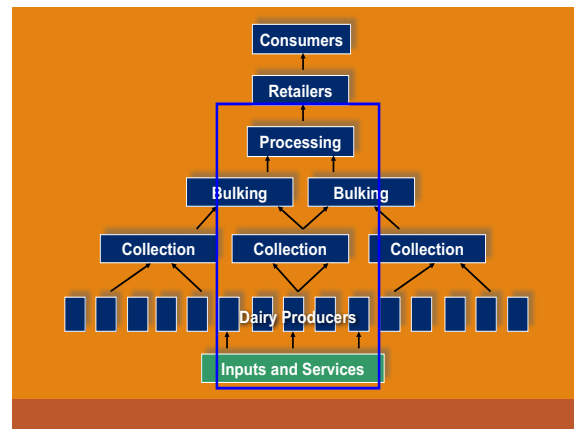


Figure 6. Vertical Coordination



Cooperatives in advanced agricultural economies were initially formed through horizontal integration, but later, many integrated vertically to gain additional value for their members. To understand the challenges that cooperatives face in attracting and maintaining membership in a vertically integrated organization, it is useful to first compare horizontal integration (Figure 5) and vertical integration (Figure 6). Horizontal

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

integration links the farm producers together to leverage economies of scale, and vertical integration brings value addition processes into the cooperative allowing for cooperative members to access the increased adjusted gross margins (Joskow, 2010; Lafontaine & Slade, 2010; Owango et al., 1998). Dairy farmers in this study area have an average of 2-3 dairy cows that are milked by hand twice per day. Fresh milk is highly perishable so needs to be either chilled or boiled within hours after milking. Some milk may be consumed at the home, but most of the morning milk will be sold into one of many market channels. There are middlemen who buy milk at the farm gate for cash, nearby tea houses and restaurants, schools and other institutions, as well as collection centers. Both cooperatives in this study own collection centers where fresh milk can be delivered.

According to Schneiberg et al. (2008) the combination of organizational theory and the theory of social movements explain what attracts and maintains cooperative members. The vertically coordinated cooperatives in this study can be described as defensive organizations that seek to protect the value of the milk produced by the smallholder dairy farmer by creating products that can compete directly with the large investor-owned dairy firms. The pressure of urbanization as the country focuses on industrialization and commercial agriculture built on modern technology and discounted the role of the rural economy. New institutional theory considers the structure of the firm as an operational structure, and how the institutions affect society (North, 1990). Cooperative businesses are structured to directly meet the needs of the members-owners, which can include financial needs as well serving the needs of the communities where members live (Hilliova, Hejkrlik, Mazancova, & Tseren, 2017; Meador et al., 2016; Royer, Bijman, & Abebe, 2017). A cooperative manager is meant to maximize profits to get the highest possible financial return to the member-owner, the principle. The board of

directors is tasked with developing the strategy that has a stream of services that incentivize member participation, which can be financial returns or other benefits such as investment in the community (Gray, 1998; Staatz, 1989).

The social capital model provides a structure by which to understand the trusted and important relationships among individuals within groups (bonding social capital), and how other groups are connected (bridging social capital). The model also provides the frameworks from which to analyze horizontal relationships among dairy producers, and vertical relationships back to suppliers and downstream to processors and others.

### **2.6 Social capital and member choice**

The term ‘social capital’ has become a common term in academic literature, global affairs, community development, and main stream media to describe various aspects of community.<sup>18</sup> The term ‘social theory’ has been a part of social science discourse for over 100 years. Tocqueville noted in his voyage to the US in the 1840s that Americans seemed to have a natural affinity for working in groups and that it might be important for a new democracy (Tocqueville, 1840). The idea of social capital, specifically the term ‘capital’ suggests there is some productive element to this form of capital (Portes, 1998). The current social capital framework is generally anchored by the work of Putman who describes the social capital and connections and engagement within a community (Putnam, 2000). In 1973, Granovetter describes the strength of weak ties in a community and the bridging effect that create important networks (Granovetter, 1973). In 1977, GC Loury also described the importance of networks in society that results in differences in income across certain marginalized groups (Loury, 1977). Coleman defined social capital as that which facilitates action, individual or collective, that is

---

<sup>18</sup> New York Times column, “Social Capital” Retrieved from <https://www.nytimes.com/column/social-capital>

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

created from networks of relationships (bringing and bonding ties) that are based on reciprocity, trust, and those socially or culturally expected behaviors (Coleman, 1988). There are others who are less optimistic about the outcome of social capital; Karl Marx considered social capital as part of the capital held by the elites who accumulated capital (Marx, 1867). Pierre Bourdieu saw social capital as a potential source of unrest and stated that social capital can also lead to negative deeds such as embezzlement or misappropriation of the very capital the group is building (Bourdieu, 1986). James Madison in *The Federalists Papers* (no.10), has a similar observation about the dangers of social capital in the form of factions in the *Federalists Papers* (Hamilton, 1961). Some scholars are working to define social capital in terms of individual decision making and rational choice theory ((Lin, 2001) and others suggest additional research to hone in on specific issues such as ‘balanced assessments of intergroup and intragroup relations’ (Durlauf, 1999). The current study uses the positive social capital definition of bridging and bonding networks described by Granovetter and Coleman, and the development and social capital model described by Woolcock and Narayan (2000), which suggests that a certain mix of bridging and bonding social capital ties can lead to increased income in developing economies.

The access to more networks of information, resources, and groups with similar issues, expands the mechanisms by which problem solving or idea generation reach a person or group. Social capital among members is part of the reason people join a cooperative; the benefits of ownership is more than economic (Feng, Friis, & Nilsson, 2016). The current study is designed to explore the ways in which membership in a dairy cooperative is associated with bonding and bridging social capital as related to higher performing cooperatives (Bisung, Elliott, Schuster-Wallace, Karanja, & Bernard,



## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

2014; Pronyk et al., 2008; Svendsen & Svendsen, 2000). Bonding social capital, based on strong ties, is typically developed among persons who have a long experience of trust and have built up strong social networks. Bridging social capital refers to ties that have the advantage of linking individuals and collective organizations to more complex organizational entities. 'Bridging' refers to those connections made to heterogeneous groups that are outside of the community; such connections can be more fragile and newer, but also foster an important inclusive element to the group (Woolcock and Narayan 2000). This suggests that a certain mix of bridging and bonding social capital ties can lead to increased income in developing economies. The bridging and bonding ties connect people to trusted and important information and resources to improve their current livelihood activities or provide information about expanding. Gutierrez, Hillborn, and Defeo (2011) describe how trust in leadership and strong social capital results in strong institutions (Gutierrez et al., 2011). Strong social capital is also a factor when promoting women in leadership (McVay, 2013).

The central focus of this paper is to understand the factors (social and economic) that predict membership in a cooperative and if there are differences (social and economic) between members of higher performing cooperative and lesser performing cooperatives.

### **3 CHAPTER 3: CONCEPTUAL FRAMEWORK**

#### **3.1 Research Setting**

The data set used for this research was part of the monitoring and evaluation protocol for a USAID-funded cooperative development project. The author of this research oversaw the first phase of the project, including the baseline data collection. There were three phases of baseline data in 4 areas, three in Kenya and one in Uganda.

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Phase 1 of the baseline research design used a household survey instrument to collect member and non-member information. The second phase of the data collected included twenty focus group discussions with purposefully selected participants; some groups were all women, some all men, and some both genders. The focus group facilitators used a discussion guide and several activities to identify bridging and bonding social capital in terms of trusted and important relationships in the community that related to their dairy activities. The focus group discussions were transcribed, and a thematic category analysis was conducted to identify key themes that could inform project design. The third phase of the baseline data collection included key informant interviews using a question guide designed around key organizational areas: leadership, governance, organizational structure, investment, and overall performance. The endline data collection was only completed for two cooperatives, as the other two dropped out of the program. The cooperative in Uganda never started processing milk, which was a criterion for participation in the program, and the third cooperative in Kenya had temporarily stopped operating.

The endline data was collected in 2015 when the author of this research was no longer with Land O'Lakes, so the data used in the current research is considered secondary data. The endline data collection included a similar structure to the baseline. Phase 1, the endline questionnaire and the dataset used for the current research, was slightly modified from the baseline to include a set of social capital variables at the cooperative level only. Key informant interviews were also conducted at that baseline, and findings are included in Table 5 and further referenced in the discussion section. The endline quantitative data was selected for this dissertation research to examine the

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

difference between the dairy farmers in each milkshed, disaggregated by member in a dairy cooperative vs. non-members.

A difference-in-differences analysis was conducted to identify how differences between members and non-members might be explained based on the milkshed of which the respondent is a part. Cooperative A members and the non-members in *Milkshed A* are located in the central highlands of Kenya in the town of Limuru 35 km (22 miles) from Nairobi. Records of farming in this area date back to the 1800s where farms, and later cooperative farms, were established by the early colonialists who were focused on extracting resources from the era. Cooperative A was established in 1969, but dairy farming has been practiced in the area for at least a century. The area is also optimal for pyrethrum production, which has returned to the area, and other high value crops such as tea. Located just 20 miles from Nairobi, there are more milk marketing channels and higher competition for milk and milk products.

Cooperative B members and non-members in *Milkshed B* are in the northern end of the central highlands, where farmers have kept dairy cows since the late 1800s, and the area remains an active coffee and tea producing area. Cooperative B is approximately 225 km (140 miles) northeast of Nairobi in the town of Meru in the shadow of Mt. Kenya. Satellite images of parts of Milkshed A and B can be viewed in Figure 7. The images focus on access to primary roads and proximity to Nairobi. Milkshed A has access to many primary road networks which allows for ease of transport, therefore a larger pool of market channels. Milkshed B has fewer primary roads, and farmers transport milk on secondary or tertiary roads which limits the distance they can cover and the market channels they can access.

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA



Partial Map of Milkshed A/Cooperative A

Partial Map of Milkshed B/Cooperative B

Figure 7: Image of a portion of the Milkshed area and proximity to primary roads and location of the cooperative (in the upper right on each map). Source: Google maps, October 2018

### 3.2 Benefits of Membership

Kenya has a long history of cooperatives and during the past few decades, members in some dairy cooperatives have agreed to seek funding to vertically invest in dairy processing. This vertical coordination is intended to remove the cost of the middlemen who consolidate and sell the milk to other processors and increase returns to farmers by adding value to the milk via processing. By creating branded products for the marketplace, cooperative dairy farmers are competing directly with large investor-owned firms, notably two large dairy companies in Kenya (Brookside and New KCC) owned by sons of former presidents of the country. One of whom, Uhuru Kenyatta, was also elected as the 4th President of Kenya in 2013. For smallholder dairy farmers to compete in the market with large investor owned firms, they simply could not do it alone.

Horizontal integration in the Kenyan dairy value chain refers to the consolidation of milk by producers, collection points that have smaller chilling facilities, or bulking centers that have 5000 liters or more of capacity. The margins on horizontal consolidation

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

are slim but could improve over time as Kenya institutes premium quality standards where milk with higher milk fetches a premium price. The manager of the chilling facility will have contracts with transporters to deliver the milk to the cooperative, if they are members of a cooperative, or to sell to other buyers. If the chilling tanks are not full, there might be some incentive to collect non-member milk, although non-members would be selling primarily based on price.

Vertically coordinated dairy cooperatives in this study are dairy cooperatives that own the processing facility. For the processing plant to run according to capacity utilization, the cooperative members deliver milk daily. The operation of such a facility requires skilled professional management, not only in plant management, but also to oversee finance, marketing logistics, and more. When the cooperative members own more downstream value addition levels of the value, they expect to capture more of the adjusted gross margins as the product has value added. Cooperative ownership of a processing facility requires members -smallholder dairy farmers -to trust their board of directors to oversee the manager who will build the cooperative reserves and approve capital investments in processing equipment, buildings, infrastructure, and staff. Bridging and bonding social capital, in which members trust that the increasingly complex linkages to technologies is valuable (Bebe, Udo, & Thorpe, 2002; Casaburi & Macchiavello, 2015; Joskow, 2010).

As described by Fisher and Qaim (2011), trust is a critical component for cooperative success. When trust is not well developed, the leaders and elites can begin to influence membership. Elected boards of directors are empowered to provide strategic oversight of capital-intensive investment such as processing. This requires a longer time perspective and thus asks cooperative members to continue to use their cooperative trust

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

that the reduced short-term dividends will pay off in the long-run (O'Brien et al., 2013). After controlling for income and other material benefits, the general hypotheses to be tested is: , the key element in differentiating members from non-members is the *bonding social capital* linkages between cooperative members and leaders, and *bridging social capital* that is manifested in the members' expectation and *trust* that investing in vertical structures, such as processing facilities, will bring about *future* gains for their farms that otherwise would not be available to them (Woolcock & Narayan, 2000).

Modern social capital theory focuses on information access and strength of social ties, (Lin, 2001); positing that social capital relates to resource attainment, actions, and social structure. There are four key elements of successful social capital - information, influence, social credential, and reinforcement – which, in part, align with Ostrom's guiding principles for long enduring collective action models, including: clearly defined boundaries, appropriation and provision rules that align with local conditions, monitoring, graduated sanctions, conflict resolution (Ostrom, 1990). The current study is applying the theory of social capital to cooperatives, and examines the following hypotheses:

- Hypothesis 1). A respondent's higher levels of social capital in a community (milkshed) will be predictor of membership in Kenyan dairy cooperatives.
- Hypothesis 2). Higher levels of social capital within a cooperative, will be a predictor of a more economically successful cooperative.

A binomial logistic regression model will be used to estimate the odds-ratio likelihood for both hypotheses of being in a group given a set of independent variables (listed in Annex A).

## 4 CHAPTER 4: METHODS AND PROCEDURES

### 4.1 Project Dataset

The US Agency for International Development's (USAID) Cooperative Development Program (CDP) has funded programs around the globe for decades, with a small and focused funding pool that has supported programs in Latin America, Asia, and Africa in areas including financial services, agriculture, and rural electrification.<sup>19</sup> The data used in this dissertation was obtained from a Cooperative Development Project in Kenya, from 2011 to 2015, that was funded by USAID and implemented by Land O'Lakes International Development.<sup>20</sup> The purpose of the project was to study vertically coordinated dairy cooperatives in Kenya and Uganda that had invested in or were planning to invest in a dairy processing facility.

Cooperative A is a vertically integrated federated cooperative in which farmers are members of the cooperative bulking stations, and Cooperative B has a centralized organizational structure where farmers are members of the cooperative which owns the processing facility. The processing facilities add value to the member's milk by packaging fresh milk for the market, making yogurt, ghee, butter, and other products that are branded and sold to wholesalers and retailers.

---

<sup>19</sup> USAID Partnerships. Retrieved from: <https://www.usaid.gov/partnership-opportunities/ngo/cooperative-development-program>, May 2017,

<sup>20</sup> USAID Cooperative Agreement number AID-OAA-10-00016

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Table 4: Study population: Cooperative Members and Non-members

		Target Sample Size	Households visited	Achieved Sample Size	Non- response Rate
Milkshed A	Cooperative Member	550	607	584	3.80%
	Non-Member	550	605	604	0.20%
Milkshed B	Cooperative Member	550	596	469	21.30%
	Non-Member	550	600	571	4.80%

The study population for this study include 2228 dairy farmers in two milksheds, each of which had a vertically integrated dairy cooperative, a dairy cooperative that owned the processing facility.

