Smallholder Livelihoods and the Marketing of Milk: A case study of dairying in the Mvomero district of Tanzania

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Abstract

Smallholder dairying is undergoing a transition from subsistence to commercial farming in Tanzania. There are ongoing efforts to promote commercial dairying in Tanzania because it is regarded as a potential pathway for reducing poverty among smallholder farmers. The Tanzania Government and other development agencies have been implementing and supporting several programs, projects, and initiatives to enhance dairying-derived households to integrate into formal dairy markets. Promotion of commercial dairying regards income as the key option for enhancing the livelihoods of the smallholders, and hence poverty alleviation. Such notions are aligned with much of what has been reported in research focusing on commercial dairying, where market participation is regarded as the best option for improving smallholders and eventually, their livelihoods. Limited research has provided on other aspects of smallholders' livelihoods, beyond income, which may be crucial in promoting commercial dairying. By employing a livelihoods approach through pathways concept, this study aims to explore how smallholders coordinate during milk market participation and why. Through such, this study brings more emphasis on the need to incorporate other aspects beyond income, which reflect on smallholders' actual livelihood circumstances and self-processes that also contribute to their livelihood outcomes. Through the livelihood lens, the concept of coordination provided a crucial contribution to the understanding of how smallholders participate in formal and informal milk markets in Tanzania. This way provided a broader understanding of how smallholders get to participate in the dairy markets in the way they do, and eventually paved the way to developing best-bet strategies for poverty alleviation which reflect on their actual settings.

Smallholders coordinated in the formal and informal milk markets at variable levels within and across their four social groups, where patterns were evident in their tribal identity, kinship relations, roles of men and women, and dynamics of household milk consumption. Differences across the smallholders' social groups were evident in the aspect the nature of dairying was attached to their institutions of identity and marriage, where the Maasai emerged to have stronger links than the Mbulu and Sukuma tribal groups. Similarities across such tribal-affiliated groups emerged in their women's identity around milk. The smallholders belonging to Maasai and Mbulu coordinated by strongly deriving on their tribal networks in accessing milk markets. The four social groups also varied in the ways their family members' networks were important in the access to labor, milk markets, and use of the income obtained from selling

milk, whereas the Maasai had significant levels of involvement of their family members' networks as compared to others. The similarities in milk consumption across the four groups emerged as evident in their common tendency to retain a portion of milk for household nutrition. However, there were increasing trends of portioning more milk to go for commercial exchanges rather than retaining household nutrition among some Maasai smallholders. The roles of men and women remained significantly linked to the traditional than non-traditional arrangements across the smallholders' groups, but trends are shifting because of the growing demand in the formal markets and increasing recognition of the contribution of milk to household income.

The study highlights that the smallholders' coordination during milk market participation is produced through diverse patterns that are associated with gender, the extent of dependence on cattle and milk for their livelihoods, and adherence to their cultural institutions and norms. The increase in cash transactions around milk is an important market factor while the impact of social and cultural capital remains significant as non-market factors, in influencing smallholders' coordination. The transition towards commercial dairying such as market formalization is significant in challenging, transforming, and undermining the smallholders' existing sociocultural institutions and norms associated with coordination during smallholders' participation in formal and informal milk markets.

Based on the key findings, this study contends for a thorough consideration of the complexity and diversity of smallholders when designing and implementing strategies for poverty alleviation in Tanzanian rural areas. The study acknowledges the significant complementarity of social, human, and financial capital through milk, which is essential in the strategic planning and implementation of the rural development policies. In addition, the study emphasizes the realization of the values that agricultural products carry beyond monetary, and how such may implicate in strategizing poverty reduction. Lastly, the study argues that culture is among the key factors to be considered in promoting commercialization. The theoretical usefulness of employing the coordination concept in the livelihood analysis, for providing an in-depth understanding of smallholders' market participation and enlightening the importance of understanding social agency in influencing livelihood actions is highlighted. Therefore, more research is required to explore different contexts of culture and their implication in milk market participation or commercialization, their implication in facilitating access to various

opportunities for vulnerable groups; and understanding the dynamics of men and women in engaging with a mix of milk markets, and their perceptions.

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Contents

List of Tables:

List of Figures:

CHAPTER 1. INTRODUCTION

1.1 Introduction

The Government of Tanzania and both domestic and international development partners have increased focus on dairying in Tanzania since the year 2005. Dairying has emerged as an important sub-sector for development and poverty alleviation in the country, and a relevant pathway for improved livelihoods of vulnerable groups. Women are among the vulnerable groups in Tanzania who have become interested in dairying. Dairying is dominantly practised by smallholder farmers who mostly live in rural areas. Several initiatives have been put in place by the government and development agencies, to improve dairying to improve livelihoods and contribute to rural economic growth in Tanzania. This study explored smallholders' engagement in formal and informal milk markets in the Morogoro region, which is among the areas where there is ongoing policy initiatives aimed at increasing the commercialization of dairying for the benefit of smallholder farmers. However, to date, there is limited understanding of how and why smallholders engage in the way they do in commercial dairying which is limiting the potential of enhancing government and development agencies initiatives that target smallholder dairying. This study aims to provide a rich description of smallholders' engagement in dairying that can inform dairy initiatives to impact positively on poverty reduction and rural development efforts in Tanzania.

The researcher's professional background is in livestock research and development and was based in Tanzania. The researcher worked as a research assistant in a dairy project, implemented by the International Center for Tropical Agriculture (CIAT) and funded by the Irish Aid. The project was implemented in Tanzania and India, in partnership with public research institutions in the respective countries. In Tanzania, the project was implemented in the regions of Morogoro (Mvomero and Kilosa districts) and Tanga (Lushoto and Handeni districts). The project promoted dairy development through value chain improvement among smallholders. The researcher coordinated all the field activities and mostly worked with dairying smallholders in facilitating training on improved dairying, field trails, establishment of innovation platforms, linking them to dairy processors, and monitoring other activities. The researcher's experience in working with dairying smallholders through such a dairy project motivated his interest in pursuing this study in the area.

This study began in 2016, and fieldwork and data collection were completed in October 2017, in Tanzania. The study was conducted through a qualitative case study as a research design. The research was designed as a single case and limited to one site. However, what emerged in the initial stages of the fieldwork was the significance of sociocultural dimensions on coordination and therefore participants were drawn from across four social groups involved in farming dairy cows and marketing milk. The four social groups involved are the Maasai, Mbulu, Sukuma tribal groups, and Prison workers. Three of the mentioned social groups were named based on the tribes they belong to, while the other (Prison workers) were of a mix of different tribes but were all employed in the prison. The data were collected through semi-structured interviews with these four groups of smallholder dairy farmers and key informants. This study employed a livelihood approach, conceptualized by the theories of livelihood pathways. Data collection involved gathering of the smallholders' dairying practices covering their activities associated with milk production and marketing, including snapshots of their historical background in the practices. The interviews captured smallholders' dairying (milk production and marketing) livelihood circumstances and activities, and their engagement in existing and emerging milk markets in the framework of their social and cultural relationships.

This PhD comprises seven chapters. This first chapter introduces the research and presents a summary of the research context in Tanzania. The second chapter reviews literature relevant to this study by covering the critical theories and concepts related to the livelihood approach. The third chapter describes the research design, by covering the research strategy, and methods of data collection and analysis. The fourth chapter presents descriptions of the case study. The fifth chapter presents the research findings, and the next chapter discusses the findings of this study. The last chapter presents the conclusions and recommendations from this study and outlines relevant research gaps that may be useful for further studies.

1.2 The Research Context

Dairying in Tanzania

Dairy farming is one of the industries identified as having the potential for growth in Tanzania and on these grounds has become a matter of considerable policy interest. In this section, I outline the current dairying context in Tanzania. First, I introduce the historical underpinnings associated with dairying in Tanzania. Second, I highlight dairying within the national agricultural context, highlighting the central role of smallholder farming. I then give an

overview of recent initiatives, which emphasize the importance of dairy to improve the well-being of smallholders. Following this, I outline an important feature of the current dairy context, the distinction between formal and informal markets.

Understanding the grounds of transformation in dairying goes back to the early 20th century before Tanzania's independence. At this time, livestock keeping was dominated by nomadic herders who belonged to existing ethnic groups, and the practice of transhumance was their common norm (Ndagala, 1990). Tanzania hosted and continues to host about one hundred and twenty (120) ethnic groups, each with their language of communication, but use Swahili as their national and official language (Abdulaziz, 2017). Such nomadic herders, referred to as pastoralists and agropastoralists, were highly disregarded by colonial authorities, and seen as backward and a threat to environmental protection, and their livestock keeping was associated with underutilization of the livestock value (Green, 2017; Hillbom, 2011). The Zebu cattle was a common breed kept by such herders, and was considered their important source of food (meat and milk), manure, and a social symbol due to their various functions (Allegretti, 2018; Green, 2017; Hillbom, 2011; Hodgson, 1999). Livestock animals were considered important for maintaining social relations amongst the herders' communities (Markakis, 2004; Ndagala, 1990). Some of the functions that cattle were socially associated with included gender and labor relations, and ownership and marital status (Hodgson, 1999; Homewood, Trench, & Kristjanson, 2009). Cattle and livestock keeping, as well as their products (e.g., milk), were entirely intended for the survival of their families or local communities, rather than economic expansion, as indicated by other studies conducted amongst some prominent livestock-keeping ethnic groups such as the Maasai (Allegretti, 2018; Århem, 1989; Galaty, 1982; Homewood et al., 2009), the Sukuma (Izumi, 2017; Welch, 1974), and Nyamwezi and Iraqw (Mayala, Katundu, & Msuya, 2017). In such cases, dairying amongst most of the people was framed in the ways the functions of cattle and milk functions were culturally defined.

Among the key interventions during the colonial era were the attempts to re-allocate herders from the communal grazing lands (Hillbom, 2011); the establishment and dissolution of the territorial boundaries of different ethnic groups in Tanzania (Allegretti, 2018), and the introduction of exotic cattle breeds by some large colonial settlers (Green, 2017). However, in the post-colonial era (post-independence), the realization of pastoralism as a way of life that could be integrated with other resources' use (e.g., land), and efforts to encourage sedentarization in livestock keeping, emerged (Green, 2017; Ndagala, 1990; Sendalo & es

Salaam, 2009). Since then, transformations in dairying have proliferated, in the prescriptions of health (nutritional) and economic (financial value) benefits of milk, plus the environmental benefits through keeping less but productive exotic cattle breeds. Such transformation has significantly marginalized pastoralism and promoted sedentary livestock keeping (Green, 2017), and eventually became the key agenda for the national and agricultural development strategies and policies (Lyatuu et al., 2022; Mbwambo, Nigussie, & Stapleton, 2019).

The ongoing transformation in dairying is the outcome of a series of structural changes that have occurred since the post-colonial era. One of the examples is the strategic land reforms, which have significant implications in marginalizing the traditional (mostly pastoralism and agropastoralism) and attracting modern livestock-keeping practices (Mattee & Shem, 2006). It is further indicated that such land reforms have resulted in a scarcity of grazing lands for the nomadic herders and led to their migration to other regions of Tanzania such as Mbeya, Iringa, Morogoro, Rukwa, and around the coast (Mattee & Shem, 2006). Other structural changes were reported during Ujamaa villagization, and market liberalization and privatisation policies (Green, 2017; Sendalo & es Salaam, 2009). Ujamaa villagization was implemented as a policy in Tanzania between 1967 and 1975 with a focus on resettlement and production, through which villages were to become schemes in which people lived and worked communally (Wakota, 2018). Since the 1980s to date, the promotion of dairy transformation in the realms of modern livestock keeping and market --orientation has been sustained in the Tanzanian policy agenda.

Dairy was identified by the Tanzanian Ministry of Livestock Development (MLD), through its Livestock Policy 2006, as a potential growth industry that offers income and nutritional opportunities for poor households (MLD, 2006). Dairying makes up approximately 30% of the livestock sector, a sector that accounts for 4.4% of the national economy (Mbwambo et al., 2019; S Michael et al., 2018). The dairy industry is overwhelmingly dominated by traditional systems, with only 3% of all farms being fully commercial systems (MLFD, 2015). As the Government's livestock report indicates, traditional systems are defined as involving milk produced and mostly consumed at home, usually with herds of indigenous cattle kept for multipurpose objectives. Commercial systems, on the other hand, involve improved (crossbred and pure) herds primarily kept for producing milk (Njombe, Msanga, Mbwambo, & Makembe, 2011). Similar descriptions of the two systems are given in a report on Tanzanian dairying by the Dutch Ministry of Economic Affairs (Nell, Schiere, & Bol, 2014). According to

Government documents, smallholder dairying contributed 70% of the total milk produced in the country from 2005 (MLD, 2006), until recently (Lyatuu et al., 2022; Mbwambo et al., 2019). The smallholders in Tanzania constitute about 80% of the farming population (Lyatuu et al., 2022). These smallholders are largely found in rural areas, where 84% of all poor households in Tanzania live (Mushi & Kundi, 2016).

Growing dairying is an area of interest for policy and development actors as it presents opportunities to serve the large population of smallholders. The policy and development actors in Tanzania dairy are diverse, with many different types of organizations such as the Government, civil associations, non-governmental organizations, the private sector, and international development agencies. The Government actors include the Ministry of Livestock and Fisheries Development (MLFD), the Ministry of Investment, Industries and Trade, and the regional and local Government authorities. The Government has associated bodies responsible for dairy and dairy product regulation and standards, such as the Tanzania Dairy Board, Tanzania Food and Drugs Agency, and the Tanzania Bureau of Standards (MLD, 2006; MLFD, 2010). Relevant civil associations include the Tanzania Milk Processors Association (TAMPA) and the Tanzania Milk Producers Association (TAMPRODA). The non-governmental and international agencies that implement dairy development projects include the International Livestock Research Institute, Heifer International, Techno Serve, and the World Agroforestry Center (Bingi & Tondel, 2015)[1]. International development funding agencies also working in this area included the Royal Danish Embassy, Irish Aid, the Bill and Melinda Gates Foundation, the International Fund for Agricultural Development, and the United Nations Food and Agriculture Organization (MLFD, 2015). These various actors have supported numerous initiatives in the dairy and livestock sector in Tanzania.

The country's livestock policy, formulated in 2006 by the Ministry of Livestock Development, aims "to utilize available resources for commercialization and market-oriented dairying to raise the income of dairy stakeholders and improve their standard of living" (MLD, 2006, p. 12). To

[1] The International Livestock Research Institute and World Agroforestry Center are part of CGIAR, a global research partnership between 15 centers and working with many partner organizations for a food-secure future. TechnoServe and Heifer International are global non-profit organizations based in the USA that aim to help people lift themselves out of poverty.

achieve this goal, the policy intends to improve the genetic potential of the national dairy herd, strengthen technical support services, promote the use of appropriate technologies, promote investments in production, processing, and marketing, and lastly promote dairy organizations and strengthen the Tanzania Dairy Board. To implement the policy, the Tanzanian Government has launched several supporting initiatives. At the time the research fieldwork was undertaken several established initiatives were being implemented by the Government of Tanzania, to address dairy industry growth, among other livestock sectors in the country. Such initiatives include the Tanzania Livestock Sector Transformation Plan (TLSTP 2022/23-2026/27), Tanzania Livestock Master Plan (TLMP 2017/18- 2021/22), and Tanzania Livestock Modernization Initiative (TLMI 2015). Such initiatives build on the Livestock Policy 2006 and the Livestock Sector Development Strategy which was developed in 2010. The Livestock Sector Development Strategy was launched in 2010, with key strategic areas of intervention identified as the improvement of financial services and incentives for private sector participation in the production, processing, and marketing of livestock and livestock products (MLFD, 2010). This was followed by the Livestock Sector Development Program launched in 2011, which aims "to increase milk production for meeting the demand of national and international markets, for better income of farmers and livelihood improvement" (MLDF, 2011, p. 13). This program promoted the production and availability of quality dairy animals using AI and embryo transfer, as well as strengthening the capacity of traditional livestock milk producers through improved technical support. A third initiative, the Tanzania Livestock Modernization Initiative, was started in 2015, with its central aim being "to improve the livelihoods of traditional and smallholder livestock farmers and the contribution of the sector to the national economy" (MLFD, 2015, p. 9). In terms of dairying this initiative outlines four priority action plans, the first and key one is "accelerating market operation systems in dairy value chains" (p. 21). As the above outline of recent policies shows, the Government's efforts to develop dairying typically highlight a target of improving smallholders' well-being. The Tanzania Livestock Master Plan (Mbwambo et al., 2019) emphasized the following key interventions; encouragement of private sector investment in milk processing plants and dairy farms; availability of more and better feed seed, forage production and marketing, and health services in all areas, regardless of whether breeds are improved; and provision of more effective extension services to support production, processing and marketing of quality milk".

Similar efforts were pursued by several projects run by internationally based development agencies in Tanzania. Since 2010, about 5 large dairy projects have been implemented in

Tanzania, with the target of improving income of the dairy-derived households through improved productivity, market access, and training. The projects include; Tanzania Inclusive Processor-Producer Partnerships in Dairy Project (TI3P 2022-2025) funded by the Gates Foundation and implemented by Heifer International, Tanzania Agricultural Development Bank, and Land O' Lakes Venture 37; MoreMilk Phase II (2019-2021) and African Dairy Genetics Gain (ADGG I & II) all implemented by International Livestock Research Institute and Tanzania Livestock Research Institute (TALIRI); and East Africa Dairy Development II program (2014-2018), funded by the Gates Foundation and implemented by Heifer Project International, TechnoServe, the International Livestock Research Institute, and the World Agroforestry Center; and "More-Milk by and for the poor in Tanzania" (2012-2016), funded by Irish Aid and implemented by the International Livestock Research Institute.

Despite the number of initiatives and activities completed and underway, the progress of Tanzania's dairy industry remains limited. Several reports from the Tanzania Government and other associated development organizations have commented on the slow progress relative to the country's growing population and economy (Katjiuongua & Nelgen, 2014; Kurwijila, Omore, & Grace, 2012; Lyatuu et al., 2022; Mbwambo et al., 2019; Weaver, Mwasi, & Weaver, 2015). In addition, the industry remains predominantly dominated by the informal dairy markets, rather than the formal (Dizyee, Baker, & Omore, 2019; Katjiuongua & Nelgen, 2014; Lyatuu et al., 2022; Mbwambo et al., 2019; S Michael et al., 2018). The situation reported by the International Livestock Research Institute in 2014 remains prominent:

> Of the 70% of milk produced in the traditional dairy sector, 90% is consumed at home, and 10% is sold in the informal market (8%) and formal market (2%). Furthermore, of the 30% of milk produced in the commercial dairy herd, 30% is consumed at home, and 70% is sold in the informal market (60%) and in the formal market (10%) (Katjiuongua & Nelgen, 2014, p. 39).

Although the distinction between what are called formal and informal markets runs throughout numerous policy documents and initiatives, often it is not clearly defined. Nevertheless, the nature of this distinction can be seen in the policy and development initiatives.

The distinction between these two market forms is strongly associated with the channels through which milk and other dairy products move. It refers to the different sorts of actors involved in the process and their roles, imposed regulations, and s licensing. It also includes

the form in which milk and other dairy products are marketed, whether as fresh or processed. How the two markets are differentiated varies across policy documents (Mbwambo et al., 2019; S Michael et al., 2018; MLD, 2006; MLDF, 2011; MLFD, 2015) and development scholars (Blackmore, Alonso, & Grace, 2015; Katjiuongua & Nelgen, 2014; Lyatuu et al., 2022). For example, in the policy, the livestock modernization report mentions the channels that are most used to market milk, namely neighbors, small-scale traders, and collective bulking centers, and associates their use with the small amount of processed milk that reaches consumers (MLFD, 2015). On the other hand, other development agencies (e.g., The International Livestock Research Institute) associates the formal dairy markets with the existence of large and small-scale processors, where milk is sold in processed (pasteurized and packaged) form for consumption, while the informal markets involve fluid milk sold directly to other farmers, neighbors, and traders (Katjiuongua & Nelgen, 2014). Furthermore, the European Center for Development Policy report similarly emphasizes the role of processors in formal markets, while informal markets refer to channels that include milk hubs, milk kiosks, schools, and restaurants, though they may extend their supply of raw milk to large scale processors on occasion (Bingi & Tondel, 2015).

The promotion of formal markets by the Tanzania Government is obvious, as the policy and development initiatives explicitly support commercialization by encouraging increased milk productivity for sale, value chain development, certification, and training. The recent Government report on the livestock master plan emphasizes investment in formal dairy markets and intensified dairy production through improved breeding (Mbwambo et al., 2019; S Michael et al., 2018). The livestock modernization emphasizes the use of quality breeds for increased milk productivity, the enforcement of quality standards, the growth of dairy cooperatives and associations, and the promoting of business linkages more widely (MLFD, 2015, p. 21). The implemented dairy development projects also promoted similar measures both in Tanzania (Omore, 2012) and in East Africa (Bingi & Tondel, 2015).