As a part of the CDP project endline evaluation, a series of key informant interviews were conducted at the baseline and endline of the project and Cooperative B showed significant improvements in governance and leadership. Cooperative A and Cooperative B were assessed along four key cooperative business dimensions at the beginning of the project in 2011 and again at the end of the project in 2015. The resulting analysis shows that Cooperative B is the higher performing cooperative on all assessed dimensions (See Table 5). These results informed Hypothesis 2 for this study.



## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

**Table 5. Qualitative Changes in Key Indicators in Cooperative A and B From 2011 to 2015**

Dimension	Cooperative A	Cooperative B
Leadership	++	+++
Governance	++	+++
Organizational Structure	--	++
Investment	-	+++
Overall Performance	++	+++

--=Decreased

-= Somewhat Decreased

+ = Same

++ = Some Improvement

+++ = Significant Improvement

*Source: Analytics Team Assessment of Changes [in Cooperative A and B over the life of project], Prepared for Land O' Lakes International Development. 2015. Summary of internal report by Michael Cook, David O'Brien, LuAnn Werner, Mary Munene, Alfred Orora and Daniel Diang'a*

Kenya is classified as an emerging middle-income country, with literacy rates at 78% (81.1% male, 74.9% female) compared to the global average of 86% as evidenced by over 20% of the sample completing secondary school, and an average of 13.4% of the respondents completing some level of post-secondary school.<sup>21</sup> The household demographics of the study sample are listed in Table 6.

<sup>21</sup> UNESCO Literacy report and CIA Factbook Kenya Retrieved from [https://globalreadingnetwork.net/sites/default/files/eddata/State%20of%20Literacy%20Brief\\_1\\_4.16%20.pdf](https://globalreadingnetwork.net/sites/default/files/eddata/State%20of%20Literacy%20Brief_1_4.16%20.pdf), <https://www.cia.gov/library/publications/the-world-factbook/geos/ke.html>, August 2018.

SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Table 6. Household (HH) Demographics of Study Sample

	Milkshed A		Milkshed B	
	Cooperative Member % (n=584)	Non-Member % (n=604)	Cooperative Member % (n=469)	Non-Member % (n=571)
Female-Headed HH	20.89%	16.56%	28.57%	25.22%
Mean # of HH members	4.3	4.3	4.6	4.6
<i>Age</i>				
Mean Age Head of HH	53.0	49.9	59.1	52.1
% Youth 18-35	24.6%	42.6%	8.5%	24.3%
% Adults 36-60	61.5%	60.3%	52.0%	63.4%
% Senior 61+	25.2%	19.8%	32.2%	22.8%
<i>Education</i>				
No/Some Schooling	7.4%	5.8%	10.9%	8.4%
Adult Education	1.5%	0.5%	1.3%	0.9%
Some Primary	19.9%	23.3%	19.8%	21.0%
Completed Primary	26.5%	25.5%	22.2%	22.1%
Some Secondary	5.8%	10.1%	8.1%	11.2%
Completed Secondary	22.1%	25.7%	22.0%	24.7%
Post-Secondary	16.8%	9.1%	15.8%	11.7%

**4.2 Study design**

This chapter will describe in detail the research design, a 2-wave longitudinal study of members and non-members in Milkshed A and B; the cooperative members were either a member of Cooperative A or B. The first wave of was conducted in 2011 and the second wave in 2015. This research will use the endline data only because it includes a set of social capital variables that are of interest for the current study. The target population is smallholder dairy farmers in central Kenya located in the milk sheds of Limuru and Meru, that includes the dairy production areas around the two dairy cooperatives in this study. Cooperative member respondents were selected using a random number generator on membership lists from the cooperatives. The names of non-members were collected from lists created from meetings with local livestock extension officers, other local government officials, and local cooperative leadership with

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

knowledge of the dairy farmers in their area. Cooperative collection points also accept milk from non-cooperative members and thus provide an opportunity to create lists of non-member dairy farmers in the areas served by the two cooperatives. The names for the non-member sample were randomly selected from these lists. Descriptive statistics of the sample are illustrated in Table 7.

Five percent additional names were added to both the members and non-members sample frame lists, so when the surveys were conducted, enumerators could go to another household if someone was not home or no longer fit the survey criteria, i.e., the household sold their dairy cows. Local enumerators were trained on the data collection instrument during a 2 day-training session, and the instrument was pre-tested in a nearby location. The field testing was part of the reliability check of the survey instrument.

The survey was conducted using an electronic tablet provided by a third-party survey firm. The enumerators conducted the interviews in the local language, Kikuyu. They reviewed each question with the facilitator to ensure there was clarity in translation from English to Kikuyu knowing there are subtle differences in meanings based on how the word or phrase was translated. The enumerators emailed the data daily to a project manager who checked data quality. The survey questionnaire was developed by a third-party firm in partnership with the project team and other advisors. The 2015 endline survey instrument included questions pertaining to over-time farm productivity, income and future goals, as well as a series of items to ascertain subjective incentives and disincentives for membership, including indicators of bonding and bridging social capital. The survey instrument (see Annex B) was created by a third-party organization that had conducted similar research on dairy farmers in Kenya and in the region. The instrument was informed in partnership with USAID, Land O'Lakes' 15 years of experience in the

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

dairy sector in Kenya, a review of relevant literature, and consultation with other organizations and institutions working with smallholder dairy farmers in Kenya. The survey collected information on household demographics, dairy practices, milk marketing channels, dairy practices and food security, use and satisfaction with specific cooperative service, trust in the communities, and satisfaction with the cooperatives in areas such as operations, leadership, and opportunities for women. The survey instrument is attached in Annex B.

A logistic regression statistical model was used to provide an odds-ratio coefficient to indicate the extent to which each of a set of independent variables increases the odds that a respondent will be a member of a cooperative (Lohr & Park, 2008). The research will also determine if gender, age, and female headed household status moderate the relationship between membership in a dairy cooperative and income and measures of social capital (Bebe et al., 2003; Musalia et al., 2007).

The project objective hoped to detect a 32% change in the mean value of household income from dairy during the 5-year project. To detect this desired outcome, the statistical power analysis estimated that the endline target sample size of 550 for member and non-member and each of the cooperatives is needed. Based on other dairy surveys in the area, the average coefficient was 1.4, the desired significance level was 0.95 with the power of 0.80. The endline survey only included two vertically coordinated dairy cooperatives in Kenya. Two indices were created for the analysis; the first scale was a trust in community variable that combined variables on trust in the community regarding levels of lending. It sought to understand, if trust in the community had improved over the past three years compared to other communities, how much people in this community

trusted each other. The second scale was created to capture the composite investment in feed, fodder, and veterinary care for the year by household.

A difference in difference estimation model was used to estimate the effect of geographic location. Cooperative A and the non-members in the surrounding Milkshed are located within 22 miles of Nairobi, the capital city of Kenya with a population of 4 million, plus the surrounding area. Limuru is part of great Nairobi suburban area and is a 'bedroom' community for people who commute to Nairobi. Cooperative B is in Meru, Kenya, with a population of nearly 2 million people. Meru is approximately 140 miles from Nairobi and is not considered part of the greater Nairobi suburban area.

### 4.3 Statistical Models

Assumptions were tested according to standard logistic regression procedures with dichotomous dependent variables and categorial and continuous independent variables. The observations within the dependent variables are mutually exclusive and categorical. Finally, the Box Tidwell procedure (1962) was used to test confirmation of a linear relationship between the group of continuous independent variables and the logit transformation of the dependent variable.

Equation 1: The first hypothesis was tested using a logistic regression model, which provides an odds-ratio coefficient to indicate the extent to which each of a set of independent variables increases the odds that a respondent will be a member of a cooperative or a non-member. The logistic model will examine the extent to which a set of independent variables that consider social capacity and economic returns are predictors of membership in a cooperative.

**Table 7: Descriptive statistics –Member and non-Member Comparisons**

---

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Variable	Member	Non-Member	Total
<i>Demographic</i>			
Average Age of Head of Household (years)			
Youth (10-35)	90	182	272
Adult (36-60)	603	724	1327
Senior (60+)	358	267	625
Level of Education (individuals)			
No/Some Schooling	94	83	177
Adult Education	15	8	23
Some Primary	209	261	470
Completed Primary	259	280	539
Some Secondary	72	125	197
Completed Secondary	232	296	528
Post-Secondary	172	122	294
Sex of Head of Household (%Male)	75.70%	79.20%	
<i>Farm asset and income</i>			
Average Total income per cow (USD)	\$ 25.94	\$ 38.79	
Average Total non-dairy income (USD)	\$ 239.98	\$ 200.93	
Average Total number of cows	1.97	1.67	
Average annual cost of feed meds fodder per cow	\$ 1,791.98	\$ 1,585.86	
<i>Trust in community</i>			
Trust in the community (scale)	1.52	1.49	
Concern for the future (locus of control)	1.78	1.78	

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

A difference-in-differences analysis was also conducted to determine differences between milksheds A and B to examine if geography or other factors could explain differences among members and non-members from Milkshed A or B.

Equation 2: The second hypothesis, also using a logistic regression model, was tested to see whether higher levels of bridging social capital such as use of services and links to networks beyond the local dairy community can predict membership in dairy Cooperative A vs. Cooperative B in central Kenya. The bridging capital variables were combined into three indices. The logistic model provides an odds-ratio coefficient to indicate the extent to which each of a set of independent variables, including bridging social capital, increases the odds that a respondent will be a member of Cooperative A or B. The logistic regression equation is described as:

$$p_i = \frac{e^u}{1 + e^u}$$

Whereby  $p$  is the probability that the  $i^{th}$  case is the membership or non-membership,  $e$  is a constant, and  $u$  is the regression equation (Harlow, 2014).

**Table 8: Descriptive statistics – Cooperative A and Cooperative B Comparisons**

Variable	Cooperative A	Cooperative B	Total
<i>Demographic</i>			
Average Age of Head of Household (years)			
Youth (10-35)	23	67	90
Adult (36-60)	244	359	603
Senior (60+)	202	158	360
Level of Education (individuals)			
No/Some Schooling	51	43	94
Adult Education	6	9	15
Some Primary	93	116	209
Completed Primary	104	155	259
Some Secondary	38	34	72
Completed Secondary	103	129	232
Post-Secondary	74	98	172
Sex of Head of Household (%Male)	71.40%	79.10%	
<i>Farm asset and income</i>			
Average Total income per cow (USD)	\$23.11	\$28.12	
Total non-dairy income (USD)	\$274.05	\$213.33	
Total number of cows (average # per household)	1.97	1.67	
Average cost of feed meds fodder	\$5,015.27	\$2,337.48	
Average annual cost of feed meds fodder per cow	\$2,545.82	\$1,399.69	



*Trust in community*

Trust in the community (scale)	1.47		1.56	
	<i>Cooperative A</i>		<i>Cooperative B</i>	
	<i>Agree (%)</i>	<i>Disagree (%)</i>	<i>Agree (%)</i>	<i>Disagree (%)</i>
It is not wise for me to plan far into the future because most things turn out to be a matter of good or bad fortune	30.3	69.7	22.8	77.2
	<i>Cooperative A</i>		<i>Cooperative B</i>	
	<i>Satisfied (%)</i>	<i>Not Satisfied (%)</i>	<i>Satisfied (%)</i>	<i>Not Satisfied (%)</i>
<i>Cooperative social capital (%yes) n=1053</i>				
Satisfaction with milk prices	13.4	86.6	27.9	72.1
Satisfaction with cooperative leadership's communication to members	69.5	30.5	84.8	15.2
Satisfaction with members ability to communicate to coop leadership	64.2	35.8	86.1	13.9
Satisfaction with cooperative leaderships efforts in promoting the participation of women in the cooperative	64.4	35.6	87.7	12.3
Satisfaction with cooperative's training & technical support to farmers	42.6	57.4	76.5	23.5
Satisfaction with enforcement of cooperative rules	66.5	33.5	81.3	18.7
Satisfaction with explanation of cooperative rules	71.4	28.6	83.0	17.0
Satisfaction with level of participation of women in cooperative mgmt.	67.6	32.4	90.6	9.4
Satisfaction with relationships between cooperative members	81.4	18.6	92.8	7.2
Satisfaction with relationships bet. cooperative members & mgmt.	59.7	40.3	88.2	11.8
Satisfaction with timeliness of milk payments	62.7	37.3	72.8	27.2
Satisfaction w/ treatment of members not meeting their responsibilities	67.8	32.2	84.9	15.1

## 5 CHAPTER 5. RESULTS

### 5.1 General Remarks

Assumptions were tested for both equations according to standard logistic regression procedures with dichotomous dependent variables and categorical and continuous independent variables. Each variable in the equation had at least 50 valid cases and the observations within the dependent variables were mutually exclusive and categorical. The Box Tidwell procedure (1962) was used to test confirmation of a linear relationship between the group of continuous independent variable and the logit transformation of the dependent variable.

### 5.2 Results of the Logistic Regression: Test of Hypothesis 1– Predicting the Odds of Community Social Capital in Predict Membership in a Cooperative vs. Non-membership

Prior to conducting the logistic regression to predict the effect of community social capital, a difference-in-difference estimation model was used to examine possible differences between the cooperative members and non-members in Milkshed A vs. Milkshed B (See Table 9). Dummy variables were created and membership in Cooperative B was used as the reference variable. The independent variables in the model were selected from the logistic regression model and included trust in community, average total income per cow, and investment in average annual investment in feed/fodder/meds.

A logistic regression was performed to predict membership versus non-membership in the two Kenyan dairy cooperatives in the survey. The dependent variable is binary; 0=non-member, 1=member. Each statistically significant variable in the model predicted

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

the odds of becoming a member of a dairy cooperatives in the study by knowing the value of that variable. The predictor variables included: basic demographics [sex, age, and level of education]; dairy farm resources, practices and outcomes [purchase of fodder, total number of cows, net income per cow, total non-dairy income, and total annual cost for all dairy cows on feed/fodder/meds]; the central social capital variable and a related social psychological component [trust in the community and locus of control].

The overall logistic regression model was statistically significant at  $p < .001$ . The model explained 10.8% (Nagelkerke  $R^2$ ) of the variance in membership versus non-membership, and correctly classified 61.2% of individuals in the sample into their correct category. Trust in community, age of head of household, level of education of head of household, and average incomes per cow was positively associated with membership. Of the nine independent variables in the model, six were significant. See Table 8.

Although the overall model was predicting membership in a cooperative only 10% better than if flipping a coin, the results can support the hypothesis that social capital will be high in cooperative members vs. non-members, specifically around trust in the community and investment in dairy cattle. The trust in community variable is significant and indicates that a one unit increase in trust increases the odds of the respondent being a cooperative member 1.4 times. Trust in community is an element in bridging social capital, which was hypothesized to be higher among members vs. non-members. The second noteworthy finding is that an increase in dairy income per cow has an inverse relationship resulting in a 1 time more likelihood of being a non-member, yet the members are investing 1.4 times more than non-members in dairy feed, fodder, and veterinary services. Although the entire model is weak, this finding does align with the

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

qualitative key informant endline survey conducted at the end of the project and suggests that cooperative members are invested in the cooperative for the long-term. Data indicated that cooperative members are willing to invest more in their cattle while getting less return per cow in the short-term, findings that were validated by the key informant interviews conducted at the time the data was collected for the current study. The cooperative members appear to be willing to engage in this activity because investing in improving dairy practices is a long-term investment that will result in more productive cows.