The above-mentioned policy and development initiatives seek to promote formal markets, but it should be noted that there are also some which points to the value of informal practices. The report on dairy in East Africa by the European Center for Development Policy comments that "informal channels provide undeniable benefits to farmers and traders by allowing them to secure their livelihoods and to low-income consumers by supplying them with affordable milk" (Bingi & Tondel, 2015, p. 21). Also, official reports from the Tanzanian Government and

International Livestock Research Institute highlight that generally higher prices delivered by informal dairy markets remain in favor of diverting milk sales away from formal channels (Katjiuongua & Nelgen, 2014; Njombe et al., 2011). There are divergent views as to the value of formal and informal markets. Moreover, it is also recognized that the informal and formal markets are not completely distinct from each other; the two are interwoven and not easily differentiated on the ground. The European Center for Development Policy report emphasized the interlinked nature of dairy's formal and informal markets in East Africa, commenting that, "these two sectors in the sector are not isolated. … In fact, they are linked through the commercial transaction and institutional relations, and the boundaries are in some cases blurred" (Bingi & Tondel, 2015, p. 7).

This PhD study acknowledges the primary aim of Tanzanian policy and development initiatives to improve smallholder livelihoods by promoting dairying to increase incomes received through markets. The above review of the current context shows the situation is complex. Development policy distinguishes between formal and informal markets and favors the former over the latter. At the same time, however, it is acknowledged that the two systems are interwoven and that farmers seem to switch easily between the two. To understand how Tanzanian smallholders, participate in milk marketing, we need to understand how they actively seek to improve their livelihoods. Smallholders constitute most of the poor households in Tanzania, living below the World Bank income standard of 2.15 US dollars per day (WorldBank, 2023). They are not, however, a homogenous group (Appels, 2015; Smucker et al., 2015). To make their living, smallholders participate in multiple activities, one of them often being dairying. As is also the case in other developing countries, their engagement in multiple activities implies that smallholders construct diverse livelihood strategies to regulate their well-being (Zezza & Gurkan, 2009). Moreover, these livelihood strategies seek to maintain and develop multiple resources rather than just formal income (Neilson & Shonk, 2014; Orr, Donovan, & Stoian, 2013).

Aim of the study and research question

The Tanzania government is ongoingly undertaking policy and development initiatives in the dairying, to alleviate the poverty that surrounds and limits the smallholders. The initiatives emphasize that livelihood improvement through increased income and secured food are key strategies for alleviating poverty among these smallholders who are engaged in dairying. In this case, the government's promotion of commercialization in dairy has pointed out key

strategic priorities namely, formalization of markets and increased milk productivity for markets, value chain development, and certification and training. The existing situation shows the informal dairy markets are dominant and a high proportion of un-marketed milk in Tanzania. In addition, studies mentioned in the previous paragraph indicate that informal dairy markets are beneficial to smallholders' livelihoods, and that, the two dairy markets (formal and informal) are operating together in ways that are not yet understood.

The tendency of the Government to focus on increased income as a key livelihood achievement for alleviating poverty risks being out of touch with the prospects of smallholders. There are several reasons for this. First, the policies tend to have a static conception of smallholders as a uniform group. Second, policies often fail to realize that formal income is just part of smallholders' multiple resources, and it may not be the main livelihood achievement. Third, with multiple resources that smallholders rely on, dairying may only be part of many strategies and activities they undergo to improve their living standards.

This doctoral study explores, analyzes, and describes the actual circumstances of smallholders, and how dairying fits within their diverse livelihood options, believing that such a study will be a useful complement to policy and development initiatives. Furthermore, this understanding will help to reveal how smallholders' self-driven motives, to make their living, fits in with their participation in a mix of formal and informal milk markets.

To achieve the above, this study investigates how smallholders coordinate to participate in the milk market and why. And focused on the two specific objectives. First, to explore and describe the patterns of coordination around milk existing in the smallholder dairying in the Mvomero district, Tanzania. Second, to explore and describe how the coordination process around milk is produced by smallholders when they participate in a mix of formal and informal dairy market channels in Mvomero district, Tanzania.

CHAPTER 2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 Introduction

This chapter provides a review of the livelihood approach and other concepts adopted for this study. As indicated in the previous chapter the expansion of dairying by smallholders is being strongly promoted by the Tanzanian government to alleviate rural poverty. The Tanzania livestock policy is committed "to utilize available resources for commercialization and market-oriented dairying to raise the income of dairy stakeholders and improve their living standards" (MLD, 2006, p. 12). Increased production for dairy markets is seen as a key means to raise smallholders' income levels and hence to improve their household-level livelihoods. Many ongoing policies and initiatives in developing countries also situate dairying expansion as a means to improve smallholder livelihoods. In general terms, this focus on enhancing how smallholders make their living has been called 'the livelihoods approach', and this approach has been informed not only by development policy but also by a now substantial tradition of scholarly work that has been underway since the 1980s. In this chapter, I review the livelihoods approach and locate my thesis as a contribution to its ongoing development.

The focus of this thesis is on the interaction between smallholder livelihoods and markets for milk. The emphasis on expanding smallholder production for markets (commercialization) rather than on improving subsistence production for home consumption is a common global policy for agriculture, reflected in both the work of national governments and international development organizations. In Tanzania, as elsewhere, increased smallholder dairying for markets is often promoted as a means to improve their livelihoods through increased income (Edgar Edwin Twine, 2016). However, some scholars have challenged this emphasis on commercialization (Chinigò, 2015; N. D. Poole, Chitundu, & Msoni, 2013; Wiggins et al., 2014). These scholars argue that prioritising commercialization assumes that poor smallholders are a uniform group with common needs (income), while smallholders are a heterogeneous group made up of people with often very different needs. Such arguments highlight the need to understand how smallholders themselves make their living and why. Emphasizing the importance of understanding smallholder activities and perspectives is a characteristic concern of the livelihoods approach.

The livelihoods approach first took shape in the 1980s and as the following review shows it has developed over time in a significant number of ways. There are several general reviews of

the livelihoods approach (de Haan, 2012; Kaag et al., 2003; Morse & McNamara, 2013; Scoones, 2009). As these reviews show, the livelihoods approach is characterized by (i) a focus on the poor as active people whose perspectives need to be acknowledged and whose capabilities need to be enhanced, and (ii) the claim that smallholder livelihoods draw upon diverse resources that extend beyond income levels alone. While standing on these features, the livelihood approach, through the concept of sustainable livelihoods, later developed to become a dominant policy framework, the Sustainable Livelihood Framework (SLF). The reviews also show that the framework lost its prominence in the mainstream development thinking and practice during the late 2000s. However, some work has continued in developing this approach. Thus, the focus of this study derives from these current developments in the livelihood approach.

The following literature review first focuses on the initial development of the approach. The second part focuses on the rise of the Sustainable Livelihoods Framework (SLF) and its criticisms. The third part focuses on the current progress of the livelihoods approach through the concept of livelihood pathways. The last part focuses on the identified research gap, which is the problem of coordination in the concept of livelihood pathways.

2.2 The Initial Development of the Livelihoods Approach

Discussions about the need for a new approach focused on the livelihoods of poor people began to gather force in development policy and thinking during the 1980s. The livelihood discussions began to develop as the alternative to structural approaches, which dominated during the 1970s and 1980s. These structural approaches emphasized that the poor's actions are shaped by society, and specifically by the economic system. Also, these structural approaches concentrated on macro-level processes (Scoones, 2009). The structural approaches were seen by many to be unsuccessful in alleviating poverty (de Haan & Zoomers, 2005). In response, the livelihood approach emphasized micro-level processes to understand the actual situations of the poor particularly by prioritizing the poor's active role in constructing their living conditions (de Haan, 2000; Kaag et al., 2003).

The views developed by Robert Chambers and Amartya Sen are acknowledged as influential works that contributed to the development of the livelihoods approach (de Haan, 2012, p. 348; Kaag et al., 2003; Scoones, 2009). Chambers (1983, 1987) argued for the need to analyze poverty by understanding poor people's living conditions and daily needs. Incorporating bottom-up and participatory approaches was advocated by Chambers (1994) as a way to gain

an understanding of people's situations, including daily needs and opportunities. Poverty had previously been viewed as linked to income and employment. Chambers (1995) extended this notion to include other dimensions such as well-being. In that sense, Chambers argued that the actual situations of the poor are local, diverse, and dynamic. On the other hand, Sen (1981) views insist that analyzing poverty should also consider what a person is capable of, which includes what he or she is able to do and to be, and what are his or her perceived choices. The livelihoods approach emerged under the above views which highlight the agency, capabilities, and holistic scope of the living conditions of poor people. These ideas fed into the development of what became known as the 'sustainable livelihoods' approach in the 1990s.

The idea of sustainable livelihoods is recognized by Solesbury (2003) as being developed from the earlier efforts produced by the World Commission on Environment and Development (WCED) through the Food 2020 and Bruntland reports in 1987. The concept of sustainable livelihood was officially recorded in 1992 after the Rio World Summit, as an agenda for the 21st century [2]. The work of Chambers and Conway (1992) is also acknowledged by Toner (2003) for emphasizing the longer-term livelihood concerns for the poor while prioritizing the natural resource base and also considering the vulnerabilities (stresses and shocks). Chambers and Conway (1992) produced a definition of what constitutes a sustainable livelihood:

> A livelihood comprises the capabilities, assets (stores, resources, claims, and, access), and activities required for a means of living: a livelihood is sustainable and can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term (p. 6).

The definition outlines themes that are the focus of the livelihoods approach. First, the notion of capabilities emphasizes that the rural poor should be able to manage stress and shocks and be able to access and make use of the existing livelihood opportunities. Second, the notion of assets includes both tangible (stores and resources) and non-tangible (access and claims) assets.

[2] The agenda stated that " everyone must have the opportunity to earn a sustainable livelihood" (Morse & McNamara, 2013)

These asset categories represent the holistic and complex nature of the poor's living conditions at a household level. Third, the activities are linked to the livelihood strategies, encompassing creation and arrangements made by the poor to sustain their living. Livelihood strategies indicate the active role of poor people, which is an indication of their agency. According to de Haan (2000, p. 10), human agency is the internal influencer of change in livelihood strategies, expressed by the individual's motives, intentions, and interests. Agency is referred to as the ability of a person to shape his or her living conditions. The effort in policy spheres to develop a relevant analytical framework that can capture the livelihood circumstances of the poor and provide entry points for policy interventions resulted in the development of the Sustainable Livelihoods Approach (SLA), an approach that was formalized and widely applied as a policy framework in the late 1990s.

2.3 The Rise of the Sustainable Livelihood Framework (SLF) and the Criticisms

The Sustainable Livelihood Approach (SLA) became the core development framework during the late 1990s into the 2000s. The chronology of its development since the late 1980s is detailed by Solesbury (2003) and is also acknowledged by other scholars (de Haan & Zoomers, 2005; Kaag et al., 2003; Morse & McNamara, 2013; Mushongah & Scoones, 2012; Scoones, 2009). The official promotion of SLA in policy circles began after the launch of a 1997 White Paper by the new British administration through its Department for International Development (DFID), and also marked the administration's commitment to poverty and livelihoods (Solesbury, 2003). In the process of developing the Sustainable Livelihood Framework (known as DFID-SL), views about access and institutions, natural resources, and diversification of livelihood options, were incorporated (de Haan & Zoomers, 2005; Scoones, 2009).

Figure 1 presents the DFID-SL framework for analyzing the poor's strengths and weaknesses through asset endowments, and their livelihood options. In the DFID-SL, livelihood assets appear in the form of a pentagon, representing the different ways in which people are affected by the five types, namely human capital (H), natural capital (N), financial capital (F), physical capital (P) and social capital (S). The framing of 'capitals' in the 'asset pentagon' places the livelihoods focus "firmly in the territory of economic analysis", as argued by Scoones (2009, p. 177). Some scholars also acknowledge the dominance and influence of economists in mainstream development thinking at that time (Morse & McNamara, 2013; Scoones, 2009), which affected the representation and application of this framework. Some contributions like the work of Bebbington (1999) which emphasized a broader view of assets, for instrumental,

hermeneutic, and emancipatory actions[3], were not given space for discussions at that time. Also, most livelihood analyzes were based on economic elements of livelihoods and concentrated on quantitative data (Scoones, 2009).

In the DFID-SL, vulnerability context represents the external influences, which are managed depending on the poor's varied levels of assets and capabilities. The transforming structures and processes involve the social, cultural, and political processes that show how and why the poor's varied asset levels are linked to their strategies and outcomes. The livelihood outcomes depend on the owned and accessed assets, strategies applied, and the facilitating institutions and supporting processes of transformation (Morse & McNamara, 2013). The outcomes cover a range of aspects beyond income. From these views, the issue of market participation by poor smallholders is also linked to their asset arrangements (Bohle, 2011). Thus, smallholders are likely to participate in markets when there are high-price attractions (Barrett, 2008) when they have access to market information and good infrastructure (Alene et al., 2008; Omiti, Otieno, Nyanamba, & McCullough, 2009), and when they have urgent and occasional needs like school fees or food shortage, as well as labor labor needs (Omamo, 1998; Zezza & Gurkan, 2009).

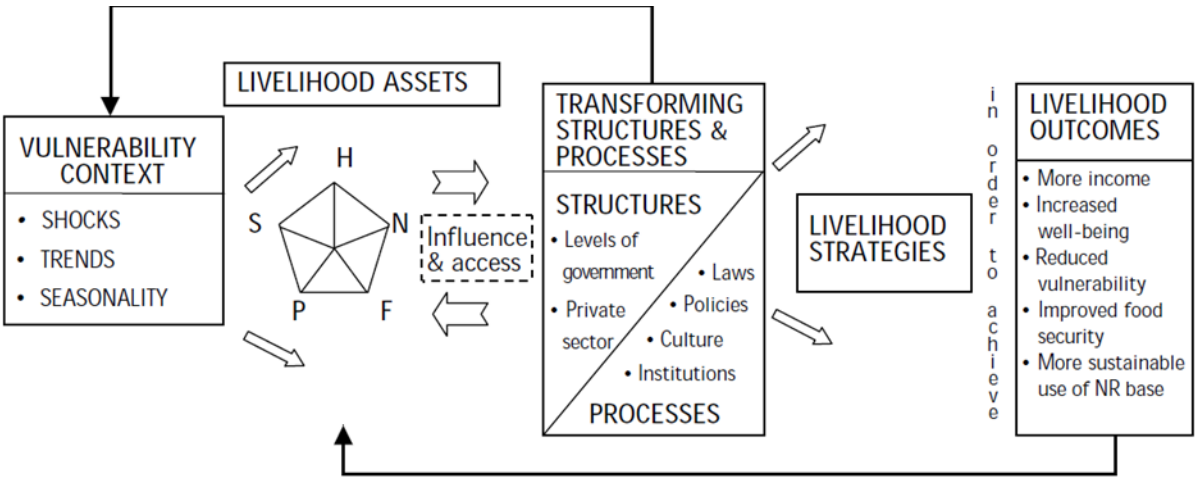

Figure 1. The Sustainable Livelihood Framework (DFID, 2001).

[3] People's assets are not merely means through which they make a living: they also give meaning to the person's world… assets are not simply resources that people use in building livelihoods: they are assets that give them the capability to be and to act… they are also the basis of agents' power to act and to reproduce, challenge or change the rules that govern the control, use and transformation of resources (Bebbington, 1999, p. 2022).

Several criticisms have been made about the DFID-SL. The DFID-SL presents a reductionist view of the livelihood approach by putting more emphasis on material and economic aspects. Several scholars have also challenged this view (de Haan, 2012; Sakdapolrak, 2014; Scoones, 2009; Toner, 2003). The notion of assets and capital is biased toward material gain, despite non-material aspects also being valuable elements of the poor's livelihoods. Other scholars emphasize the need for increased attention on the non-material aspects of power relations, history, and institutional processes (Bebbington, 1999; Dijk, 2011; Sakdapolrak, 2014). The framework's (DFID-SL) emphasis that the poor depend on assets reduces their goals to the intention of economic maximization. The critics portray this as *homo economicus*, which downplays the human role of perception and ideas, hopes and fears, norms, and values (Kaag et al., 2003). A study on smallholder commercialization in Zambia by N. D. Poole et al. (2013) shows how attitudinal characteristics influence farmers' decisions to participate in commercialization in Zambia. In addition to the above criticisms, the DFID-SL's emphasis downplays the view that livelihoods are also a product of unintentional or unconscious decisions, influenced by power and history (de Haan & Zoomers, 2005; Scoones & Wolmer, 2002). A relevant example where the aspect of power relations is ignored is derived from the DFID-SL's notion of a household. Referring to a household as a single unit of decision-making (Ellis, 1998), or as a co-resident group of persons (Schmink, 1984), ignores intra-household dynamics and conflicts, as also argued by de Haan and Zoomers (2005), Prowse (2010) and (Scoones, 2009). The incorporation of gender studies has popularized the notion of power in the livelihoods approach, particularly, concerning intra-household dynamics (Agarwal, 1997; Anderson, Reynolds, & Gugerty, 2017; Lenjiso, Smits, & Ruben, 2016; Smith, 2015). The final criticism is about the concentrated focus of the DFID-SL on micro-level rather than macro-level details. Several scholars support the argument that the livelihood analysis fails to engage on-going global processes, such as the shifts in markets and politics (de Haan, 2012; Moser, Norton, Conway, Ferguson, & Vizard, 2001; Scoones, 2009).

The prominence of the DFID-SL or the SLA in development thinking and practice ended during the late 2000s. Despite the sense of dissatisfaction expressed among scholars, efforts have been ongoing to develop and improve the livelihood approach. The next section presents the concept developed to address the challenges outlined in this section.

2.4 The Livelihood Approach in Progress: Livelihoods as Pathways

The livelihood pathways concept is a developed concept that some theorists argue is a reasonable attempt to respond to the previously mentioned criticisms of the livelihoods approach. The concept of pathways provides a broader expression of the notion of strategies that is emphasized in the DFID-SL. In the DFID-SL, the asset endowments subject poor people to exercise rational and strategic decisions to attain their pre-set livelihoods' ends. The assumption in the DFID-SL situates all livelihood activities (economic or social) of the poor as motivated towards utility maximization (Sakdapolrak, 2014). Contrary to such views, the concept of pathways emphasizes that the livelihood actions of poor people emerge from a wider range of options that encompass both rational and strategic thinking and incorporate unintentional conduct (de Haan & Zoomers, 2005). In addition, this wider range of livelihood options is built on both immediate and longer-term dimensions and is also partly influenced by social arrangements such as power relations, culture, history, politics, and the like.

The concept of livelihood pathways emerged from several studies that focused on understanding how people make their livings in unstable climatic conditions (de Bruijn & van Dijk, 2003, 2004; de Bruijn, van Dijk, & Foeken, 2001). Pathways were described as strategies arising out of the decisions actors, households, and groups of people take to deal with risk in unstable environments (de Bruijn & van Dijk, 2003, p. 346). The authors (de Haan & Zoomers, 2005; Scoones & Wolmer, 2002) argue that past experiences, social diversity, power relations, and institutional processes are important influences on livelihood decisions. Based on these authors' arguments, pathways are now understood as the observed patterns or regularities of livelihood among a specific group (de Haan & Zoomers, 2005, p. 42). De Haan and Zoomers further elaborate:

> Patterns in livelihood arise because persons of the same social class, gender, or caste have similar dispositions and face similar life opportunities, expectations of others, etc., resulting in a livelihood typical of their group (de Haan & Zoomers, 2005, p. 41).

The focus of analysis in the livelihood pathways concept is group-level processes. The group level is represented by actors, households, or a cluster of the actors or households.

The concept of livelihood pathways has been applied in recent empirical studies to understand the dynamics of livelihoods among poor people (Belton, Asseldonk, & Bush, 2016; Pritchard, Vicol, & Jones, 2017; Quy, Lam, & Tech, 2016; Rungmanee, 2014; M. Vicol, 2014a, 2014b).

Some studies show how livelihood pathways reflect the existing social inequalities and the dynamics of access to and distribution of resources among smallholders, like in India (Pritchard et al., 2017; M. Vicol, 2014a, 2014b), Ghana (Nyantakyi-Frimpong & Bezner Kerr, 2016) and in Bangladesh (Belton et al., 2016). Furthermore, the livelihood pathways concept is applied also to understand the dynamics of livelihoods among the smallholders because of the influence of the broader processes of markets. An example from a study in Bangladesh shows how national or domestic market demand of *pangasius* crops has influenced the livelihoods of different classes of crop farmers (Belton et al., 2016). Another study shows the global influence on the local livelihoods of smallholders through potato contract farming and peasants in India (M. Vicol, 2014a, 2014b). The livelihood pathways concept is therefore relevant for understanding how smallholders, in the broader influences of past experiences and structures of inequalities (power relations and institutions), attempt to participate in markets. The following section considers the issue of coordination as an important component for understanding livelihood pathways. Thus, the section discusses the details of coordination and identifies a gap for further development of this concept.

2.5 The Problem of Coordination in the Analysis of Livelihood Pathways

Early work in the livelihood approach focused on agency, which was seen as based on assets and strategic actions. Subsequently, the concept of livelihood pathways has been developed to extend this initial focus on agency by adding the aspects of power, history, and institutions as structural factors that mediate agency. The analysis of livelihood pathways is undertaken at the group level. This group-level analysis is useful as it acknowledges that "some of the opportunities and constraints on decision-makers are precisely located in the presence or absence of assets and the preferences of other actors and the limitations imposed by these actors and higher-level institutions" (de Bruijn & Van Dijk, 2005, p. 12).