Table 9. Difference in Difference Estimation Model (Milkshed A and B)

Reference: Member Coop B	Trust in Community			Total income/cow		Feed/Fodder/Meds		
	$\beta$		S.E.	$\beta$	S.E.	$\beta$		S.E.
Non-member Coop B	-0.06	**	0.027	0.101	0.090	-0.350	***	0.050
Member Coop A	-0.091	***	0.028	0.089	0.103	0.621	***	0.053
Non-member Coop A	-0.098	***	0.027	0.427	*** 0.093	0.302	***	0.050

$p < 0.05$ \*  $p < 0.01$ \*\*  $p < 0.001$ \*\*\*

SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Table 10. Logistic Model of Predictors of Membership vs. Non-membership in two Kenyan Dairy Milksheds – Test of Hypothesis 1 (n=2228)

	$\beta$		S.E.	Exp ( $\beta$ )
<i>Demographics</i>				
Age of Head of Household	0.026	***	0.004	1.027
Level of Education	0.102	***	0.035	1.107
Sex of Head of Household	0.216		0.133	1.241
<i>Farm assets and income</i>				
Total income per cow (USD)	-0	***	0.001	0.996
Total non-dairy income (USD) (ln)	-0.02		0.046	0.98
Total number of cows	0.118	**	0.049	1.126
Average cost of feed meds fodder (ln)	0.333	***	0.066	1.395
<i>Trust in community</i>				
Trust in the community (scale)	0.318	**	0.123	1.374
Willingness to plan (locus of control)	0.057		0.118	1.059
Constant	-5.05	***	0.613	0.006
Sig.	0.000			
$\chi^2$	139.724			
-2 Log Likelihood	2151.971			
df	8			
% of Membership Predicted	51.30			
% of non-Membership Predicted	70.00			
Total Sample Predicted	61.20			
Nagelkerke R Square	0.108			
Hofsmar and Lemeshow	0.598			

$p < 0.05$  \*  $p < 0.01$  \*\*  $p < 0.001$  \*\*\*

### 5.3 Data Quality and Model Fit

Results of the logistic regression are shown in Table 10.

The odds ratios for each of the statistically significant independent variable predictors are as follows: The age of the head of household is significant at the level of  $p < .001$ ; for each additional year of age, a respondent is 1.03 times more likely to be a member of a cooperative. Level of education is also significant at the level of  $p < .01$ , and for each additional level of education, the respondent is 1.1 times more likely to be a member. The average cost of dairy feed fodder & med (scale) is significant at the  $p < .001$  level, and an increase in one unit along the feed/med/fodder scale, increases the odds of being a member of a cooperative 1.4 times. Total number of cows is significant at the level of  $p < .05$  and an increase of one cow increases the chances of being a member 1.13 times. The Trust in Community index is significant at the level of  $p < .05$ ; an increase of one unit and increases the odds of respondent being a cooperative member 1.4 times. Dairy income per cow is significant at the level of  $p < .000$  and one-unit increase in income per cow has an inverse relationship resulting in a 1 time more likely to be a non-member.<sup>22</sup> The null hypothesis can be rejected because the exogenous values, especially those related to bonding social capital in the logistic regression are closer to predicting membership than would be expected by chance.

The Box-Tidwell model confirms a linear relationship between the continuous exogenous variables (Box and Tidwell, 1962). Test for multicollinearity indicates there is no issue. The model is statistically significant at  $p < .001$ , which is further confirmed by

the non-significant results of the Hosmer Lemeshow test at  $p=.589$ . However, based on the range of the Cox and Snell  $R^2$  and the Nagelkerke  $R^2$ , the explained variation is only between 8.1% and 10.8%. The logistic regression model predicts if cases can be classified correctly. The addition of the independent variables improves the model which, based on the classification table, correctly classifies 61.2% of all cases, 51.3% of the members were correctly predicted to be members and 70.0% of the non-members were correctly predicted as such. See the 'Discussion' section below for in-depth analysis.

The difference-in-difference (DID) model (Bellman and Cooke, 1963) is presented in Table 10, and the results suggest that members of Cooperative B have greater trust in community than non-members of the same milkshed, and is statistically significant at  $p<.05$ , but also greater trust in community than both groups in Milkshed A. Members of Cooperative A have -0.091 and non-members have -0.098 units, both statistically significant at  $p<.000$ . The total income per cow is statistically significant \$.43 higher for non-members of Cooperative A, statistically significant at  $p<.001$ . Feed, fodder, and veterinary and meds for dairy cows are \$.35 higher for non-members of Cooperative B than for members of cooperative B, and \$.62 higher for members of Cooperative A than for members of cooperative B, and \$.30 higher for non-members of cooperative A than for members of cooperative B, all statistically significant at  $p<.001$ .

#### **5.4 Results from Logistic Regression: Social Capital as a Predictor of Membership in a More Economically Successful Cooperative – Test of Hypothesis 2.**

A logistic regression was performed to predict membership in Cooperative A versus Cooperative B; 0=Cooperative A; 1=Cooperative B. The results are shown in Table 11. The predictor variables in the model included: the statistically significant

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

demographic variables in Table 1 [Age of Head of Household and Level of Education]; farm assets and income [the purchase of fodder, total number of cows, net income per cow, total non-dairy income, and total annual cost for all dairy cows on feed/fodder/meds], satisfaction with material gains from cooperative membership [satisfaction with milk prices, received dividends] and a series of social capital variables pertaining to the cooperative itself, [leadership's communication with members, participation of women in the cooperative, cooperative's training and technical support, enforcement of cooperative rules, explanation of cooperative rules, voice in major decisions in the cooperative, participation of women in cooperative management, satisfaction with members, satisfaction with relationship between members and management, and a related social psychological variable [locus of control]. The logistic regression model was statistically significant at  $p < .000$ ; therefore, we can reject the null hypothesis. The model explained 52% (Nagelkerke  $R^2$ ) of the variance of membership and correctly classified 79.6% of the members of the more economically successful cooperative. Of the 22 independent variables in the model, 11 were significant; age of head of household, sex of head of house hold, scale of feed/fodder costs, receipt of member dividend, a set of satisfaction with the cooperative questions including; satisfaction with milk prices, satisfaction with training opportunities, satisfaction with level of women in cooperative management, satisfied with relationship between board and members, total non-dairy income, total number of cows, and willingness to plan for the future. See additional details in Table 10.

Respondents satisfied with milk prices are 2.15 times more likely to be a member of Cooperative B. Those satisfied with training and technical support to farmers are 3.0 times more likely to be a member of Cooperative B. These results indicate trust in the



## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

cooperative to optimize marketing channels for the product, reduce losses, increase efficiency in the factory, all of which is categorized as bonding social capital, those trusted and important relationships in the community. The training and technical support to the cooperative members is considered part of the benefits of membership and indicates high levels of bonding social capital as evidenced by strength of the collective to identify and respond to the needs of the member-owners. Respondents with a positive outlook on their control over outcomes in their life are also 2.37 times more likely to be a member of Cooperative B. This general behavior, 'locus of control,' is also an indicator of someone who is more likely to engage in civic activities such as voting (Ajzen, 2002).

Cooperative members satisfied with the level of participation of women in cooperative management are 3.6 times more likely to be a member of Cooperative B. This is a strong indicator of bridging social capital, specifically connecting groups, in this case bridging the management team to the group of women interested in participating in management in the cooperative. Cooperative members who are satisfied with the relationship between cooperative members and management are 2.4 times more likely to be a member of Cooperative B; again, this is an indication of bridging social capital, connecting groups with the expected outcome of higher future returns (Lin, 2001).

# SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Table 11. Logistic Model for Predictors of Membership in a More Economically Successful Cooperative (n=776)

			$\beta$		S.E.	Exp ( $\beta$ )
<i>Demographics</i>						
Age of Head of Household			-0.03	***	0.008	0.974
Level of Education			-0.09		0.066	0.918
Sex of Head of Household			-0.74	**	0.245	0.475
<i>Farm assets and income</i>						
Total income per cow (USD)			0		0.002	0.997
Total non-dairy income (USD) (ln)			0.399	***	0.088	1.491
Total number of cows			-0.24	***	0.072	0.791
Average cost of feed meds fodder (ln)			-1.19	***	0.154	0.305
Member has received a dividend on cooperative membership			-0.84	***	0.207	0.43
<i>Trust in community</i>						
Trust in the community (scale)			0.322		0.246	1.38
Voice in the major decisions related to the cooperative			-0.41		0.22	0.667
Willingness to plan (locus of control)			0.863	***	0.233	2.37
<i>Cooperative social capital</i>						
Satisfaction with milk prices			0.767	**	0.264	2.153
Satisfaction with cooperative leadership's communication to members			-0.15		0.258	0.858
Satisfaction with cooperative leaderships efforts in promoting the participation of women in the cooperative			0.121		0.313	1.128
Satisfaction with cooperative's training & technical support to farmers			1.089	***	0.236	2.973
Satisfaction with enforcement of cooperative rules			0		0.29	0.997
Satisfaction with explanation of cooperative rules			0.064		0.29	1.066
Satisfaction with level of participation of women in cooperative management			1.272	***	0.346	3.566
Satisfaction with relationships between cooperative members			-0.22		0.339	0.802
Satisfaction with relationships between cooperative members & management			0.856	**	0.271	2.354
Satisfaction with timeliness of milk payments			-0.24		0.22	0.789
Satisfaction with treatment of members not meeting their responsibilities			0.318		0.248	1.374
Constant			7.085	***	1.399	1193.94
Sig.	0	Total Sample Predicted.	79.6			
$X^2$	373.515	Nagelkerke R Square	0.52			
-2 Log Likelihood	677.577	Hofsmer and Lemeshow.	0.78			
df	22					
% of Coop A Predicted	86.4					
% of Coop B Predicted	69.9	$p < 0.05^*$ $p < 0.01^{**}$ $p < 0.001^{***}$				

### 5.5 Data Quality and Model Fit – Hypothesis 2

Cooperative A is a centralized dairy cooperative with dwindling membership as farmers shift away from dairy into other cash crops, especially pyrethrum. Conversely, Cooperative B was thriving. Many of the issues identified in the baseline study: high volume of farm gate and factory gate losses, poor governance, and the need for professional management, were operationalized by the cooperative between 2011 and 2015 and the baseline results highlight the value of these investments. According to the results of logistic regressions shown in Table 1, the sensitivity is ‘yes’ for Cooperative B, and the results show predictor values that are significant and meaningful in the analysis of membership in Cooperative A vs. Cooperative B. The study was designed to include dichotomous dependent variable more than two independent variables and confirmed independence of observations and all categories of data. All data are mutually exclusive and there are over 50 cases per variable. The Box-Tidwell model (1962) confirms a linear relationship between the continuous exogenous variables. A test for multicollinearity indicates there is no issue.

The odds ratios for each of the significant independent variables are described as follows: the age of the head of household is significant at the level of  $p < .001$  and for each addition year of age, the respondent is .97 times less likely to be a member of Cooperative AA. Non-dairy income of respondents is significant at the level of  $p < .000$  and given a one-unit increase in income, respondents are 1.5 times more likely to be a member of Cooperative B. Dairy feed fodder med scale- is significant at the  $p < .000$  level, an increase in one unit along the feed/med/fodder scale, reduces the odds of being a member of Cooperative B by .7 times. The cooperative member receiving a dividend is significant at the level of  $p < .001$  and an increase of one unit (receiving a dividend)

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

reduces the odds of being in Cooperative B by .43 times. The members of Cooperative A were receiving a dividend in part because the processing facility is wholly owned by the cooperative and the profits of both member and non-member business contribute to the dividend calculation. The satisfaction with milk price is significant at the level of  $p < .005$  and with an increase of one unit, the respondent is 2.15 times more likely to be a member of Cooperative B. The satisfaction with training and technical support to farmers is significant at the level of  $p < .000$  and given an increase of one unit the respondent is 3.0 times more likely to be a member of Cooperative B. The satisfaction of cooperative members with the level of participation of women in cooperative management is significant at the level of  $p < .000$  and given an increase of one unit the respondent is 3.6 times more likely to be a member of Cooperative B. The satisfaction of cooperative members with the relationship between cooperative members and management is significant at the level of  $p < .005$  and given an increase of one-unit the respondent is 2.4 times more likely to be a member of Cooperative B. The total number of dairy cows is significant at the level of  $p < .005$  and given a one-unit increase in income, respondents are 1.79 times more likely to be a member of Cooperative A. We can reject the null hypothesis because the exogenous values, especially those related to bridging social capital in our logistic regression are closer to the actual dependent variable (member of Cooperative A vs. Cooperative B) than one would expect by chance alone.

The model is statistically significant at  $p < .001$ , which is further confirmed by the not significant results of the Hofsmer Lemeshow test at  $p = .780$ . However, based on the range of the Cox and Snell  $R^2$  and the Nagelkerke  $R^2$ , the explained variation is only between 38.2% and 51.5%. The logistic regression model predicts if cases can be classified correctly. The addition of the independent variables improves the model

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

which, based on the classification table, correctly classifies 79.6% of all cases, 69.9% of the members were correctly predicted to be members of Cooperative A – the less economically viable - and 86.4% of the members were correctly predicted to be members of Cooperative B, the more economically viable.

## 6 CHAPTER 6: DISCUSSION

### 6.1 Contributions to Our Understanding of Cooperatives and Development in East Africa

The first hypothesis predicted that social capital linkages to the local community would be the most important predictor of joining a cooperative. A difference-in-difference estimation was conducted to determine if there is a causal effect on membership vs non-membership based on location in Milkshed A or Milkshed B. The results for trust in community, listed in Table 9, confirm there are differences between members and non-members in Milkshed A vs B. Non-members in Cooperative B have slightly less trust in community than members in Cooperative B. However, members and non-members in Cooperative A both have .03-.038 less units of trust in community than do members of Milkshed B. This could be explained by Milkshed A's proximity to Nairobi resulting in rapid growth in housing, often constructed on farmland, with many newcomers employed in Nairobi and not engaging in farming.

For the variable total income per cow, only the non-members in Milkshed A had a significant result indicating that non-members in Milkshed A earn more by .427 per cow than Cooperative B members in Milkshed B and can also be explained by proximity to the Nairobi area where farmers have multiple market channels for their milk. Investment in feed, fodder, and veterinary services was significant and positively related to higher income for all members and non-members. Non-members of Cooperative B in Milkshed B spend .350 units less than members of Cooperative B in Milkshed B. Members of Cooperative A in Milkshed A spend .621 more and non-members of Cooperative A spend .302 more on feed/fodder/meds than members of Cooperative B in Milkshed B. The results indicate that members of Cooperative B in Milkshed B are spending more per cow

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

than the other segments. The qualitative results, specifically the key informant interviews, noted in the endline report that Members of Cooperative B in Milkshed B have a long-term vision for their cooperative and are ready to make investments in the short-term. They are willing to accept a short-term loss for higher returns in the long-term. Members of Cooperative A in Milkshed A are investing more in feed, fodder, and meds than are Members of Cooperative B in Milkshed B, which can be explained by proximity. Cooperative B has larger areas of land where fodder and feed can be grown and distributed via the network of member. See Figure 7 for a satellite image of the area.