A useful definition of livelihood pathways is given by de Haan and Zoomers (2005, p. 43):

> Pathways are defined as patterns of livelihood activities, which arise from a coordination process among actors. The coordination emerges from individual strategic behavior embedded both in a historical repertoire and in social differentiation, including power relations and institutional processes, both of which pre-structure subsequent decision-making.

As this definition shows, coordination is central to the formation of livelihood pathways; these pathways "arise from a coordination process among actors". It is this coordination of "individual strategic behavior" that results in group-level livelihoods. However, existing work on pathways has tended to analyze this group-level phenomenon by combining observations derived from individuals who are taken to have common livelihood patterns. I argue that there are problems with this sort of analysis.

As indicated by de Haan and Zoomers (2005), group-level analysis of livelihood pathways focuses on shared social identities or variables like social class, gender, and caste. These social variables are assigned to individuals and then aggregated to produce what are taken to be group-level pathways. Scoones (2009, p. 172), for example, says that "analyzes at the individual level can in turn aggregate up to complex livelihood strategies and pathways at the household, village or even district levels". Similarly, Belton et al. (2016, p. 5) argue that the use of aggregation "enables analyzes of livelihoods to be read off cumulatively at wider social scales". Several empirical studies of livelihood pathways have also used this idea of aggregation (Belton et al., 2016; Nyantakyi-Frimpong & Bezner Kerr, 2016; Pritchard et al., 2017; M. Vicol, 2014a, 2014b). Individuals are in various forms of socio-economic stratification, such as differences in land and farm size, education level, and caste status. Individuals who share the same attributes are taken as belonging to the same group and on this basis are seen as following a collective livelihood pathway.

However, there are many important examples of coordination that do not fit with this aggregative approach. Households, for example, are often considered to be the basic unit of livelihood analysis (Chambers (1983)) and many policy interventions are designed with a household focus. However, the household notion acknowledges that multiple co-residing individuals have multiple roles. Studies of gender relations have enriched this idea by investigating intra-household dynamics (Agarwal, 1997; Mattila-Wiro, 1999). Gender relations within households have been shown to involve bargaining, where explicit or implicit negotiations between different household members inform livelihood decisions (Grossbard, 2011). Such bargaining is a coordination process in which multiple individuals negotiate to produce collective decisions that hold for the household as a collective actor. This gender-based negotiation is an example of coordination which is not simply an "aggregating up" of individual-level actions. Such coordination may apply not only within households but also across them, producing groups of households who can act collectively. Moreover,

coordination processes may operate independently of households, for example when women or men from different households form ties with each other and act together.

As the above examples suggest, aggregation provides only a limited understanding of the coordination that results in collective pathways. The use of aggregation based on individual attributes does not capture the power of social relationships (e.g., gender) in the lives of poor people. It tends to neglect the operation of social agency (such as negotiation) which may lead to group formation. In general, the use of aggregation misrepresents the individual agency of groups because collective actors are "read off cumulatively" from the individual-level agency. As Nyantakyi-Frimpong and Bezner Kerr (2016) argue, to analyze social groups as aggregates of individuals in similar situations results in a static and homogenous picture of these groups.

Based on the above arguments, I propose to investigate livelihood pathways as a form of coordination that produces collective actors. By studying this group formation, I focus on understanding the activities and consequences of coordination for smallholders in terms of their livelihoods, experiences, and market participation. Existing literature provides limited information on the coordination processes that create group-level responses, and this is the gap in understanding that my doctoral research addresses. My proposed research investigates how dairying smallholders' interactions and activities bring about group-level livelihood pathways and seeks to determine the significance of such coordination for their participation in milk marketing.

2.6 Understanding social capital in livelihoods analysis.

Social capital is a relevant factor in the understanding of smallholders' livelihoods circumstances, particularly in their attempts to participate in markets, like selling milk in this study. In this study, the influence of social capital in shaping the smallholders' livelihoods when attempting to engage in dairying and selling milk emerged as evident. Emphasis on the importance of social capital in this study aligns with theoretical critiques presented above in association with understanding poor people's livelihoods. In this study, the concept of social capital is brought in to enrich the understanding of the downplayed non-material aspects of smallholder livelihoods, as many of the scholars (de Haan, 2012; Sakdapolrak, 2014; Scoones, 2009) argued against the SLF. In addition, it extends the understanding of the basis of existing social relations among smallholders involved in selling milk.

Social capital is defined as "networks, norms and trust that facilitate co-operation and co-ordination" (Lyon, 2000, p. 664). In addition, social capital recognizes that both formal and informal channels play out as grounds for interpersonal communication and exchanges (Putnam, 1993). In the social capital concept, networks refer to the social connections among individuals (Putnam, 2000), applied as long or short-term products of their strategies, which are maintained and reproduced by their social institutions and exchanges (Bourdieu, 1990). Trust has a mix of definitions which all associate it with a typical behavior grounded on individual's actions and orientations and is conceptualized as a property of the individual, social relationships, or social systems (Sutherland et al., 2013). Trust simply reflects or signifies the extent of co-dependence and mutual reciprocity among people (Lyon, 2000; Woolcock & Narayan, 2000). Norms are customary rules of behavior that coordinate our interactions with others and may conveniently be regarded as products of forged collective understandings existing in a closely connected society (Thenuwara Acharige, 2022).

Two dimensions of social capital exist: structural and cognitive (Cofré-Bravo, Klerkx, & Engler, 2019; van Rijn, Bulte, & Adekunle, 2012). These authors indicate that structural and cognitive social capitals shape social interactions and enable solidarity and unity among society members, as per their associated frameworks. Structural capital is further categorized into three forms, namely bonding, bridging, and linking (Cofré-Bravo et al., 2019). The bonding social capital (for families, close friends, peers, and kin), is expressed by ties that exist between members of a network who share socio-demographic characteristics, which are mainly grounded in aspects of trust and reciprocity (Bhandari, 2013). The bridging social capital (for women or youth groups, etc.) is mainly described as weaker ties among the networks, formalized relationships with less reliance on trust but focused on collaboration and coordination for a particular purpose e.g., membership of women groups (Bhandari, 2013; Cofré-Bravo et al., 2019). Lastly, the linking social capital which is "norms of respect and networks of trusting relationships between people who are interacting across explicit, formal, or institutionalised power or authority gradients in society" (Cofré-Bravo et al., 2019, p. 55).

2.7 Defining smallholders in complex circumstances

The livelihood circumstances of poor people in poor countries are diverse and complex. For Africa, its diversity across aspects of geography, agroecology, socio-economics, and demography validate the argument for relying on context-specificity rather than generalizations when defining smallholder farmers (Kamara, Conteh, Rhodes, & Cooke, 2019). Some of the

most common criteria have been used by scholars for describing smallholder farmers include their agricultural and household holdings (e.g. land and labor source (Jaworski, 2014; Kamara et al., 2019; Kweka & Ouma, 2019; Thenuwara Acharige, 2022). These studies illustrate that smallholder farmers can be described based on different dimensions and are referred to in different ways, as 'small-scale farmers' (Islam, Islam, Islam, & Billah, 2019; Lyatuu et al., 2022; Ulrich et al., 2012), 'small farmers' (Kaur & Kaur, 2016; Monge, Hartwich, & Halgin, 2008; Obi, 2011), as well as 'resource-poor' and 'family farms' (Thenuwara Acharige, 2022).

In the current era, smallholder farmers are increasingly distanced from the uniformity rhetoric popularized by economic theorists and development practitioners. Scholars who have focused on researching livelihood aspects associated with gender, income and assets (Bryceson, 2019; Galiè, Farnworth, Njiru, & Alonso, 2021; Katie Tavenner, Crane, & Values, 2018; K Tavenner et al., 2019) point to the broader inequalities among smallholders, while others implicate access to and use of resources to the variation (Kamara et al., 2019) and their purpose for farming (Thenuwara Acharige, 2022).

Some scholars argue that in defining or describing smallholder farmers, a variety of aspects are important to be considered to reflect their diversity and hence the complexity of their livelihood circumstances (N. D. Poole et al., 2013; Thenuwara Acharige, 2022). Such aspects include the smallholder farmers' livelihood strategies, asset-holding, aspirations, livelihood pathways and trajectories, income, level of subsistence and market participation. Further, scholars also advocate the diversity of smallholder farmers, where they have explored such farmers' context-specific livelihood-circumstances. In dairying, studies were conducted to understand smallholders' market participation in Tanzania (Hillbom, 2011; Kadigi, 2013; Leonard, Gabagambi, Batamuzi, Karimuribo, & Wambura, 2016); in Kenya (Berem, Obare, & Bett, 2015; Kurgat, Lagat, & Gathungu, 2023), and other countries such as India (Daftary, 2019; Kaur & Kaur, 2016). In addition, further studies explored the associated aspects such as gender dynamics in dairying in Tanzania (Allegretti, 2018; Galiè et al., 2021; Howland, Brockington, & Noe, 2020) and Kenya (Basu, Galiè, & Baltenweck, 2019; Katie Tavenner, Crane, et al., 2018), as well as other developing countries. A variety of typologies distinguish smallholder farmers based on two aspects of analysis, namely the unit (e.g. household) and research purpose (e.g. to identify class relations) (Thenuwara Acharige, 2022).

This study emphasizes, in a similar way to scholars mentioned above, the need to consider the aspects of diversity, complexity, and particularity of the circumstances when seeking to

understand smallholder farmers' livelihoods. The understanding of such aspects helps to enrich knowledge gaps and thereby inform scholarly and policy platforms seeking to address poverty through rural development interventions. This study will go some way to addressing this gap by providing a specific description of how and why smallholder farmers' in Tanzania coordinate in selling milk while in their state of diverse and complex livelihood circumstances.

2.8 Livelihood transitions and the smallholders' market participation.

Livelihoods are dynamic and people's strategies change in response to different transitional circumstances (Z. Liu & L. Liu, 2016). Livelihood transition processes have gained interest among scholars, including those who research smallholders' social relationships during their agricultural practices (Douangphachanh, Idrus, Phommavong, & Jaquet, 2021; Kuchimanchi, De Boer, Ripoll-Bosch, & Oosting, 2021a; Z. Liu & L. Liu, 2016). Livelihood transitions are associated with essential changes in livelihood strategies that occur in an area over a specified time and usually correspond to the transition of a socio-economic development phase (Bhandari, 2013; Z. Liu & L. Liu, 2016; Mushongah & Scoones, 2012). The transition of a socio-economic development phase may be associated with aspects such as structural changes in the economy, demography, and urbanization. In developing countries, smallholders' livelihoods are mostly dependent on agriculture, and rural-based, transitions have emerged with varied levels of outcomes and impacts. Such levels are associated with the understanding of smallholders' dynamics concerningconcerning their livelihood assets; livelihood vulnerability and risks; livelihood strategies; influence of policies and institutions on their livelihoods; and the interrelationships between their livelihoods and the environment (Z. Liu & L. Liu, 2016).