The results of the logistic regression, however, indicate there is minimal difference between members and non-members on this indicator of social capital. The model did not disaggregate based on milkshed, which could be part of a design of future studies. The model only predicted members vs. non-membership at 60%, which is 10% better than the odds of predicting correctly if of one were flipping a coin. Members of a cooperative were slightly older and more educated, suggesting the cooperative members benefit from the bonding social capital offered by the cooperative that require a commitment of time such as participation on boards and committees and engaging with members. Other evidence of bonding social capital is the slight increase in investment in fodder, feed, and medicines, all of which are intended to increase the milk production per animal and show a commitment to the cooperative in that net income per cow is higher for non-members. This suggests that cooperative members are investing in their animals with an expected return in the future. This can be described in terms of bonding social capital. Non-members can sell their milk into the highest value market, although the long-term financial – i.e., security – in having a buyer for the milk irrespective of market conditions, is one of the services provided by a cooperative. The contribution to

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

development is that given numerous market channels with sales options that provide immediate cash payment, cooperative leaders need to identify a clear value proposition for their members, as evidenced by the member investment in feed, fodder, and meds, yet still receiving less per cow than non-members.

The results of the logistic regression used to test Hypothesis 2 indicate the model correctly classifies nearly 80% of all cases. Nearly 70% of respondents from Cooperative A were correctly predicted, and 86.4% of the cases were correctly predicted for Cooperative B. Independent variables for total non-dairy income and bridging social capital variables such as satisfaction of level of participation of women in cooperative management, satisfaction with the relationship between cooperative members and management were all predictors of membership in Cooperative B, as were several bonding social capital variables such as willingness to plan, satisfaction with milk prices and satisfaction with training and technical support. These findings reinforce the value of cooperative business models when the cooperative has strong governance and is operating as business. During the CDP project, Cooperative B followed a democratic process to elect new board members and a new chair. The new board members along with a dynamic new CEO were able and willing to bravely invest in change. The board invested in member engagement and intentionally grooming future board members. After building trust through more engaged networks with members, the cooperative management invested in route mapping to more efficiently collect milk to bring to the processing facility and reorganized the operations team to minimize losses at the processing facility. These efficiencies produced profits that then were invested in improving member benefits, including bonuses for additional deliveries of milk to the



## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

processing plant. This represents another action that leads to stronger member engagement and stronger bonding social capital.

Cooperative B is a federated structure with the cooperative fully owned by the primary cooperatives and appears to be reinvesting any profit back into increasing member engagement to further reduce losses and improve production. Members who are satisfied with the price of milk offered by the cooperative are 2.1 times more likely to be a member of Cooperative B, the stronger cooperative that is operationalizing a clear strategy to investing back into the cooperative structure. Similarly, respondents satisfied with training and technical support were 3 times more likely to be members of Cooperative B, further supporting the hypothesis that stronger bonding social capital will predict membership in Cooperative B. Members who were satisfied with the participation of women in cooperatives were 3.6 times more likely to be a member of Cooperative B. Finally, members satisfied with the relationship between cooperative members and management were 2.4 times more likely to be a member of Cooperative B. Both the total number of cows and the amount of non-dairy income were significant predictors of membership in Cooperative B.

The non-significant predictor, community social capital indicates there was no difference between Cooperative A and B with respect to their community environment, but rather the differences in social capital indicators within the respective cooperatives.

Cooperative B is focused on increasing income from dairy by creating and improving systems to increase quality and quantity of milk and decreasing losses. The cooperative has elected an active, trusted, and empowered board to hire competent management to create systems and processes to maximize profits on dairy. The board and management have built a strong network of supporting institutions and organization

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

at the local and regional levels who provide technical or other support services to the cooperative, including extension, inputs, market access, storage technology, and milk management systems.

The baseline key informant interviews confirm the members of Cooperative B were active and engaged. Additionally, Cooperative B had changes in the board who understood their responsibility in hiring a manager. In Africa, many cooperatives do not have a strong capital base and are very hesitant to hire a manager, even when well capitalized.<sup>23</sup> One way of overcoming this is found in West Africa, where a simplified cooperative law is included in OHADA, the legal framework ratified by 17 West African Countries, which allows for a management committee comprised of members.<sup>24</sup> The structure is useful for nascent cooperatives or those with lower income-earning potential. Strong, transparent leadership is required for successful cooperative development. The findings of this study show that trust in leadership, and satisfaction with communication to and from leadership, especially for women, are positively associated with membership in the stronger of the two cooperatives in this study (Gutierrez, Hilborn, & Defeo, 2011; McVay, 2013).

*Governance* is a confusing term to many cooperative actors. Oftentimes the members of cooperatives in East and Southern Africa describe governance as something equivalent to government, a misconception that is perpetuated by the long shadow of government-controlled cooperatives during the colonial period. Such entities are not actually operating as autonomous cooperatives because they are not fully member-owned or controlled, and as a result, the term ‘cooperative business’ is not welcome in many

---

<sup>23</sup> Personal interview, MadaOmby Livestock Cooperative leadership team, Antananarivo, Madagascar, July 20, 2018.

<sup>24</sup> OHADA Uniform Act on Cooperative Societies, August 30, 2018. Retrieved from <http://www.ohada.org/index.php/en/>

communities where their forced participation in a government-run collective at an earlier time resulted in a loss of their contributions, including cash, crops, or labor (Gouët & Van Paassen, 2012).

### 6.2 Limitations

The endline analysis included only two vertically integrated cooperatives in Kenya, so certain findings may tend to reflect conditions unique to Kenya. Secondly, Cooperative A and Cooperatives B are in different milksheds. Cooperative A is closer to Nairobi and the members have several commercial options with ready market access, the difference-in-difference model highlights the differences and is described in section 5.4.

Therefore, the study was limited in that a logistic regression model is predictive in only one direction, so the set of independent variables were predicting the odds of being in Cooperative A vs. Cooperative B, for example, but the model could not predict the opposite if membership in Cooperative A vs. Cooperative B could predict the odds of any of the independent variables.

Figure 8. (left) Photo of Pyrethrum in Limuru, Kenya Source: Retrieved from <http://agripreneur.co.ke/agripreneur/history-of-pyrethrum-in-kenya/>



Figure 9. (right) Photo of Woman near Limuru (Nakuru County), participating in government grant program to grow pyrethrum daisies. (Retrieved from: <https://www.nation.co.ke/business/seedsforgold/Sh29-million-boost-for-pyrethrum-farmers/2301238-4345104-ncfvtn/index.html>)

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

During the endline survey, some cooperative members indicated during key informant interviews that in addition to dairy, they also were engaged in poultry production, which has many market channels in nearby Nairobi and others were going back to raising pyrethrum. In 1940 when Cooperative A was founded, the original members grew pyrethrum. The discovery of synthetic substitutes decreased the demand for natural pyrethroids; however, in recent years, the increase demand for natural pesticides, like pyrethrum, has become a lucrative option for Cooperative A farmers – a ~\$60 investment in 1 acre of land yields a crop worth ~\$1000 after only 4 months. Like the trade-off between teff and chat by Ethiopian farmers (Cafer, 2015), farmers in Cooperative A have several non-dairy options to consider and determine what role the cooperative has in these new ventures that may replace dairy for some of the members. With subgroups forming and a lack of homogeneity of goals, the member owners of Cooperative A will need to determine if the cooperative will demutualize (shift into another form of business), do nothing, spawn, or reinvent to start another lifecycle of the cooperative (Cook, 2018).

There are few cooperative development models that have been translated and restructured into elements of a project design. Project design in international development is important. Donor-funded projects can have unintended negative consequences such as distorting markets, derailing existing business plans, or crippling innovation because prescriptive development programs can be lucrative to communities in other ways. Some even suggest that cash transfers would have better outcomes than expensive development projects.<sup>25</sup> There are programs that are ‘light touch’ projects with

---

<sup>25</sup> Which USAID Project Work? The US Runs Tests, But Won't Talk About It. Retrieved from <https://www.npr.org/sections/goatsandsoda/2018/09/14/647212387/which-foreign-aid-programs-work-the-u-s-runs-a-test-but-wont-talk-about-it>, September 18, 2018.

less US investment, and more resources available for local private sector firms, civil society organizations, and more. The Cooperative Development Program is meant to be just that, a light touch program that provides targeted technical assistance, helps to strengthen the enabling environment, and increases investment in cooperative development.

### **6.3 Future Research**

Future research could include analyzing the percentage of income from dairy as it relates to membership and bridging and bonding social capital, examining if there is a relationship between percent of income from dairy and participation in a cooperative. Key informant interview and focus group discussions with members only were conducted when this endline quantitative data was collected; future research could include quantitative data on social capital and more details on the sense of ownership, control, and benefit from the cooperative.<sup>26</sup> The difference-in-difference econometric model could also be applied to a broader set of variables within the data set to examine causality of membership vs non-membership, which could not be assessed using the logistic regression model.

Other research could build on the work of Calabrese and Borchert (1996) on the role of technology and social capital. This could include research on how cooperatives facilitate the introduction of new technology, connections between strong dairy marketing cooperatives and their associated SACCOS or other cooperatives such as private sector health cooperatives.

---

<sup>26</sup> Analytics Team Assessment of Changes [in Cooperative A and B over the life of project], Prepared for Land O' Lakes International Development. 2015. Summary of Land O'Lakes International Development internal report by Michael Cook, David O'Brien, LuAnn Werner, Mary Munene, Alfred Orora and Daniel Diang'a.

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Successful cooperative development in the US has been supported by a set of institutions and organizations such as cooperative development centers, university extension offices, USDA Rural Development offices, organizations that offer cooperative training such as the University of Wisconsin Center for Cooperatives, or St. Mary's University Sobey School of Business, the Cooperative Development Foundation (CDF), and trade associations such as the National Council of Farmer Cooperatives (NCFC) and the National Cooperative Business Association and the Cooperative League of the USA (NCBA CLUSA). Future research might analyze how some form of these institutions and organizations may be introduced into the sub-Saharan African environment. Currently, in low- and middle-income countries, there is little information about the existence, scope, and skills of such cooperative support organizations.

### **7 CHAPTER 7: CONCLUSION**

The current study suggests that the cooperative business model brings economic and social capital benefits to members. Good governance appears to be a critical element in the success of the cooperative. The data highlight that the more successful Cooperative B had much stronger engagement by its members, better communication between the board and members, and active participation than in Cooperative A as demonstrated by members selling their milk through the cooperative. The cooperative model requires trust. A smallholder farmer who delivers milk to the cooperative trusts he or she will receive payment, often via an electronic payment system, which is still not fully trusted by the older generation who make up the largest percentage of dairy farmers in the population in this study and of dairy farmers in Kenya. If dairy farmers sell their milk at the farm gate, the transaction is in cash, and during much of the year, many of the households in the study are subsistence farming, whereby there is little or no surplus.

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Grossman et al (1986) observe that as the dairy business becomes more vertically integrated and the milk moves along the value chain there are increased losses when these transfers of ownership are incomplete. *The smallholder farmer must trust that the investment that he or she is making in professional management, which reduces the short-term returns to the farmer, will accrue longer-term benefits to the farmer.* These vaguely defined property rights issues within the marketing cooperatives has been described in the developing world under colonialism for decades (Niyogi, 1939) and are key issues that influence cooperative success over time (Cook, 2018).

The findings of this study suggest that social capital indicators are strong predictors of both membership in a Cooperative A and more specifically membership in a better functioning cooperative. Trusted and important relationships that allow for access to information, services, and a guaranteed market catalyze the members to become active and engaged. Collective action also allows for higher access to inputs and other services. Cooperative development projects often include robust training programs for boards of directors, preparation of bylaws, etc., but little is done create a learning environment for understanding how good governance is operationalized within the cooperative business. The model is limited in directionality so the probability in the opposite direction, that successful coops lead to higher levels of social capital, cannot be ascertained.

One of the final cooperative development project reports states that a key result of the project is that the introduction of new technologies, improved operations, improved management, and stronger governance will result in a stronger cooperative, Cooperative B. The report also states that Cooperative B has strong social capital, evidenced by increased member engagement, and significantly higher levels of satisfaction with the cooperative in terms of price of milk, communication between members and leaders, and

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

among members, opportunities for women and more. Development programs focused on cooperative development often focus on the association side of the cooperative (members and board) as outlined the cooperative model Figure 1. Projects also focus on production, post-harvest management, and good manufacturing practices, included in the enterprise side of cooperative model in Figure 1. Project implementors, local partners, government agents, and others may not fully grasp the connection between the association side and the enterprise side of the business.

A cooperative is, in simplest terms, an association of people and a business. The current study connected both sides of the cooperative structure and evaluated the cooperative based on the complete business model. The 5-year cooperative development project, Cooperative B, met the project objectives of increased income for its members by increasing member engagement, active participation in governance, and a strong board willing to invest in business operations resulting in substantial decrease in losses. The results of this study contribute to the growing body of literature about cooperative development. Hopefully the findings will be part of the wave of information that informs international development project design with insights for supporting business-oriented, member-focused cooperative development that addresses both the governance and business elements found in strong, successful cooperatives.



**REFERENCES**

- Alonso-Fradejas, A., Borrás, S. M., Holmes, T., Holt-Giménez, E., & Robbins, M. J. (2015). Food sovereignty: convergence and contradictions, conditions and challenges. *Third World Quarterly*, 36(3), 431.  
doi:10.1080/01436597.2015.1023567
- Ajzen, I. (2002), Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology*, 32: 665-683.  
doi:[10.1111/j.1559-1816.2002.tb00236.x](https://doi.org/10.1111/j.1559-1816.2002.tb00236.x)
- Bebe, B. O., Udo, H. M. J., Rowlands, G. J., & Thorpe, W. (2003). Smallholder dairy systems in the Kenya highlands: cattle population dynamics under increasing intensification. *Livestock Production Science*, 82(2-3), 211-221.  
doi:10.1016/s0301-6226(03)00013-7
- Bebe, B. O., Udo, H. M. J., & Thorpe, W. (2002). Development of smallholder dairy systems in the Kenya highlands. *Outlook on Agriculture*, 31(2), 113-120.
- Bellman, Richard Ernest and Kenneth L. Cooke. (1963) Differential-difference equations. Santa Monica, CA: RAND Corporation.  
<https://www.rand.org/pubs/reports/R374.html>.
- Bernard, T., & Spielman, D. J. (2009). Reaching the rural poor through rural producer organizations? A study of agricultural marketing cooperatives in Ethiopia. *Food Policy*, 34(1), 60-69. doi:10.1016/j.foodpol.2008.08.001
- Bernard, T., Taffesse, A. S., & Gabre-Madhin, E. (2008). Impact of cooperatives on smallholders' commercialization behavior: evidence from Ethiopia. *Agricultural Economics*, 39(2), 147-161. doi:10.1111/j.1574-0862.2008.00324.x

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

- Bisung, E., Elliott, S. J., Schuster-Wallace, C. J., Karanja, D. M., & Bernard, A. (2014). Social capital, collective action and access to water in rural Kenya. *Social Science & Medicine*, *119*, 147-154. doi:10.1016/j.socscimed.2014.07.060
- Bourdieu, P. (1986). *The forms of capital*. In J. Richardson (Ed.) *Handbook of Theory and Research for the Sociology of Education*. New York: Greenwood, 241-258.
- Box, G. E. P. and Tidwell, P. W. (1962) Transformation of the independent variables. *Technometrics* *4*, 531-550.
- Burrell, M. J., Cook, M. L., & Klein, P. G. (2008). The clustering of organizational innovation: developing governance models for vertical integration. *International Food and Agribusiness Management Review*, *11*(4), 127-153.
- Cafer, A. (2016). Tef, khat, and community resilience: a mixed methods examination of smallholder adoptions of sustainable intensification practices (Doctoral dissertation). Retrieved from <https://mospace.umsystem.edu/xmlui/handle/10355/5314/discover>.
- Calabrese, A., Borchert, M. (1996). Prospects for electronic democracy in the United States: rethinking communication and social policy. *Media, Culture & Society*, *(18)*, 249-268.
- Casaburi, L., & Macchiavello, R. (2015). Loyalty, exit, and enforcement: Evidence from a Kenya dairy cooperative. *American Economic Review*, *105*(5), 286-290. doi:10.1257/aer.p20151076
- Chaddad, F. & Cook, M. (2004). Understanding New Cooperative Models: An Ownership-Control Rights Typology. *Review of Agricultural Economics*, *(3)*, 348. Retrieved from

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

<http://proxy.mul.missouri.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.3700806&site=eds-live&scope=site>

Chagwiza, C., Muradian, R., & Ruben, R. (2016). Cooperative membership and dairy performance among smallholders in Ethiopia. *Food Policy*, 59, 165-173.

doi:10.1016/j.foodpol.2016.01.008

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, S95-S120. doi:10.1086/228943

Cook, M. L. (2018). A life cycle explanation of cooperative longevity. *Sustainability*, 10(5). doi:10.3390/su10051586

Cook, M. L., & Iliopoulos, C. (2016). Generic solutions to coordination and organizational costs: Informing cooperative longevity. *Journal on Chain and Network Science*, 16(1), 19-27. doi:<http://www.wageningenacademic.com/loi/jcns>

Dobrin, A. (1970). The role of agrarian cooperatives in the development of Kenya. *Studies in Comparative International Development*, 5(6), 107.

Draperi, J.F.(2000). *From cooperative theory to cooperative practice*. Retrieved from: [http://recma.org/sites/default/files/From\\_cooperative\\_theory\\_to\\_cooperative\\_practice.pdf](http://recma.org/sites/default/files/From_cooperative_theory_to_cooperative_practice.pdf)

Durlauf, S.N., (1999). *The case "against" social capital*, Wisconsin Madison - Institute for Research on Policy. *Focus*, (20) 3, 1-5. Retrieved from <https://www.irp.wisc.edu/publications/focus/pdfs/foc203.pdf>

*Economic development through cooperatives*. (1974). Washington, D.C. : U.S Dept. of Agriculture, Farmer Cooperative Service.

Fairbairn, B. (1994). The meaning of Rochdale: The Rochdale Pioneers and the cooperative principles [Occasional Paper]. *Center for the Study of Co-operatives*

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

*University of Saskatchewan*. Retrieved from:

<http://usaskstudies.coop/documents/occasional-papers/Meaning%20of%20Rochdale.pdf>

Fay, C. R. (1908). *Co-operation at home and abroad: A description and analysis*.

London: P.S. King and Sons, Orchard House.

Feng, L., Friis, A., & Nilsson, J. (2016). Social capital among members in grain marketing cooperatives of different sizes. *Agribusiness*, 32(1), 113-126.

doi:10.1002/agr.21427

Fischer, E., & Qaim, M. (2012). Linking smallholders to markets: Determinants and impacts of farmer collective action in Kenya. *World Development*, 40(6), 1255-1268. doi:10.1016/j.worlddev.2011.11.018

Fukuyama, F. (2001). Social capital, civil society and development. *Third world quarterly*, 22(1), 7-20.

Gouët, C., & Van Paassen, A. (2012). Smallholder marketing cooperatives and smallholders' market access: Lessons learned from the actors involved. *The Journal of Agricultural Education and Extension*, 18(4), 369-385.

doi:10.1080/1389224X.2012.691784

Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), 1360.

Gray, T. W., & Kraenzle, C. A. (1998). *Member participation in agricultural cooperatives : a regression and scale analysis*. Washington, D.C. : United States Department of Agriculture, Rural Development, Rural Business-Cooperative Service.

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Grossman, S. J., & Hart, O. D. (1986). The costs and benefits of ownership: A theory of vertical and lateral integration. *Journal of Political Economy*, 94(4), 691.

Gutierrez, N. L., Hilborn, R., & Defeo, O. (2011). Leadership, social capital and incentives promote successful fisheries. *Nature*, 470(7334), 386-389.  
doi:10.1038/nature09689

Hamilton, A., & Rossiter, C. (1961). *The Federalist Papers; Alexander Hamilton, James Madison, John Jay*. [New York]: New American Library, [1961]. Retrieved from <http://proxy.mul.missouri.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=cat04885a&AN=merlin.b1686539&site=eds-live&scope=site>

Hammond, D., & Luiz, J. (2016). The co-operative model as a means of stakeholder management: an exploratory qualitative analysis. *South African Journal of Economic and Management Sciences*, (4), 630. <https://doi-org.proxy.mul.missouri.edu/10.17159/2222-3436/2016/v19n4a11>

Hansmann, H. (1996). *The ownership of enterprise*. Cambridge: The Belknap Press of the Harvard University Press.

Harlow, L. L. (2014). *The essence of multivariate thinking: Basic themes and methods* (2nd ed.). New York: Routledge.

Hart, A. K., Milder, J. C., Scherr, S. J., & McMichael, P. (2016). Multi-functional landscapes from the grassroots? The role of rural producer movements. *Agriculture and Human Values*, 33(2), 305-322. doi:10.1007/s10460-015-9611-1

Hilliova, M., Hejkrlik, J., Mazancova, J., & Tseren, T. (2017). Reaching the rural poor through agricultural cooperatives in Mongolia. *Annals of Public and Cooperative Economics*, 88(3), 449-465. doi:10.1111/apce.12162

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

- Joskow, P. L. (2012). Vertical Integration. *The Antitrust Bulletin*, 57(3), 545–586.  
<https://doi.org/10.1177/0003603X1205700303>
- Kebebe, E. G., Oosting, S. J., Baltenweck, I., & Duncan, A. J. (2017). Characterisation of adopters and non-adopters of dairy technologies in Ethiopia and Kenya. *Tropical Animal Health and Production*, 49(4), 681-690. doi:10.1007/s11250-017-1241-8
- Kilelu, C. W., Klerkx, L., & Leeuwis, C. (2017). Supporting smallholder commercialisation by enhancing intergrated coordination in agrifood value chains: Experiences with dairy hubs in Kenya. *Experimental Agriculture*, 53(2), 269-287. doi:10.1017/s0014479716000375
- Kumari, B., & Malhotra, R. (2016). Impact of women dairy co-operative societies on income and employment of women in Begusarai District of Bihar. *Agricultural Economics Research Review*, 29(2), 313-318. doi:10.5958/0974-0279.2016.00059.8
- Kunzru, O. N., & Tripathi, H. (1994). A comparative study of adoption of dairy farm technologies between non-members and members of dairy cooperative villages. *Indian Journal of Animal Sciences*, 64(5), 501-507.
- Lafontaine, F., & Slade, M. E. (2010). Transaction cost economics and vertical market restrictions—Evidence. *Antitrust Bulletin*, 55(3), 587-611.
- Lal, P. (2015). *African socialism in postcolonial Tanzania : between the village and the world*. New York, NY : Cambridge University Press, 2015.
- Lin, N. (2001). *Social capital : a theory of social structure and action*: Cambridge ; New York : Cambridge University Press.
- Lohr, L., & Park, T. A. (2008). Testing nonlinear logit models of performance effectiveness ratings: cooperative extension and organic farmers. *Journal of*

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

*agricultural and applied economics*, 40(2), 667-679.

doi:<http://www.agecon.uga.edu/~jaae/jaae.htm>

Loury, G. (1977). A Dynamic Theory of Racial Income Differences. In P. A. Wallace & A. M. LaMonde (Eds.), *Women, Minorities and Employment Discrimination*. Lexington, MA: Lexington Books

Majee, W., & Hoyt, A. (2011). Cooperatives and community development: A perspective on the use of cooperatives in development. *Journal of Community Practice*, 19(1), 48-61. doi:10.1080/10705422.2011.550260

Markelova, H., Meinzen-Dick, R., Hellin, J., & Dohrn, S. (2009). Collective action for smallholder market access. *Food Policy*, 34(1), 1-7.

doi:<http://dx.doi.org/10.1016/j.foodpol.2008.10.001>

Marx, K., Engels, F., Aveling, E. B., & Moore, S. (1887). *Capital*. Retrieved from <http://proxy.mul.missouri.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edshtl&AN=mdp.39015004747005&site=eds-live&scope=site>

McGarth, M. J. (1978). *Cooperatives, small farmers & rural development*. Madison, Wis.: University Center for Cooperatives, University of Wisconsin-Extension,.

McMichael, P. (2000). *Development and social change : a global perspective*(2<sup>nd</sup> ed.). Thousand Oaks, Calif : Pine Forge Press.

McVay, L. A. (2013). *Rural women in leadership : positive factors in leadership development*. Boston, MA : CABI, 2013.

Meador, J. E., O'Brien, D. J., Cook, M. L., Grothe, G., Werner, L., Diang'a, D., & Savoie, R. M. (2016). Building sustainable smallholder cooperatives in emerging market economies: Findings from a five-year project in Kenya. *Sustainability*, 8(7). doi:10.3390/su8070656

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Mellor, J. W. (1966). Production problems and issues in agricultural development.

*Journal of Farm Economics*, 48(5), 1195.

Mellor, J. W. (1973). Accelerated growth in agricultural production and the intersectoral

transfer of resources. *Economic Development & Cultural Change*, 22(1), 1.

Mellor, J. W. (1988). Food policy, food aid and structural adjustment programmes: the

context of agricultural development. *Food Policy*, 13(1), 10.

Mellor, J. W. (1998). What to do about Africa. *Choices: The Magazine of Food, Farm &*

*Resource Issues*, 13(4), 38.

Mellor, J. W. (2014). High rural population density Africa - What are the growth

requirements and who participates? *Food Policy*, 48, 66-75.

doi:10.1016/j.foodpol.2014.03.002

Mellor, J. W., & Dar, A. K. (1968). Determinants and development implications of

foodgrains prices in India, 1949-1964. *American Journal of Agricultural*

*Economics*, 50(4), 962.

Mellor, J. W., & Malik, S. J. (2017). The impact of growth in small commercial farm

productivity on rural poverty reduction. *World Development*, 91, 1-10.

doi:10.1016/j.worlddev.2016.09.004

Micklethwait, J., & Wooldridge, A. (2003). *The company, A short history of a*

*revolutionary idea*. New York and Toronto: Random House.

Mooney, P. H. (2004). Democratizing rural economy: Institutional friction, sustainable

struggle and the cooperative movement. *Rural Sociology*, 69(1), 76-98.

doi:10.1526/003601104322919919



## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

- Mooney, P. H., & Gray, T. W. (2002). *Cooperative conversion and restructuring in theory and practice. [electronic resource]*. Washington, D.C.: U.S. Dept. of Agriculture, Rural Business-Cooperative Service.
- Moyo, D. (2010). *Dead aid : Why aid is not working and how there is a better way for Africa*. New York : Farrar, Straus and Giroux.
- Moyo, D. (2012). Does aid work? No says Dambisa Moyo. *New Statesman*, 141(5111), 24.
- Musalia, L. M., Wangia, S. M. M., Shivairo, R. S., Okutu, P., & Vugutsa, V. (2007). Dairy production practices among smallholder dairy farmers in Butere/Mumias and Kakamega districts in Western Kenya. *Tropical Animal Health and Production*, 39(3), 199-205. doi:10.1007/s11250-007-9011-7
- Nilsson, J., Kihlen, A., & Norell, L. (2009). Are traditional cooperatives an endangered species? About shrinking satisfaction, involvement and trust. *International Food and Agribusiness Management Review*, 12(4), 101-121.
- Nilsson, J., Svendsen, G. L. H., & Svendsen, G. T. (2012). Are large and complex agricultural cooperatives losing their social capital? *Agribusiness*, 28(2), 187-204. doi:10.1002/agr.21285
- Nilsson, J., & Svendsen, G. T. (2011). Free riding or trust? Why members (do not) monitor their cooperatives. *Journal of Rural Cooperation*, 39(2), 131-150.
- Niyogi, J. P. (1939). Problems of co-operative marketing. *Annals of Public & Cooperative Economics*, 15(2), 338.
- Nygaard, D. F. (1987). Technology transfer as development aid: Discussion. *American Journal of Agricultural Economics*, 69(5), 936.

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

- O'Brien, D. J., Banwart, L., & Cook, M. L. (2013). Measuring the benefits of smallholder farmer membership in producer-controlled vertical value chains: Survey findings from a development project in East Africa. *Poverty & Public Policy*, 5(4), 399.
- Olson, M. (1965). *The logic of collective action: public goods and the theory of groups*. Cambridge, MA: Harvard University Press.
- Ostrom, E. (1990). *Governing the commons: the evolution of institutions for collective action*. Cambridge; New York: Cambridge University Press. Retrieved from <http://proxy.mul.missouri.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=cat04885a&AN=merlin.b3067327&site=eds-live&scope=site>
- Owango, M., Lukuyu, B., Staal, S. J., Kenyanjui, M., Njubi, D., & Thorpe, W. (1998). Dairy co-operatives and policy reform in Kenya: effects of livestock service and milk market liberalisation. *Food Policy*, 23(2), 173-185. doi:10.1016/s0306-9192(98)00027-x
- Peet, R., & Hartwick, E. (2015). *Theories of development: Contentions, arguments, and alternatives*. New York: Guilford Press.
- Pennington, R. (2014). *Local first in practice: Unlocking the power to get things done*. Retrieved from: <https://www.peacedirect.org/us/local-first-action>
- Portes, A. (1998). Social Capital: Its Origins and Applications in Modern Sociology. *Annual Review of Sociology*, 24, 1. Retrieved from <http://proxy.mul.missouri.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=1056932&site=eds-live&scope=site>
- Poteete, A. R., Janssen, M., & Ostrom, E. (2010). *Working together : collective action, the commons, and multiple methods in practice*. Princeton, NJ: Princeton University Press.

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Pronyk, P. M., Harpham, T., Busza, J., Phetla, G., Morison, L. A., Hargreaves, J. R., . . .

Porter, J. D. (2008). Can social capital be intentionally generated? A randomized trial from rural South Africa. *Social Science & Medicine*, 67(10), 1559-1570.

doi:10.1016/j.socscimed.2008.07.022

Putnam, R. D. (2000). *Bowling alone: the collapse and revival of American community*:

New York : Simon & Schuster.

Rostow, W. W. (1960). *The stages of economic growth : a non-Communist manifesto*.

Cambridge Eng.: University Press.

Rostow, W. W. (1963). *The economics of take-off into sustained growth*. London:

Macmillan; St Martin's Press.

Royer, A., Bijman, J., & Abebe, G. K. (2017). Cooperatives, partnerships and the challenges of quality upgrading: A case study from Ethiopia. *Journal of Co-*

*Operative Organization and Management*, 5(1), 48-55.

doi:10.1016/j.jcom.2017.04.001

Ruttan, V. W. (1996). *United States development assistance policy: the domestic politics of foreign economic aid*. Baltimore: Johns Hopkins University Press.

Ruttan, V. W. (1997). Induced innovation, evolutionary theory and path dependence:

Sources of technical change. *The Economic Journal* (444), 1520.

Schneiberg, M., King, M., & Smith, T. (2008). Social movements and organizational

form: Cooperative alternatives to corporations in the American insurance, dairy, and grain industries. *American Sociological Review*, 73(4), 635-667.