In developing countries, livelihood transitions in the smallholders' rural settings are widely associated with policy reforms that promote market-oriented agriculture. Market-oriented agriculture is linked to the increased commoditization of agricultural inputs and products, which have improved food access in the global market. Livelihood transitions among smallholders are largely popularized in economic dimensions by many scholars (Belton et al., 2016; Bhandari, 2013; Bijman, Muradian, & Schuurman, 2016; Kuchimanchi, De Boer, Ripoll-Bosch, & Oosting, 2021b; Z. Liu & L. J. J. o. R. S. Liu, 2016; Snyder et al., 2020b; Soares, 2018) In such cases, smallholders', who mainly practice subsistence farming, are assumed to be on a path to more specialized and intensified farming through the use of advanced technologies (including animal husbandry) to meet market demands. The impact is therefore regarded as leading to increased pressures on resources including physical e.g. land use, and

social e.g. the restructuring of social relationships and marginalization of communities, among many others (Kuchimanchi et al., 2021b).

Further, market-oriented forces are portrayed as key in the smallholders' transitions in developing countries, because the presumed desire for economic gain amongst them will overcome their social and cultural aspirations and identities, hence deeming them flexible to adapt to such changing circumstances (Kuchimanchi et al., 2021b). Such economic-centered notions are widely popularized by many scholars, including those researching dairying (Pingali, Aiyar, Abraham, & Rahman, 2019; Snyder et al., 2020b; Katie Tavenner, Saxena, & Crane, 2018; K Tavenner et al., 2019; Edgar E. Twine, Rao, Baltenweck, & Omore, 2019). That is why the understanding of smallholders' livelihood circumstances and dynamics is largely centered on the economic context or influences. Some studies have looked at social relationships in the context of markets such as gender dynamics (Basu et al., 2019; Howland et al., 2020; Sachs, 2019; Katie Tavenner, Crane, et al., 2018; Katie Tavenner, Saxena, et al., 2018; K Tavenner et al., 2019), and cultural dynamics (Allegretti, 2017; Little, Debsu, & Tiki, 2014; Nkedianye et al., 2019; Soares, 2018). Such studies found the significant influence of social relationships in shaping the way smallholders participate in the markets and remain strongly attached to their cultural foundations.

The positioning of market orientation as a key influence for smallholders' livelihood transition remains contested by other scholars and development policy advocates (Gwiriri, Bennett, Mapiye, & Burbi, 2021). Rather what is advocated is that smallholder livelihood transitions occur under the influence of wider contextual dimensions beyond only economic, and include technological, social, cultural, and environmental aspects. In such perspectives, scholars who have focused on dairying argue that smallholders' transition should be viewed as a multifaceted phenomenon, and emphasize the role of social relationships in also influencing social and cultural transitions (Sachs, 2019; Snyder et al., 2020b; K Tavenner et al., 2019; M. Vicol, Pritchard, & Htay, 2018). This study aligns with such arguments on the perspectives of understanding livelihood transition among smallholder farmers and will extend this work by exploring holistically smallholders' coordination around selling milk.

Smallholders' market participation in the context of livelihood transitions is detailed in the next section. The focus is directed to how smallholders are engaged in dairying and their participation in milk markets.

2.9 Empirical findings on dairying smallholders and their market participation

The role of milk among smallholders

Milk is a valuable animal product for some smallholders in developing countries. Different studies report that milk serves different livelihood functions among smallholders in developing countries, such as consumption, social, exchange, protection, and production. In the consumption function, different studies report that milk serves as an important source of food rich in protein for smallholders' dietary needs (D'Haene, Desiere, D'Haese, Verbeke, & Schoors, 2019). In addition, cow's milk is reported as being consumed by children below 5 years of age, as reported in examples from countries like Tanzania (Galiè et al., 2019; Kidoido & Korir, 2015) and Ethiopia (Amenu, Wieland, Szonyi, & Grace, 2019). Apart from being consumed by children, milk consumed by smallholders has cultural value in some countries. In Ethiopia, smallholders refer to the cultural values of milk from cattle, including the nutritional value of raw milk and the cosmetic value of butter (Amenu et al., 2019). Smallholders in Tanzania consume milk for its nutritional and medicinal roles which are culturally embedded (Gitungwa, 2018).

The social functions of milk are associated with milk being regarded as an asset for strengthening social relations and social networks among some smallholders. Some studies have reported that smallholders use milk during their traditional gatherings such as ceremonies and funerals, with examples from Tanzania (Allegretti, 2018; Århem, 1989; Loos & Zeller, 2014) and Kenya (Weiler, Udo, Viets, Crane, & De Boer, 2014). Also, other studies report some smallholders gift milk to other people (relatives, neighbors, or villagers) as a way of strengthening ties or mutual support, as reported in one of the studies from India (Rana & Oza, 2019).

The exchange functions of milk among the smallholders are related to income-earning or in-kind purposes. In income-earning, studies show that some smallholders exchange milk to gain cash, as an additional (Berem et al., 2015; Leonard et al., 2016), a regular (Berem et al., 2015; Hillbom, 2011; Kaur & Kaur, 2016), or a seasonal activity (McDermott, Staal, Freeman, Herrero, & Van de Steeg, 2010). On the other hand, smallholders also exchange milk for other commodities such as agricultural inputs or other foods, as reported among dairy smallholders in Kenya and Tanzania (Kilelu, Klerkx, & Leeuwis, 2016; Rao, Mtimet, Twine, Baltenweck, & Omore, 2019)

Some smallholders regard milk as an important asset that also serves the function of protection. Studies have shown that some smallholders diversify their livelihood activities as a risk-spreading strategy through milk, to secure multiple household needs (food, income etc.) as reported in examples from Tanzania (Lie①a, Rich, Kurwijila, & Jervell, 2012; Edgar E. Twine et al., 2019) and Ethiopia (Bereda, Kurtu, & Yilma, 2014; D'Haene et al., 2019). Milk is also reported as important for some smallholders in terms of buffering their income from shocks, an example from Tanzania (Hillbom, 2012) shows how smallholders sell some of their milk to occasional buyers to get cash for urgent needs.

In general, the various functions of milk for smallholders reflect the multiple dimensions of their livelihood circumstances. The above-reviewed studies show that there is a strong influence or association between the cultural norms and traditions around milk among smallholders. This reflects what has been stated and researched by other scholars (Yanuartati, 2021). This research seeks to describe the multiple dimensions of smallholder dairy farmers' livelihoods and how this links to how smallholders participate in dairy farming and milk marketing.

Smallholders' market participation

Market participation is widely emphasized in scholarly and policy arenas, as a suitable intervention for fast-tracking agricultural development and for reducing poverty among smallholders in developing countries. The concept of market participation in the context of smallholders is mostly popularized in studies conducted in Africa (Barrett, 2008; Elisabeth Fischer & Qaim, 2012; Otekunrin, Momoh, & Ayinde, 2019), as well as in other developing countries (Barrett et al., 2012; N. Poole, 2017). Much of the scholarly and policy perspectives of market participation focus on high-value agricultural markets and income as the primary options for reducing smallholders' poverty (Barrett, 2008; Barrett et al., 2012; Elisabeth Fischer & Qaim, 2012). The high-value agricultural markets are featured with formally-institutionalized quality standards, written contracts, and standardized prices (Barrett, 2008; Oduol et al., 2017). Despite the above focus, other scholars refer to smallholders' market participation as any market-related activity that promotes cash or in-kind exchanges, or commercialization (Otekunrin et al., 2019). Some applied studies emphasize integrating smallholders into high-value commodity markets, such as dairying in East Africa dairying (Basu et al., 2019; Lenjiso et al., 2016) and India (Birthal et al., 2016; Daftary, 2019), and cropping (Dawson, Martin, & Sikor, 2016; Quisumbing et al., 2015).

These studies tend to assume that smallholders' market participation in high-value agricultural markets will enhance smallholder incomes. However, further review of the literature on smallholders' market participation highlights that smallholders are still predominantly embedded in their local and social practices, and this is evident in several ways.

First, there is evidence that smallholders' reciprocal motives such as mutual support, sharing, and gifting are still significant in influencing their market participation. This is shown in studies where smallholders rely on reciprocal relationships when they collectively(groups or networks) (Bijman, 2016; E. Fischer & Qaim, 2014; Mutonyi, 2019) or individually participate in the agricultural markets (Allegretti, 2017; Lamb et al., 2016; Mehta, Semali, & Maretzki, 2011; C. Mwema & Crewett, 2019a). Second, smallholders still induce their cultural-based systems when participating in markets. Examples from studies show the association between smallholders' cultural institutions of elderhood and warriorhood in cattle marketing among the pastoralists in Tanzania (Allegretti, 2017; Mayala et al., 2017), Kenya, and Ethiopia (Little et al., 2014), and also, around institution of authority in ownership of resources in east Africa (K Tavenner et al., 2019; Yurco, 2018) and India (Islam et al., 2019). Third, studies show that smallholders' existence in diversified livelihoods is also associated with their market participation. Examples of this are reported in studies where smallholders (peasants) resist contract farming to embrace livelihood diversity, in Africa (Bernstein, 2014; Manley & Van Leynseele, 2019; Martiniello, 2015), some Asian countries (Daftary, 2019; Sunam & McCarthy, 2016; M. R. Vicol, 2016) and in Latin America (Steckley & Weis, 2016).

Furthermore, evidence from academic and policy studies shows that structures that support smallholders' participation in high-value agricultural markets are still emerging. Such evidence is supported by the ongoing policy transformations promoting market-based structures. First, there is evidence of the ongoing promotion of agricultural intensification in several African countries, in the areas of livestock production (McDermott et al., 2010; Oosting, Udo, & Viets, 2014), land use (Mutoko, Hein, & Bartholomeus, 2014a; Robinson, Ericksen, Chesterman, & Worden, 2015) and cropping systems (Dawson et al., 2016; K. Fischer, 2016; Rudel et al., 2016). Second, there is evidence of ongoing policy transformation around most of the developing countries to promote agricultural intensification (McDermott et al., 2010; Mdoe, Mlay, & Kadigi, 2015; Vanlauwe et al., 2014), promoting formalization of traditional markets (Birthal et al., 2016; Blackmore et al., 2015), as well as the expansion of rural-urban connections (Berem et al., 2015; Migose, Bebe, de Boer, & Oosting, 2018; Ørtenblad, Birch-

Thomsen, & Msese, 2019). So far, advocacy for market participation focuses on overcoming the challenges that are constraining smallholders in the poverty trap. Such challenges are mainly associated with higher transaction costs in aspects of production and market efficiency (Abebe, Bijman, & Royer, 2016; Pingali et al., 2019). Therefore, as collective action (Karatepe & Scherrer, 2019; Mutonyi, 2019) and contract farming (Cieslik, 2015; Nguyen, Dzator, & Nadolny, 2015; M. Vicol, Fold, Pritchard, & Neilson, 2018) are increasingly acknowledged in smallholder market participation, their outcomes on the livelihoods of such people, especially at individual levels remain in the scope of discussion and research in the development policy and among scholars (Mutonyi, 2019).