Segal, A. (1968). The politics of land in East Africa. *Economic Development & Cultural Change*, 16(2), 275.

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

- Spielman, D. (2008). Mobilizing rural institutions for sustainable livelihoods and equitable development: a case study of farmer cooperatives in Ethiopia. *IFPRI*
- Retrieved from:  
[http://siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/Resources/244362-1170428243464/3408356-1170428261889/3408359-1170428299570/3408360-1225211037391/Ethiopia\\_RI\\_Country\\_Study.pdf](http://siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/Resources/244362-1170428243464/3408356-1170428261889/3408359-1170428299570/3408360-1225211037391/Ethiopia_RI_Country_Study.pdf)
- Srinivasan, R., & Phansalkar, S. J. (2003). Residual Claims in Co-operatives: Design Issues. *Annals of Public & Cooperative Economics*, 74(3), 365.  
<https://doi.org/10.1111/1467-8292.00228>
- Staatz, J. M. (1989). *Farmer cooperative theory: recent developments*. Washington, D.C. : United States Department of Agriculture, Agricultural Cooperative Services.
- Staatz, J. M., & Eicher, C. K. (1998). *International agricultural development(3<sup>rd</sup> ed.)*. Baltimore, MD: Johns Hopkins University Press.
- Stiglitz, J. E. (2004). Capital-market liberalization, globalization, and the IMF. *Oxford Review of Economic Policy*, 20(1), 57-71. doi:10.1093/oxrep/grh004
- Svendsen, G. L. H., & Svendsen, G. T. (2000). Measuring social capital: The Danish co-operative dairy movement. *Sociologia Ruralis*, 40(1), 72-+. doi:10.1111/1467-9523.00132
- Thiemann, L. (2015). Operationalising food sovereignty through an investment lens: how agro-ecology is putting ‘big push theory’ back on the table. *Third World Quarterly*, 36(3), 544. doi:10.1080/01436597.2015.1023568
- Tocqueville, A. de, & Reeve, H. (1840). *Democracy in America*. [electronic resource]. [Auckland, New Zealand]: Floating Press, 1840. Retrieved from

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

<http://proxy.mul.missouri.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=cat04885a&AN=merlin.b10442515&site=eds-live&scope=site>

U. S. Department of Agriculture, Rural Development. (1997) *Co-ops 101: An Introduction to Cooperatives* (USDA Publication No. CIR 55). Retrieved from <https://www.rd.usda.gov/files/publications/CIR55.pdf>

Wanyama, F. O., Develtere, P., & Pollet, I. (2009). Reinventing the Wheel? African Cooperatives in a Liberalized Economic Environment. *Annals of Public & Cooperative Economics*, 80(3), 361–392. <https://doi-org.proxy.mul.missouri.edu/10.1111/j.1467-8292.2009.00390.xhttps://sustainabledevelopment.un.org/content/documents/1247ilo.pdf>

Woolcock, M., & Narayan, D. (2000). Social Capital: Implications for Development Theory, Research, and Policy. *World Bank Research Observer*, 15(2), 225.

Young, C., Sherman, N. P., & Rose, T. H. (1981). *Cooperatives & development : agricultural politics in Ghana and Uganda*. Madison, WI: University of Wisconsin Press.

**Permissions**

The University of Missouri IRB number #2013246 MU.

**8 APPENDICES**

8.1 Appendix A. Description of Independent Variables

		Description	Hypothesis 1 (Coop Member vs. Non- Member)	Hypothesis 2 (Coop A vs. Coop B)
<i>Demographic</i>				
1	Age of Head of Household	1=18-35, 2=36-60, 3=60+	x	x
2	Sex of Head of Household	0=female, 1=male	x	x
3	Level of Education	Categories	x	x
<i>Farm assets and income</i>				
4	Satisfaction with milk prices	Satisfied/Not Satisfied		x
5	Satisfaction with cooperative leadership’s communication to members	Satisfied/Not Satisfied		x
6	Member has received a dividend on cooperative membership	Yes/No		
7	Satisfaction with cooperative leaderships efforts in promoting the participation of women in the cooperative	Satisfied/Not Satisfied		x
8	Satisfaction with cooperative’s training and technical support to farmers	Satisfied/Not Satisfied		x
9	Satisfaction with enforcement of cooperative rules	Satisfied/Not Satisfied		x
10	Satisfaction with explanation of cooperative rules	Satisfied/Not Satisfied		x
11	Satisfaction with level of participation of women in cooperative management	Satisfied/Not Satisfied		x



## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

12	Satisfaction with relationships between cooperative members			x
13	Satisfaction with relationships between cooperative members & management	Satisfied/Not Satisfied		x
14	Satisfaction with timeliness of milk payments	Likert Scale		x
15	Satisfaction with treatment of members not meeting their responsibilities	Satisfied/Not Satisfied		x
	<i>Dairy Cows and Income</i>			x
16	Average cost of feed meds fodder (ln)	Satisfied/Not Satisfied	x	x
17	Total income per cow (USD)	USD	x	x
18	Total non-dairy income (USD) (ln)	USD	x	x
19	Total number of cows	Scale	x	x
	<i>Trust in community</i>			
20	Trust in the community (scale)	Index	x	x
21	Voice in the major decisions related to the cooperative	0=female, 1=male		x
22	Willingness to plan (locus of control)	Scale	x	x

**8.2 Appendix B: Correlation Tables**

**Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.659	0.666	22

SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Correlations

		Age	Sex	Educ	Accuracy of weigh & recording	Milk Prices	Timeliness of milk pymts	Trmt of members not mtg resp.	Rel. between co-op members	Rel. bet. co-op mem & co-op mgmt.	Co-op train & tech sup. to farmers	Part. of wom. in co-op mgmt	Co-op efforts to promote wmn	Explanation of co-op rules	Enforcement of co-op rules	Co-op leadership' s communication to members	Avg Cost Feed/Fodder/Meds	Avg Total Inc per cow	Total non-dairy income	Total Cows	Trust Community	Voice in Decision Making about co-op	Willingness to plan for future
Age	Pears on Correlation	1	-	-	0.0	0.0	0.0	0.0	.07	.08	.07	0.0	0.0	0.0	0.0	0.0	-	-	-	0.0	-	-	0.0
	Sig. (2-tailed)		.183**	.387**	.28	.37	.14	.58	7*	8**	0*	.59	.35	.02	.18	.05	0.0	0.0	.099**	.06	0.0	0.0	.15
	N	22	22	22	10	10	10	10	10	10	10	10	10	10	10	10	10	22	22	22	22	22	10
Sex	Pears on Correlation		1	.34	0.0	-	-	0.0	0.0	0.0	0.0	-	-	-	-	-	0.0	0.0	.09	0.0	0.0	0.0	0.0
	Sig. (2-tailed)			.9**	.01	0.0	0.0	.06	.29	.14	.03	0.0	.06	0.0	0.0	0.0	.11	.17	.7**	.11	.30	.46	.04
	N	22	22	22	10	10	10	10	10	10	10	10	10	10	10	10	22	22	22	22	22	22	10
Educ	Pears on Correlation			1	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	.25	-	-	.08	0.0
	Sig. (2-tailed)				.31	.05	.01	0.0	.49	.08	.38	0.0	.12	0.0	.08	.22	.10	.25	.2**	.04	0.0	.0**	.09
	N	22	22	22	10	10	10	10	10	10	10	10	10	10	10	10	22	22	22	22	22	22	10

SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Correlations

		Age	Sex	Educ	Accuracy of weigh & recording	Milk Prices	Timeliness of milk pymts	Trmt of members not mtg resp.	Rel. between co-op members	Rel. bet. co-op mem & co-op mgmt.	Co-op train & tech sup. to farmers	Part. of wom. in co-op mgmt	Co-op efforts to promote wmn	Explanation of co-op rules	Enforcement of co-op rules	Co-op leadership' s communication to members	Avg Cost Feed/Fodder/Meds	Avg Total Inc per cow	Total non-dairy income	Total Cows	Trust Community	Voice in Decision Making about co-op	Willingness to plan for future
Accuracy of weighing and recording	Sig. (2-tailed)	0.00	0.00		0.317	0.881	0.979	0.638	0.112	0.792	0.217	0.914	0.689	0.794	0.802	0.472	0.632	0.239	0.000	0.050	0.243	0.009	0.679
	N	22	22	22	10	10	10	10	10	10	10	10	10	10	10	10	22	22	22	22	22	10	22
	Pears on Correlation	0.028	0.028	0.028	1	.197**	.216**	.082**	.096**	.152**	.176**	.122**	.164**	.095**	.125**	.221**	0.039	-0.48	0.054	.081**	0.056	.509**	-0.22
Milk Prices	Sig. (2-tailed)	0.361	0.971	0.317		0.000	0.000	0.008	0.002	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.209	0.118	0.080	0.009	0.071	0.000	0.466
	N	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Pears on Correlation	0.037	-0.010	0.005	.197**	1	.222**	.101**	.082**	.147**	.167**	.119**	.112**	.123**	.166**	.144**	0.059	0.033	0.035	0.024	0.000	-0.21	.157**
	Sig. (2-tailed)	0.235	0.734	0.881	0.000		0.000	0.001	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.290	0.254	0.445	0.497	0.000	0.733



SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Correlations

		Age	Sex	Educ	Accuracy of weigh & recording	Milk Prices	Timeliness of milk pymts	Trmt of members not mtg resp.	Rel. between co-op members	Rel. bet. co-op mem & co-op mgmt.	Co-op train & tech sup. to farmers	Part. of wom. in co-op mgmt	Co-op efforts to promote wmn	Explanation of co-op rules	Enforcement of co-op rules	Co-op leadership' s communication to members	Avg Cost Feed/Fodder/Meds	Avg Total Inc per cow	Total non-dairy income	Total Cows	Trust Community	Voice in Decision Making about co-op	Willingness to plan for future	
co-members	Correlation																							
	Sig. (2-tailed)	0.012	0.340	0.112	0.002	0.007	0.025	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.413	0.243	0.667	0.450	0.423	0.462	0.443	
Relations bet. co-op members and co-op mgmt	N	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053
	Pearson Correlation	.088**	0.014	0.008	.152**	.147**	.176**	.303**	.427**	1	.429**	.218**	.234**	.218**	.388**	.363**	0.043	0.025	0.012	0.009	-	.128**	-	0.054
Co-op training and technical support to farmers	Sig. (2-tailed)	0.004	0.650	0.792	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.164	0.423	0.687	0.760	0.025	0.000	0.081	
	N	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053
	Pearson Correlation	.070*	0.003	0.038	.176**	.167**	.148**	.242**	.293**	.429**	1	.237**	.311**	.255**	.298**	.332**	0.036	-	0.027	0.000	-	.108**	-	0.062*
	Sig. (2-tailed)	0.023	0.917	0.217	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.241	0.624	0.376	0.989	0.001	0.001	0.045	

SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Correlations

	Age	Sex	Educ	Accuracy of weigh & recording	Milk Prices	Timeliness of milk pymts	Trmt of members not mtg resp.	Rel. between co-op members	Rel. bet. co-op mem & co-op mgmt.	Co-op train & tech sup. to farmers	Part. of wom. in co-op mgmt	Co-op efforts to promote wmn	Explanation of co-op rules	Enforcement of co-op rules	Co-op leadership' s communication to members	Avg Cost Feed/Fodder/Meds	Avg Total Inc per cow	Total non-dairy income	Total Cows	Trust Community	Voice in Decision Making about co-op	Willingness to plan for future	
Participation of women in co-op management	N	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	
	Pearson Correlation	0.059	-0.026	-0.003	.122**	.119**	.120**	.143**	.158**	.218**	.237**	1.000	.673**	.099**	.136**	.152**	.120**	0.041	.069*	0.005	.110**	.131**	.105**
	Sig. (2-tailed)	0.57	0.399	0.914	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.181	0.025	0.882	0.000	0.000	0.001
Co-op leaderships efforts to promote participation of women	N	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	
	Pearson Correlation	0.035	-.063*	0.012	.164**	.112**	.093**	.177**	.178**	.234**	.311**	.673**	1.000	.115**	.165**	.155**	.075*	0.034	0.052	0.042	.063*	.176**	.061*
	Sig. (2-tailed)	0.63	0.041	0.689	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.264	0.089	0.068	0.040	0.000	0.047
N	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	

SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Correlations

		Age	Sex	Educ	Accuracy of weigh & recording	Milk Prices	Timeliness of milk pymts	Trmt of members not mtg resp.	Rel. between co-op members	Rel. bet. co-op mem & co-op mgmt.	Co-op train & tech sup. to farmers	Part. of wom. in co-op mgmt	Co-op efforts to promote wmn	Explanation of co-op rules	Enforcement of co-op rules	Co-op leadership' s communication to members	Avg Cost Feed/Fodder/Meds	Avg Total Inc per cow	Total non-dairy income	Total Cows	Trust Community	Voice in Decision Making about co-op	Willingness to plan for future
Explanati on of co-op rules	Pears on	0.0	-	-	.09	.12	.11	.25	.17	.21	.25	.09	.11	1	.59	.20	-	0.0	-	0.0	-	.11	-
	Corre lation	02	0.0	0.0	5**	3**	8**	2**	8**	8**	5**	9**	5**		0**	2**	.07	17	0.0	29	.08	7**	.08
	Sig. (2-tailed)		18	08													5*	81	50	54	1**	00	7**
Enforcem ent of co-op rules	Pears on	0.9	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.5	0.9	0.3	0.0	0.0	0.0
	Corre lation	43	62	94	02	00	00	00	00	00	00	01	00		00	00	15	81	50	54	09	00	05
	Sig. (2-tailed)																						
Co-op leadership's communi	Pears on	0.0	-	0.0	.12	.16	.16	.26	.26	.38	.29	.13	.16	.59	1	.29	-	0.0	-	-	-	.15	-
	Corre lation	18	0.0	08	5**	6**	3**	4**	9**	5**	8**	6**	5**	0**		2**	0.0	42	0.0	0.0	.09	4**	.09
	Sig. (2-tailed)		07													37		86	81	09	7**	00	5**
Co-op leadership's communi	Pears on	0.5	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.2	0.1	0.8	0.7	0.0	0.0	0.0
	Corre lation	65	26	02	00	00	00	00	00	00	00	00	00	00		00	32	73	86	81	02	00	02
	Sig. (2-tailed)																						
Co-op leadership's communi	Pears on	0.0	-	0.0	.22	.14	.09	.22	.31	.36	.33	.15	.15	.20	.29	1	0.0	-	0.0	0.0	-	.13	0.0
	Corre lation	05	0.0	22	1**	4**	1**	6**	2**	3**	2**	2**	5**	2**	2**		37	0.0	12	13	0.0	0**	07
	Sig. (2-tailed)		57														30	30	86	81	19	00	07



SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Correlations

		Age	Sex	Educ	Accuracy of weigh & recording	Milk Prices	Timeliness of milk pymts	Trmt of members not mtg resp.	Rel. between co-op members	Rel. bet. co-op mem & co-op mgmt.	Co-op train & tech sup. to farmers	Part. of wom. in co-op mgmt	Co-op efforts to promote wmn	Explanation of co-op rules	Enforcement of co-op rules	Co-op leadership' s communication to members	Avg Cost Feed/Fodder/Meds	Avg Total Inc per cow	Total non-dairy income	Total Cows	Trust Community	Voice in Decision Making about co-op	Willingness to plan for future	
cation to members	Sig. (2-tailed)	0.865	0.066	0.472	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.226	0.326	0.699	0.681	0.536	0.000	0.815	
	N	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053
Avg Cost Feed/Fodder/Meds	Pears on Correlation	-0.021	0.011	0.010	0.039	0.059	-0.010	.089**	0.025	0.043	0.036	.120**	.075*	-0.075*	-0.037	0.037	1.000	0.000	0.024	-0.013	.315**	-0.025	.285**	
	Sig. (2-tailed)	0.327	0.616	0.632	0.209	0.055	0.736	0.004	0.413	0.164	0.241	0.015	0.015	0.015	0.232	0.226	0.998	0.267	0.537	0.000	0.414	0.400	0.000	
	N	2228	2228	2228	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	1053	2228	2228	2228	2228	2228	1053	2228	
Avg Total Inc per cow	Pears on Correlation	-0.026	0.017	0.025	-0.048	0.033	0.018	0.019	0.036	0.025	-0.015	0.041	0.034	0.017	0.042	0.030	0.000	1.000	-0.008	-0.025	-0.008	-0.001	0.005	
	Sig. (2-tailed)	0.216	0.427	0.239	0.118	0.290	0.558	0.540	0.243	0.423	0.624	0.181	0.264	0.581	0.173	0.326	0.998	0.694	0.238	0.698	0.969	0.969	0.808	

SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Correlations

		Age	Sex	Educ	Accuracy of weigh & recording	Milk Prices	Timeliness of milk pymts	Trmt of members not mtg resp.	Rel. between co-op members	Rel. bet. co-op mem & co-op mgmt.	Co-op train & tech sup. to farmers	Part. of wom. in co-op mgmt	Co-op efforts to promote wmn	Explanation of co-op rules	Enforcement of co-op rules	Co-op leadership' s communication to members	Avg Cost Feed/Fodder/Meds	Avg Total Inc per cow	Total non-dairy income	Total Cows	Trust Community	Voice in Decision Making about co-op	Willingness to plan for future
Total non-dairy income	N	22	22	22	10	10	10	10	10	10	10	10	10	10	10	10	22	22	22	22	22	10	22
	Pears on	28	28	28	53	53	53	53	53	53	53	53	53	53	53	53	28	28	28	28	28	53	28
	Correlation Sig. (2-tailed)	-.09	.09	.25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.06	0.0	0.0	-	-	0.0	0.0	-	1	-	-	.09
Total Cows	N	22	22	22	10	10	10	10	10	10	10	10	10	10	10	10	22	22	22	22	22	10	22
	Pears on	28	28	28	53	53	53	53	53	53	53	53	53	53	53	53	28	28	28	28	28	53	28
	Correlation Sig. (2-tailed)	0.06	0.11	-.04	1**	0.24	0.0	0.21	0.23	0.09	0.00	0.05	0.42	0.29	0.00	0.13	0.00	0.00	0.00	1	-.04	0.08*	0.02*
Trust Community	N	22	22	22	10	10	10	10	10	10	10	10	10	10	10	10	22	22	22	22	22	10	22
	Pears on	28	28	28	53	53	53	53	53	53	53	53	53	53	53	53	28	28	28	28	28	53	28
	Correlation Sig. (2-tailed)	0.00	0.30	0.00	0.56	0.00	0.08	0.00	0.00	0.06	0.09	0.00	0.11	0.06	0.08	0.09	0.00	0.00	0.00	0.00	0.04	0.01	0.00



# SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

## Correlations

	Age	Sex	Educ	Accuracy of weigh & recording	Milk Prices	Timeliness of milk pymts	Trmt of members not mtg resp.	Rel. between co-op members	Rel. bet. co-op mem & co-op mgmt.	Co-op train & tech sup. to farmers	Part. of wom. in co-op mgmt	Co-op efforts to promote wmn	Explanation of co-op rules	Enforcement of co-op rules	Co-op leadership' s communication to members	Avg Cost Feed/Fodder/Meds	Avg Total Inc per cow	Total non-dairy income	Total Cows	Trust Community	Voice in Decision Making about co-op	Willingness to plan for future
2-tailed																						
N	22	22	22	10	10	10	10	10	10	10	10	10	10	10	10	22	22	22	22	22	10	22
**	28	28	28	53	53	53	53	53	53	53	53	53	53	53	53	28	28	28	28	28	53	28
** . Correlation is significant at the 0.01 level (2-tailed).																						
* . Correlation is significant at the 0.05 level (2-tailed).																						

8.3 Appendix C: Endline Survey

**2015**

**LandO'Lakes Cooperative Development Project**

**Endline Quantitative Performance Evaluation Household Survey Tool**

**SPOT CHECK SURVEY**

Supervisor Name: \_\_\_\_\_

Date(s): \_\_\_\_\_

Milk-Shed: \_\_\_\_\_

Society/Route: \_\_\_\_\_

Enumerator #: _____	Questions Checked: _____
Enumerator #: _____	Questions Checked: _____
Enumerator #: _____	Questions Checked: _____
Enumerator #: _____	Questions Checked: _____
Enumerator #: _____	Questions Checked: _____
Enumerator #: _____	Questions Checked: _____

TANGO International

# SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Instructions .....	3
1. Identification Variables.....	4
2. Screening Questions, Introduction and Consent .....	4
3. Household Characteristics .....	5
4. Dairy Cows, Production and Sales.....	7
5. Cooperative Membership.....	11
6. Training.....	15
7. Feed Practices .....	16
8. Dairy Production Costs .....	16
9. Household Assets .....	17
10. Household Food Consumption .....	19
11. Household Income .....	20
12. Household Expenditures .....	20
13. Trust and Aspirations .....	21
14. Limuru Processing Investment.....	22

## Instructions

This endline survey is to be administered to dairy farmers located in Limuru and Meru milk sheds. The dairy farmers are to be either 1) an active cooperative member, with active defined as having sold milk to the cooperative in the previous 12 months or 2) a non-cooperative member dairy farmer who is currently milking cattle. The fieldwork is scheduled to be completed in February and March of 2015.

Only respondents who have been randomly selected should be asked to participate in this survey.

The survey is voluntary, and all respondents' information is kept completely confidential.

This survey is administered using Open Data Kit (ODK) Collect on Nexus 7 Android Tablets in English and Kiswahili. See the ODK program for translations. The paper/Microsoft word/.pdf document is used for training, review and quality control purposes only.

If you have any questions on this survey tool or the associated sampling methodology, please contact Lloyd Owen Banwart at TANGO International at [Lloyd@Tangointernational.com](mailto:Lloyd@Tangointernational.com)

## SCREENING QUESTIONS

### MEMBER HOUSEHOLD

Is the name on your list? (YES)

Has the household sold milk to the COOPERATIVE in the last 12 months? (YES)

### NON-MEMBER HOUSEHOLD

Does the household have dairy cattle currently producing milk? (YES) Is the household a member of **ANY DAIRY COOPERATIVE**? (NO)

## A. Identification Variables

Q#	Question	Response	Logic
GPS	GPS Coordinates of Household		
A1	Date of Interview		
A2	Milkshed Area	Meru Limuru	
A3	Cooperative Society Name AREA	List of all areas	
A4	Limuru Milk Route AREA		

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

A5	Interviewer code		
A6	Daily household number [The N <sup>th</sup> household interviewed by enumerator today] [First household today = 1] [Second household today = 2] [Third Household today = 3] [Fourth Household today = 4] [Fifth Household today = 5]		

### B. Screening Questions, Introduction and Consent

Q#	Question	Response	Logic
B1	Household type	Meru Cooperative Member Meru Non-member Limuru Cooperative Member Limuru Non-member	
B2	Introduction and Consent and Screening 1) Information 2) Confidential 3) Voluntary	Could not locate household No milk producing dairy cattle Member not selling milk to cooperative Does not consent Consent	

### C. Household Characteristics

Q#	Question	Response	Logic
C1	Name of Respondent		
C2	Sex of Respondent	Male Female	
C3	Age of Respondent		
C4	Respondents Relation to Head of Household	Head of HH Spouse of Head of HH Daughter/Son of HHH Brother/Sister of HHH Father/Mother of HHH Other family relation (HHH) Friend of HHH	
C5	Total number of Male adults in the HH [18 years of age and older]		
C6	Total number of Female adults in the HH [18 years of age and older]		
C7	Total number of Children in the HH [17 years of age and younger]		*
C8	Name of Head of Household?		
C9	How old is Head of Household?		
C10	Sex of Head of Household?	Male Female	
C11	What are the CURRENT sources of household income? [Probe – anything else?] [Select all that apply]	<ol style="list-style-type: none"> <li>1. Work on own farm (crops)</li> <li>2. Milk Sales</li> <li>3. Dairylivestocksales</li> <li>4. Other livestock sales</li> <li>5. Hired agricultural/livestock laborer</li> <li>6. Other unskilled labor</li> <li>7. Skilledlabor/professional</li> <li>8. Teacher</li> <li>9. Merchant/Businessman</li> <li>10. Remittances</li> <li>11. Other(specify)</li> </ol>	*

Q#	Question	Response	Logic
C12	Of these income sources, what percentage of income came from each source?	<ol style="list-style-type: none"> <li>a. Work on own farm (crops)</li> <li>b. Milk Sales</li> <li>c. Dairy livestock sales</li> <li>d. Other livestock sales</li> <li>e. Hired agricultural/livestock laborer</li> <li>f. Other unskilled labor</li> <li>g. Skilled labor/professional</li> <li>h. Teacher</li> <li>i. Merchant/Businessman</li> <li>j. Remittances</li> </ol>	

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

		k. Other (specify)	
C13	How many household members are engaged in dairy related activities?		
C14	Who in the HH is PRIMARILY responsible for deciding upon the MIX of ALL farm activities?	Household head Spouse Both HHH and Spouse Son Daughter Other family member (male) Other family member (female) Hired help	
C15	Who in HH is PRIMARILY responsible for care of dairy cattle?	Household head Spouse Both HHH and Spouse Son Daughter Other family member (male) Other family member (female) Hired help	
C16	Who in HH is PRIMARILY responsible for milking of dairy cattle?	Household head Spouse Both HHH and Spouse Son Daughter Other family member (male) Other family member (female) Hired help	
C17	Who in HH is PRIMARILY responsible for sale of milk	Household head Spouse Both HHH and Spouse Son Daughter Other family member (male) Other family member (female) Hired help	

Q#	Question	Response	Logic
C18	How many hours per day does the person PRIMARILY responsible for the CARE OF DAIRY CATTLE work each day on these dairying activities?		
C19	How many hours per day does the person PRIMARILY responsible for MILKING DAIRY CATTLE work each day on these dairying activities?		
C20	How many hours per day does the person PRIMARILY responsible for SALE OF MILK work each day on these dairying activities?		
C21	Education of HH Head	No Schooling Some Primary Schooling Completed Primary Schooling Some Secondary Schooling Completed Secondary Schooling Post-Secondary Schooling Can read/write (No formal Schooling) Adult Education	

### D. Dairy Cows, Production and Sales

Q#	Question	Response	Logic
D1	How many cows (calved at least once) do you currently have?	Local _____ Exotic _____ Cross _____	



## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

D2	What types of exotic breeds of milk cows do you own? [PICTURE OF BREEDS]	Holstein-Friesian Ayrshire Jersey Guernsey Other Don't Know None	
D3	How many cows are currently being milked?	* Local _____ Exotic _____ Cross _____	
D4	How many heifers do you have?	Local _____ Exotic _____ Cross _____	

Q#	Question	Response	Logic
D5	How many calves do you have?	Local _____ Exotic _____ Cross _____	
D6	What is your CURRENT total milk production (LITERS) in the MORNING? (from ALL cows producing milk)		
D7	What is your CURRENT total milk production (LITERS) in the EVENING (from ALL cows producing milk)		
D8	NORMAL daily total production (LITERS) of milk (from all cows in your herd) during the DRY SEASON? [including both morning and evening collections]		
D9	NORMAL daily total production (LITERS) of milk (from all cows in your herd) during the RAINY SEASON? [including both morning and evening collections]		
D10	How has your milk production changed in the last 5 years?	* Increased Stayed the same Decreased	
D11	How have you improved (increased) your milk production? [Probe] [Select up to three reasons]	Increased herd size Introduced more productive cows into the herd Improved production of feed/fodder Improved access to purchased feed Improved health care of animals Improved herd management Other (Specify)	
D12	Why has your milk production decreased? [Probe] [Select up to three reasons]	Changed to other more profitable activities Illness/Death of cattle Illness/Death of family members Higher cost of inputs Drought/lack of access to water Response to lower milk price Reduced herd size Other (specify)	
D13a	Have you sold ANY milk in the past 12 months?	Yes No	
D13b	Why have you not sold any milk in the last 12 months? [Probe] [Select up to three reasons]	Do not produce enough milk Price too low No buyers available Not interested to sell (produce for home consumption only) Other (specify)	

Q#	Question	Response	Logic
D14	What types of buyers do you regularly sell milk to in the DRY seasons? [Select all that apply]	Individual Customer(s) Milk traders (middlemen, brokers) Primary cooperative Dairy company Restaurant/Hotel	

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

		Other (specify) None	
D15	What types of buyers do you regularly sell milk to in the RAINY seasons? [Select all that apply]	Individual Customer(s) Milk traders (middlemen, brokers) Primary cooperative Dairy company Restaurant/Hotel Other (specify) None	
D16	What types of buyers do you CURRENTLY sell milk to? [Select all that apply]	Individual Customer(s) Milk traders (middlemen, brokers) COOPERATIVE Dairy company Restaurant/Hotel Other (specify) None	
D17	Rank buyers you currently sell milk to from most important (1) to least important (last number). [Most important is 1]	Individual Customer(s) Milk traders (middlemen, brokers) COOPERATIVE Dairy company Restaurant/Hotel Other	
<b>ASK FOLLOWING QUESTIONS FOR EACH BUYER TYPE LISTED IN D17</b>			
D18	How much milk do you currently sell [BUYER]? (liters/day)		
D19	What is the CURRENT sales price per liter to [BUYER]?		
D20	What time of day do you sell to this buyer?	Morning Evening Both Morning and Evening	

Q#	Question	Response	Logic
D21	Why do you sell to [BUYER]? [Probe] [Select all that apply]	High Price Timely Payments Stable Price Easily accessible (short distance) Other inputs/services provided by this buyer Can sell excess Convenient collection time Buyer does not check quality To support my local community (e.g. schools) No reason Other (specify)	
D22	Estimate your TOTAL average daily sales in the previous year in the DRY SEASON (liters/day)		
D23	Estimate your TOTAL average daily sales in the previous year in the RAINY SEASON (liters/day)		
D24	Do you ever have difficulties selling all your milk in the DRY season?	Yes No	
D25	What kinds of difficulties selling milk in DRY season? [Probe] [Select up to 3 reasons]	Buyers won't buy all milk Access/transport problems Nobody to transport Rejections because of quality Low/unstable price No buyers available Other (specify)	
D26	Do you ever have difficulties selling all your milk in the RAINY season?	Yes No	

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

D27	What kinds of difficulties selling milk in RAINY season? [Probe] [Select up to 3 reasons]	Buyers won't buy all milk Access/transport problems Nobody to transport Rejections because of quality Low/unstable price No buyers available Other (specify)	
D28	In the last 12 months have you switched to different milk buyers?	Yes No	
D29	Why did you switch buyers? [Probe] [Select up to 3 reasons]	Better Price Want more buyers Buyer who will take larger quantity More reliable buyer Previous buyers stopped buying Other (Specify)	
D30	How much milk does your household consume per day at this time [CURRENTLY] ?	__ Liters/day	