2.10 Conclusion

The section highlights the theoretical rationale of the livelihoods approach, as a relevant concept for this research. The concept of livelihood pathways builds the basis of understanding how and why the dairying smallholders coordinate to participate in milk markets in Tanzania. The livelihoods approach enables the researcher to understand the dairying smallholders' different circumstances and actual day-to-day experiences which reflect on their social interactions, actions, and decisions around dairying and their market engagement. The livelihood pathways further provide a linkage to the approach, by complementing the research towards understanding the dynamics of smallholders' dairying and their market engagement, by drawing on their socially constructed foundations in pursuing their living.

The livelihood pathways concept builds on the criticisms associated with limited acknowledgment of the smallholders' social agency and intra-household (within and across) which are key in teasing out the understanding of their livelihood actions around dairying and market engagement. In the views of the current transitions towards commercialization of dairying, the focus of the scholar and development policy literature has mostly acknowledged economic approaches, drawing on material-based research. Despite ongoing efforts to contribute to the understanding of social-related perspectives around commercial dairying, there is still more call for further research.

Therefore, this study employs the livelihood approach and pathways concept to add the contribution of socially constructed perspectives to the empirical literature around dairying, in the era of commercialization. In such a case, the chapter highlights the important roles of norms, institutions, and social context in which milk is produced and marketed or sold, and how their associated dynamics are key in understanding the ways such smallholders

individually or collectively participate in markets. This study further highlights how both social and economic perspectives of dairy commercialization are intertwined in the complex livelihood settings among the dairying smallholders.

CHAPTER 3. RESEARCH STRATEGY

3.1 Introduction

This study answers the research question "How do smallholders coordinate to participate in the milk market, and why? In answering this question, the research aims to provide insights to inform dairy development initiatives in Tanzania that seek to engage smallholders in formal dairy markets. This chapter covers the research approach, and study design, and describes the research methods used in this study. The chapter comprises ten sections. Following the introduction, Section 4.2 describes the author's research approach; Section 4.3 describes the case study research design; Section 4.4 describes the process of selecting the case; Section 4.5 describes the data collection process; and Section 4.6 explains the process for data analysis. Section 4.7 explains the measures taken to ensure the quality of the research. The description of ethical issues associated with the study is presented in Section 4.9 and the final Section 4.10 provides a summary of the chapter.

3.2 Positionality of the Researcher

In interpretive research such as this, the position of a researcher is recognized as influencing the outcome of a research project because of the researcher's beliefs, experiences, and values shaping observations and interpretations (Thomas, 2013). The researcher was born and raised in Tanzania, in the central region. The researcher's academic background is in Animal Science, where I mostly specialized in Animal Production. Professionally, the researcher worked as a Livestock research officer at Tanzania Livestock Research Institute (TALIRI). After completing his second degree, he worked at the International Center for Tropical Agriculture (CIAT) on a dairy project and was based in the Morogoro region where this study was undertaken. The project focused on smallholders: the project was 'Milk in India and Tanzania' (MilkIT). The researcher worked as a Research Assistant, where he served as contact personnel for the project's activities in Tanzania. The dairy project he was involved in, was implemented in Morogoro (which was the country office) and Tanga regions, and in the two districts of the respective regions. One of the districts involved was Mvomero, where this study took place. Through the project, the researcher engaged with the government departments in the project areas, as well as some of the dairy smallholders, through field visits, training sessions, and workshops, as part of project implementation. Through working on the project, the researcher learned about the market-oriented approaches for improving dairying in the rural settings where most of the smallholders operate. Furthermore, the researcher learned about the actual

circumstances in which dairying is practiced by smallholders, and what opportunities and challenges they face in pursuing their living. Furthermore, the researcher managed to establish personal relationships with some people who participated in the project, especially the local government extension staff, farmer group leaders, and some smallholders, in the areas of project implementation. The researcher realized the gap in the actual understanding of the smallholders' needs and interests, as pertained to what could be contextualized in the scope of their livelihoods when promoting dairy value chain development. Such became the researcher's area of interest for pursuing his doctoral degree.

The above description stands with arguments from scholars on how positionality can shape the acceptance of the researcher by research actors because of similarities, shared histories, common ground, and mutual acquaintances. These connections are a catalyst for better access to participants and validity of the study findings (M. Vicol, 2014b). This research was facilitated by pre-established relationships between the researcher and the extension officers in the Mvomero district council, who assisted in fast-tracking the research permit from the district council. In addition, linking the researcher with the ward and village extension and executive officers, key informants, and most of the dairying smallholders was made convenient through their coordination. Apart from that, the pre-established relationship with some dairying smallholders, particularly those belonging to Maasai was another important incentive in facilitating this research. Through them, the researcher was able to interview their traditional leader in the study area as a key informant, and to directly reach other Maasai smallholders who were operating in the study area. Furthermore, in some situations where some other Maasai smallholders were unable to communicate fluently in Swahili, the researcher was assisted by a translator who is Maasai by tribe, and who participated in the project. The translation did not affect much of the reliability of the gathered information, as cautioned in qualitative research (Temple & Young, 2004), because it mostly occurred in instances where some (very few) participants (Maasai) could not explain fluently in Swahili and clarification was done by the translator. The researcher used audio-recorded conversations and interviews and wrote notes in a notebook, to ensure clarity of the information. Another factor was the common language of communication, which is the Swahili language. Swahili is Tanzania's national language, used as official first language countrywide and taught from early to secondary school education. Through Swahili, the researcher was positioned in mutual acquaintances with the participants, and used the language for conducting the interviews except in few circumstances with some of the Maasai smallholders. The researcher's familiarity with

the study area (Mvomero district), particularly on production systems, and dairy markets (e.g., milk collection centers and marketplaces) was an additional incentive in reaching some of the dairying smallholders, exploring more and enriching observations of the dairying and contextual circumstances which were useful in the triangulation of gathered data.

3.3 Research Design

Research is undertaken based on 'a set of assumptions that define an intellectual understanding of how the world operates and how knowledge is produced' (O'Leary, 2009, p. 10). This study adopts constructivism. According to Sayer (2000), the emphasis of constructivism is that contexts, realities, and structures are to be considered subjective interpretations of distinct experiences, knowledge, and personal characteristics. ConcerningConcerning the nature of this study, constructivism was adopted because the idea carries the belief that meanings are socially framed and constructed by people, and such meanings can be constructed in different ways by different people in a given circumstance (Crotty, 1998). Furthermore, constructivism accepts that information captured in a specific context is useful for informing understanding more broadly (Way & Tracy, 2012). A constructivist approach was consistent with the researcher's aim to explore the diversity of smallholders' coordination around the selling of milk and what shapes this coordination through the lived experiences and voices of smallholders.

Qualitative case study design

This study applied a qualitative research approach. Qualitative research is a broad term for research methods that describe and explain a person's experiences, behaviors, interactions, and social contexts without the use of statistical procedures or quantification. This design was used because the study's focus was on understanding the social practices and perspectives of smallholders around dairy farming and the marketing of their milk. The study of coordination among smallholders was complex because it drew from smallholders' varied experiences, their daily needs and preferences, and relationships, which are diversely shaped by social structures (power, history, and institutional processes) within their contexts.

This research applied a case study design. According to Baxter and Jack (2008, p. 81), case study research:

Involves the study of a single instance or small number of instances of a phenomenon to explore in-depth nuances of the phenomenon and the contextual influences on and explanations of that phenomenon.

The phenomenon of interest in this research is smallholder coordination related to the marketing of milk. In addition, case studies enable an understanding of how and why, as well as allow an emphasis on contemporary events that have not been designed or framed for the research (R. K. Yin, 2013). This study captured how the milk produced and marketed by smallholders is coordinated, why, and what processes were involved. Several dimensions were explored in this case to gain an in-depth understanding of coordination. The first was to understand patterns of coordination around milk. The second was an in-depth investigation of individual smallholders to understand how the coordination process is produced and why.

Site and case selection

This study was conducted in the ward of Dakawa, located in Mvomero district in Morogoro region, the Eastern zone of Tanzania. The study was conducted around the five villages that constitute Dakawa ward, namely, Wami Dakawa, Wami Sokoine, Wami Luhindoi, Milama, and Kwamhunzi.

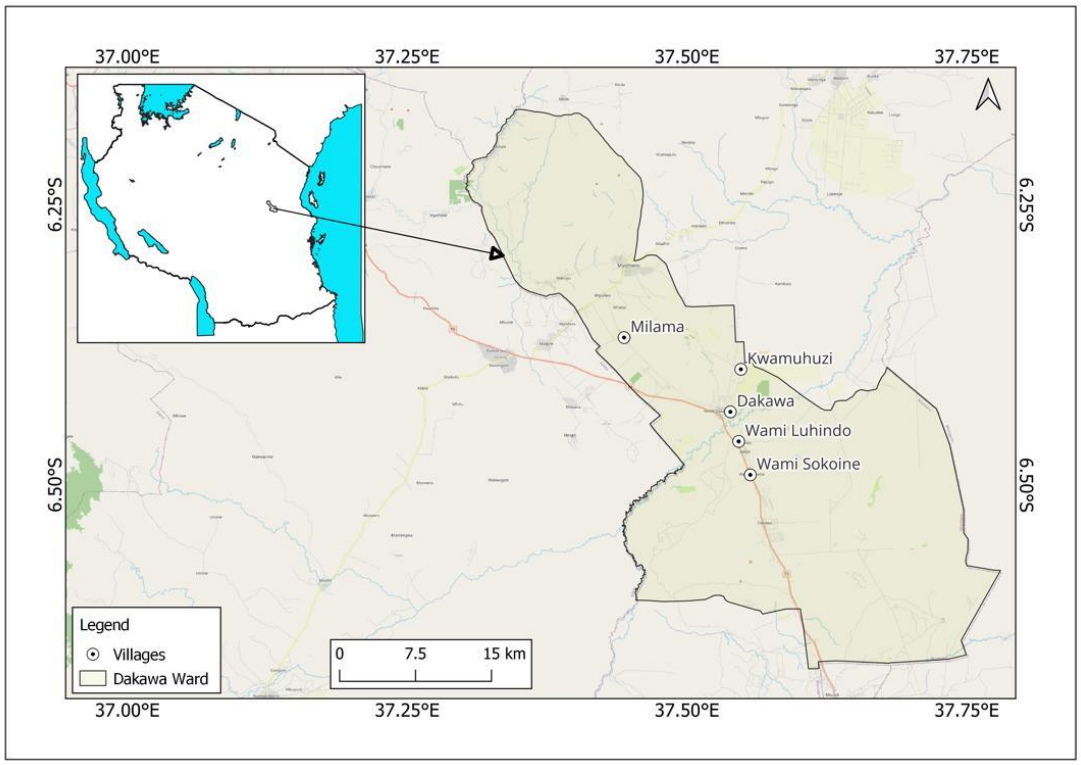

Figure 2. A map showing selected study villages in Dakawa ward, Mvomero district, Tanzania.