Q#	Question	Response	Logic
D31	Do you have any children under 5 years old in your household?	Yes No	
D32	How many children under 5 reside in your household?	Boys under 5 __ Girls under 5 __	
D33	How much milk per day do your under 5 children consume? [Liters]	Boys under 5 __ Girls under 5 __	

### E. Cooperative Membership

Q#	Question	Response	Logic
E1	How many years have you (or a family member) been a member of \${coop}? [Less than 1 year = 1] [Don't know = 98]		
E2	Did you, or a household member, attend \${coop}'s last annual general meeting?	Yes No	
E3	What services are offered by \${coop}? [Probe] [Select all that apply]	a. Milk collection at convenient location b. Animal health Services c. Provides dairy inputs d. Provides crop inputs e. Provides AI services f. Savings and credit g. Provides credit for inputs h. Provides credit for AI i. Provides general credit j. Provides health insurance k. Provides training l. Provides cross-cooperative visits m. Consumer stores n. School fees o. Milk transport services p. Other (specify) q. No service	
Ask E4 – E5 for each service selected in E3			
E4	Was this service added by \${coop} in the previous 5 years?	Yes No	
E5	Have you used this service?	Yes No	

Q#	Question	Response	Logic
E6	What other services should \${coop} provide that are not currently provided by the cooperative? [Select all that apply]	a. Milk collection at convenient location b. Animal health Services c. Provides dairy inputs d. Provides crop inputs	

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

		<ul style="list-style-type: none"> <li>e. Provides AI services</li> <li>f. Savings and credit</li> <li>g. Provides credit for inputs</li> <li>h. Provides credit for AI</li> <li>i. Provides general credit</li> <li>j. Provides health insurance</li> <li>k. Provides training</li> <li>l. Provides cross-cooperative visits</li> <li>m. Consumer stores</li> <li>n. School fees</li> <li>o. Milk transport services</li> <li>p. Other (specify)</li> <li>q. None</li> </ul>	
E7	<p>Why are you a member of \${coop}?</p> <p>[Read each benefit and check those indicated by respondent]</p> <p>[Select all that apply]</p>	<ul style="list-style-type: none"> <li>High milk price</li> <li>Timely payment</li> <li>Convenient payment</li> <li>Stable prices over the year</li> <li>Access to inputs on credit</li> <li>Access to loans</li> <li>Access to training</li> <li>Exchange visits</li> <li>Regular/Reliable source of cash</li> <li>Cooperative supports social measures</li> <li>Family Legacy</li> <li>Other (specify)</li> </ul>	
E8	<p>Have you experienced any problems with membership in \${coop}?</p>	<p>Yes No</p>	
E9	<p>What problems have you had with \${coop}?</p> <p>[PROBE]</p> <p>[Select all that apply]</p>	<ul style="list-style-type: none"> <li>Low prices</li> <li>Delayed payment</li> <li>Unable to sell desired quantities (quotas)</li> <li>Long distance to collection center</li> <li>Inconvenient collection times</li> <li>No evening collection</li> <li>Testing requirements</li> <li>Personal conflicts with other members or management</li> <li>Delays in collection</li> <li>Falsification of quantities by weighing clerks</li> <li>Other (Specify)</li> </ul>	
E10	<p>Is the HH currently (in the last 30 days) delivering milk to \${coop}?</p>	<p>Yes No</p>	

Q#	Question	Response	Logic
E11	<p>Why not currently delivering milk to \${coop}?</p> <p>[PROBE]</p> <p>[Select all that apply]</p>	<ul style="list-style-type: none"> <li>Immature cows</li> <li>Dry cows</li> <li>Sold all cows</li> <li>Cows died</li> <li>Better selling price from other buyers</li> <li>Consuming all the milk</li> <li>Cooperative not taking milk at this time</li> <li>Excessive delays in payments</li> <li>No benefits to coop membership</li> <li>Other (specify)</li> </ul>	
E12	<p>Does \${coop} purchase ALL milk you want to sell?</p> <p>[PROBE]</p>	<ul style="list-style-type: none"> <li>Rainy Season Only</li> <li>Dry Season Only</li> <li>Both Rainy and Dry Season</li> <li>Not able to buy milk anytime</li> </ul>	

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

Are you satisfied with following aspects of \${coop}?			
E13a	Milk testing requirements	Satisfied Not Satisfied	
E13b	Accuracy of weighing and recording	Satisfied Not Satisfied	
E13c	Milk Prices	Satisfied Not Satisfied	
E13d	Timeliness of milk payments	Satisfied Not Satisfied	
E13e	Treatment of members not meeting their responsibilities	Satisfied Not Satisfied	
E13f	Relationships between cooperative members	Satisfied Not Satisfied	
E13g	Relationships between cooperative members and cooperative management	Satisfied Not Satisfied	
E13h	Cooperative's training and technical support to farmers	Satisfied Not Satisfied	
E13i	Participation of women in cooperative management	Satisfied Not Satisfied	
E13j	Cooperative leaderships efforts in promoting the participation of women in dairy	Satisfied Not Satisfied	
E13k	Explanation of cooperative rules	Satisfied Not Satisfied	
E13l	Enforcement of cooperative rules	Satisfied Not Satisfied	
E13m	Cooperative leadership's communication to members	Satisfied Not Satisfied	
E13n	Members ability to communicate to cooperative leadership	Satisfied Not Satisfied	

Q#	Question	Response	Logic
<b>Cooperative Engagement</b>			
E14	Do you have a voting right with your membership share in \${coop}?	Yes No DNK	
E15	Have you received a dividend on your \${coop} membership?	Yes No	
E16	How do you and the cooperative leadership communicate? [PROBE] [Select all that apply]	Informal one-on-one discussions Informal group discussions Annual General Meeting Member meetings Via letters Via Telephone Via SMS text messages Via Internet No communication Other (Specify)	
ENP	How strongly would you recommend the cooperative to a friend or relative and encourage them to join?	0 (Not recommend at all) 1 2 3 4 5 6 7 8 9 10 (Strongly Recommend)	
<b>Cooperative Non-members</b>			
E17	Were you, or a family member, ever a member of \${coop} in the past?	Yes No	

Q#	Question	Response	Logic
E18	What are the reasons you, or a family member, are not currently a member of \${coop}? [PROBE] [Select all that apply]	Low prices Rumors of delayed payment Unable to sell desired quantities (quotas) Long distance to collection center Inconvenient collection times	

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

		No evening collection Testing requirements too strict Personal conflicts with other members or management Delays in collection Rumors of falsification of quantities by weighing clerks Uncertainty of cooperative stability Too expensive (membership fees) Don't produce enough milk Poor services provided by cooperative Other (Specify) Do not know	
E19	Are you, or a family member, a member of any other dairy cooperative (other than \${coop})?	Yes No	

### F. Training

Q#	Question	Response	Logic
F1	Have you received any training on dairying in the last 5 years?	Yes No	
F2	What kinds of training have you received? [Read out each item] [Select all that apply]	Improved feeding practices Animal health practices Animal Genetics/AI Herd Management Record Keeping/Accounting Cross Visits Other (specify)	
F3	Are there types of training that you would like to receive in the future?	Yes No	
F4	What other kinds of training would you like to receive? [PROBE] [Select all that apply]	Improved feeding practices Animal health practices Animal genetics/AI Herd management Record keeping/ accounting Cross visits Other (specify)	

### G. Feed Practices

Q#	Question	Response	Logic
G1	Main system for keeping cattle this year in DRY SEASON	Only Grazing (free range or tethered) Mainly grazing with some stall feeding Mainly stall feeding with some grazing Only stall feeding (zero grazing)	
G2	Main system for keeping cattle this year in RAINY SEASON	Only Grazing (free range or tethered) Mainly grazing with some stall feeding Mainly stall feeding with some grazing Only stall feeding (zero grazing)	
G3	Has your system for keeping cattle changed in last 5 years?	Yes No	
G4	How has your system for keeping cattle changed?	Increased use of grazing Decreased use of grazing Adopted zero grazing	

### H. Dairy Production Costs

Question #	Question	Response	Logic
H1	Did you purchase any fodder in the past year?	Yes No DNK	
H2	Total Cost of fodder purchased per month (KSH)?		
H3	Number of months purchased fodder (in the last 12 months)		
H4	Have you fed your cows with feed concentrates in the last 12 months?	Yes No DNK	

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

H5	What is the cost per month of concentrates you feed in the DRY SEASON? (KSH)		
H6	What is the cost per month of the concentrates you feed in the RAINY SEASON? (KSH)		
H7	Where do you PRIMARILY purchase your feed concentrates?	Agrovet shop Private veterinary Cooperative Other (specify)	
H8	Did you feed dairy animals with concentrates 5 years ago?	Yes No	
H9	How much did you pay (total) for medicines and vet services over the past 12 months? (KSH)		

Question #	Question	Response	Logic
H10	From whom do you obtain medicines, vet services? [Select all that apply]	Agrovet shop Private veterinary Cooperative Government Other (specify) Do not obtain any	
H11	What methods do you use to inseminate your cows?	Bull AI Bull and AI None	
H12	How much did you pay for AI/Bull service in the last 12 months? (KSH)		
H13	Who provided AI services? [Select all that apply]	Private service provider PRIMARY COOPERATIVE Government Vet Other Don't know	
H14	Why not use AI? [Select all that apply]	Service not available Too expensive Not aware of benefits of AI Prefer to use bull Other (specify)	
H15	Do you currently hire any laborers for your dairy operations?	Yes No	
H16	How many monthly dairy laborers do you currently employ?		
H17	TOTAL wages paid to ALL monthly dairy workers (currently)? (KSH/month)		
H18	In the past year have you hired any casual laborers for your dairy operations?	Yes No	
H19	How many months per year do you hire casual laborers for your dairy operations?		
H20	TOTAL wages paid to ALL casual dairy workers (currently)? (KSH/month)		

### I. Household Assets

Q#	Question	Response	Logic
I1	Household assets – Number owned		
	Radio		
	Television		
	Mobile phone		
	Landline phone		
	Refrigerator		
	Solar panel		
	Car battery		
I2	Transportation assets – Number owned		
	Vehicle		

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

	Motorcycle		
	Bicycle		
I3	Farm assets – Number owned		
	Animal cart		
	Shovel		
	Axe		
	Bush knife (panga)		
	Hoe		
	Plough		
	Wheelbarrow		
	Tractor		
	Spray pump		
	Draft animals (oxen)		
	Chaff cutter		

### J. Household Food Consumption

Question #	Question	Response	Logic
J1	Which of the following foods were consumed by your household yesterday?		
	Cereals	Yes No	
	Roots/Tubers	Yes No	
	Legumes/Pulses	Yes No	
	Dairy products	Yes No	
	Meat/poultry/offal	Yes No	
	Fish/seafood	Yes No	
	Oils/fats	Yes No	
	Sugar/honey	Yes No	
	Fruits	Yes No	
	Eggs	Yes No	
	Vegetables	Yes No	
	Other	Yes No	

### K. Household Income

Q#	Question	Response	Logic
K1	How much money do you consider that your household earns from the following activities per MONTH? (KSH)		
	Sales of milk/dairy products		
	Other farm activities (bee keeping, coffee, tea, beer brewing, wood, charcoal, etc.)		
	Wages/salaries/pensions		
	Business activities		
	Other (remittances, etc.)		
K2	How much money do you consider that your household earns from the following activities per YEAR? (KSH)		
	Dairy cattle sales		
	All other livestock sales		
	Crop sales		



## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

### L. Household Expenditures

Q#	Question	Response	Logic
L1	How much do you consider that your household spends on the following items each MONTH? (KSH)		
	House rent		
	Food		
	Fuel		
	Education		
	Transport		
	Medical		
	Loan repayment		
	Electricity		
	Tithes/religious offerings		
	Other		

### M. Trust and Aspirations

Q#	Question	Response	Logic
I'm going to read a series of statements to you, please tell how much you agree or disagree with the following statements			
M1	I feel like what happens in my life is mostly determined by powerful people.	Strongly disagree  Disagree Agree Strongly agree	
M2	It is not wise for me to plan far into the future because most things turn out to be a matter of good or bad fortune.		
M3	I can mostly determine what will happen in my life.		
M4	When I get what I want, it is usually because I worked hard for it.		
M5	My life is determined by my own actions.		
M6	I have a voice in the major decisions associated with \${coop}.		
M7	The future of \${coop} is NOT in my control		
M8	People in this community generally trust one another in matters of lending and borrowing.		
M9	In the last three years, has the level of trust in your community improved, worsened or stayed the same?	Improved Worsened Stayed the same	
M10	Compared with other communities, how much do people in this village trust each other in matters of lending and borrowing?	More trust than other communities Same as other communities Less trust than other communities DNK	
M11	Which institutions in your community are important to your dairying activities? [PROBE] [Select all that apply]	a. Cooperative b. Church c. Agro-vet d. Government e. Milk-traders f. Dairy Company g. Restaurant/Hotel h. Family	

## SOCIAL CAP AND MEMBERSHIP IN DAIRY CO-OPS IN KENYA

		i. School j. Veterinary k. AI Service Providers I. Non-Dairy CBOs m. Banks n. Other (Specify)	
M12	Of the institutions that are important to your dairying activities, rate your level of trust for each one	No Trust Some Trust Fully Trust	

### N. Limuru Processing Investment

Q#	Question	Response	Logic
N1	Did you invest in the Limuru Milk Processors Ltd Company, IN ADDITION to your membership in Limuru Dairy Farmers Cooperative Society?	Yes No	
N2	Do you own a share in the Limuru Milk Processors Ltd Company?	Yes No DNK Refused	
N3	How did you purchase your share in the Limuru Milk Processors Ltd Company? [Select all that apply]	Cash Check-off Loan Refused	
N4	Can you sell your share?	Yes No DNK Refused	
N5	Have you received a cash return on your investment in the Limuru Milk Processors Ltd Company?	Yes No Refused	

## VITA

Rebecca Savoie was born in Minneapolis, Minnesota, the second of four daughters of Phil and Jean Savoie, and was raised in Minnesota, Colorado, and Virginia. She completed her undergraduate degree (BS) in Natural Resources and Environment Science and Soil Science from the College of Agriculture, University of Minnesota, St. Paul, Minnesota in 1995. She worked for Hennepin County Soil and Water Conservation District before serving in the Peace Corps from 1996-1998. It was this experience as a Peace Corps volunteer in Tanzania that introduced her to the field of international agriculture and economic development. She returned to the US for a master's program and in 2001 received a MA in international environment policy from the Middlebury Institute of International Studies at Monterey, Monterey, California. Subsequently she has lived in Liberia, Tanzania, Liberia, and Egypt and has done short terms consulting in many Africa countries, and in Asia with partners ranging from sole proprietorships in rural communities to multinational firms.

She has recently started working with cooperatives in Latin America. For over a decade Rebecca has managed public-private partnerships and believes in the business orientation to international development and in 2012 she received her MBA from the Carlson School of Management at the University of Minnesota.

Rebecca is the Director of Cooperative Development at NCBA CLUSA where she supports cooperative development projects, leads thought leadership in collective action for international development, and drives knowledge management for the organization's cooperative and producer organization community of practice. She and her daughter currently live in Columbia, Missouri.