The Mvomero district was selected purposively for two reasons. First, the region represents a potential milk-producing area in Tanzania as it is in the Eastern zone. In the region, several dairy programs have been implemented. The projects include MoreMilk in Tanzania (MoreMilkiT), and Milk in India and Tanzania (MilkIT) (Omore, 2012). This district therefore was expected to include smallholders engaged in dairying for sale to markets.

Second, there were practical and pragmatic reasons why this district was selected (Silverman, 2013). The researcher is familiar with and has contacts in the district having been involved in several dairy projects implemented there. This familiarity meant it was easy for the researcher to mobilize participating smallholders, and key informants, and access secondary documents from the Mvomero District's Livestock Department.

The research site was in the Wami Dakawa ward and included four distinct social groups drawn from across all five villages in the ward. The decision to conduct the study across all 5 villages was made after the researcher had begun fieldwork in the district. As highlighted by Miles & Huberman (1994) insights once in the field can inform participant and site selection. The decision was made upon discussion with the District Livestock Officer (DLO) in Mvomero district. The main argument for the decision was to capture the diversity of smallholders and types of coordination, as it was revealed that dairying smallholders were distributed in different social groups and separate villages. Evidence also suggested the nature of the coordination of these social groups differed. In the ward, dairying smallholders were mostly of the tribal groups Maasai, Sukuma, and Mbulu. In addition, other groups lived together in a village in groups comprised of people from a mix of different tribes. This included a group of households in Milama village, and a group centered around the Prison as one or more of the householders worked in the Prison. The Maasai were the most dominant tribe and were present as a group in every village within the ward. Members from the Sukuma and Mbulu tribes were only located in Milama and Wami Luhindo, respectively. The decision to explore all 5 villages was intentionally made to capture the sociocultural diversity across dairying smallholders in the ward and track comprehensively market channels and forms of coordination for milk (formal and informal).

Therefore, this study focuses on four cases of smallholder coordination. The characteristics of the four social groupings studied in this research are outlined in Table 1.

Table 1. Important Characteristics of the Selected Participants in the Case Study

Characteristics	Groups of Case Smallholders/Participants			
	Maasai	Sukuma	Mbulu	Prison residents
Location	Wami Dakawa, Milama, Wami Sokoine and Kwamuhunzi	Milama	Wami Luhindo	Milama
Total number of participants	24	6	5	10
Gender Composition	14 males and 10 females	5 male and 1 female	4 male and 1 female	6 males and 3 females
Ethnicity	Homogenous	Homogenous	Homogenous	Heterogeneous (a mix of different tribes)

The characteristics of the villages from which participants were drawn are as follows:

(i) each of the selected villages had more than 500 households or more than 1000 residents,

(ii) at least more than 50 households in each village were smallholders involved in dairying, and

(iii) Smallholders in all villages had access to both formal and informal dairy markets such as individual buyers, milk collection centers and restaurants, local shops, milk vendors, and other local traders.

These characteristics ensured adequate participants engaged in a range of dairy marketing arrangements could be accessed across the diversity of social groupings present in the ward. This sampling strategy contributed significantly to understanding the richness of coordination in the context.

3.4 Data collection methods

Participant Sampling

This study's participants were selected primarily purposively but in some instances through snowball sampling. These sampling methods are commonly applied in the field of qualitative research (Miles & Huberman, 1994). It is further argued Mason (2002) that purposive sampling means selecting groups or categories to study based on their relevance to your research questions, your theoretical position and analytical framework, your analytical practice, and most importantly the argument of explanation that you are developing. Purposive sampling is concerned with constructing a sample that is meaningful theoretically and empirically because it builds in certain characteristics of criteria that help to develop and test your theory or your argument.

Snowball sampling was also employed as initial participants, through their knowledge of their village, were able to identify other participants undertaking dairying who were then able to be invited to participate in the research.

A sampling of the participants was completed during the researcher's field visit in Tanzania. The process undertaken by the researcher is as follows. First, the researcher paid a courtesy visit to the Mvomero district's livestock officer to introduce himself and the research and to seek permission to undertake interviews in the area. Second, the researcher was assigned to the ward livestock officer who helped him to identify nine potential key informants in the ward, who included smallholder leaders, village livestock officers, and representatives (milk traders) from different milk channels (formal and informal) [outlined in Table 2]. The smallholder leaders were selected to provide overview details of dairying and assist in proposing the list of other dairy smallholders. The village livestock officers were selected concerning to provide an overview of villages concerning dairying and other agricultural activities, circumstances of the smallholders in the area and assisting in proposing lists of smallholders and in coordinating the interviews in their villages. The milk channel representatives were those who had experience in and information about milk markets and how they interact with different smallholders during the exchanges of milk.

Table 2. A list of the key informants interviewed and their location.

No.	Key Informant	Location
1	Ward Livestock Officer	Wami Dakawa ward
2	Village Livestock Officer	Wami Dakawa village
3	Tanga Fresh Milk Collection Center Supervisor	Milama village
4	Dar Fresh Milk Collection Center Supervisor	Dakawa village
5	Milk Vendor	Wami Dakawa ward
6	Milk Vendor	Wami Dakawa ward
7	Restaurant Owner	Wami Dakawa ward
8	Maasai Livestock Keepers' representative	Wami Sokoine village
9	Ward Executive Officer	Wami Dakawa ward

Third, the researcher obtained a list of smallholders engaging in dairying in all the villages in the ward. The researcher had a meeting with the ward livestock officer and with each of the village livestock officers separately to discuss the selection of individual smallholders to be interviewed. The criteria on which smallholders were selected are as follows:

I. Dairying smallholders who were active participants and non-participants in any dairy projects implemented in the area.
II. Dairying smallholders who were producing and selling their milk in any of the existing milk markets.
III. Dairying smallholders who at least participated in a producer or milk sellers' group

Most participants were selected based on these criteria. However, as mentioned earlier some participants were identified through snowball sampling by other interviewees. Snowballing was applied because it helped in identifying individuals who appeared to be of interest due to their engagement in dairying, and mostly involved women and potential traditional leaders. A good example of the result of snowball sampling of dairying smallholders was identifying most of the female participants such as the interviewee who represented the widows and some who

were part of the family network of members of the widows group. The total number of interviewed dairying smallholders according to the group and location is presented in Table 3 below.

Table 3. Interviewed smallholders in Dakawa ward according to their identified social groups.

Smallholders' Group	Location (village)				
	Wami Dakawa	Wami Sokoine	Wami Luhindo	Milama	Kwamuhunzi
Maasai	10	3	0	6	5
Sukuma	0	0	0	6	0
Mbulu	0	0	5	0	0
Prison residents	0	0	0	10	0

Data collection

The process of data collection involved the use of a range of methods: namely, key informant interviews; in-depth interviews with dairy farm participants; participant observations to complement the interviews, and sourcing of secondary documents.

The techniques employed for data collection.

Qualitative case study research usually features multiple forms and sources of data (Silverman, 2013; R. K. Yin, 2013). Multiple forms and sources of data can be used to verify descriptive context details including area characteristics and number of smallholders. However, the voices of smallholders captured through interviews have integrity and together form the basis of the case study.

This study employed in-depth semi-structured interviews, secondary documents, and direct observation as the techniques for collecting data. In-depth interviews, according to (Thomas, 2017), involve a semi-structured interview guided by a list of topics, and there are open opportunities to investigate further if necessary. The design of this interview method provides unlimited space for explanations, hence wider room for capturing detailed information from

the participants (Thomas, 2017). Such a technique was relevant to employ as most of the smallholders were diverse in terms of their livelihood circumstances, including their status, histories, and ethnic attachments.

The use of secondary documents was also part of this study, contributing to the descriptive context information of the case and thereby providing a foundation for scrutinizing the case cognisant of its context (Merriam, 1998). The usefulness of this technique lies in the information on dairy-related projects, programs, and strategies incorporated and presented in documents. It was useful for acquiring background information on the study area context in aspects of the local government administration perspectives and structure, key livelihood activities, demographic dynamics, and details of the agricultural development strategies and activities ongoing in the area. Contextual understanding was key in the triangulation of data during the analysis.

The researcher's observations were useful as an additional technique in collecting data that informed and complemented the interview process. Observations noted in a field notebook were taken during this study's data collection process. The researcher employed a non-participant direct observation approach, which was valuable in broadening his understanding of the relationships and interactions (Ciesielska, Boström, & Öhlander, 2018) among the participants and the different surroundings. During the interviews, the researcher's observations were on household manners, for example, the way female and male dairy smallholders approach the interviews, and, on how dairying activities were practiced. In terms of exploring the surroundings, the researcher visited different marketplaces and milk collection centers and observed how milk exchanges occurred, as well as the delivery of milk to the markets, which provided crucial insights into the formal and informal milk market participation. Apart from the above, the observations helped the researcher to tease out new in-depth questions and clarify certain aspects observed during interviews, it also assisted the researcher develop his thinking about the research. The field notes were useful in noting down some key issues which were then raised during the interviews, as well as some keywords or slang which were used as references during data analysis.

Employment of the interview guidelines

The researcher developed interview guidelines to guide the in-depth semi-structured interviews. The interview guidelines were designed keeping in mind the research question and literature reviewed. The employment of such protocols is said to be useful for increasing the

reliability of the case study (R. Yin, 2003). Based on this study, the guidelines were designed for the key informants and the dairying smallholders and are included in the Appendices (See Appendix C). All interviews were digitally recorded for later transcription and analysis.

In-depth interviews

The in-depth interviews involved two categories of study participants, namely, the key informants and smallholders. A total of 54 in-depth interviews were conducted: nine key informants and 45 dairying smallholders. The in-depth interviews were similar for the two categories concerning the procedures, but there were differences in the content for each category. The interviews with key informants were undertaken in the first phase of the research to capture an understanding of the dairying in the area, as well as to help in the identification of the smallholders for the study. The interviews with smallholders followed a few weeks later. The information gained from the key informants informed a review of the interview guidelines. In all the interviews conducted, both contextual information was gathered, and open and probing questions were used, as advocated for qualitative research interviews (Wengraf, 2001).

The in-depth interviews with participants were undertaken using the procedure outlined here. Before starting the interviews, the researcher first paid a courtesy visit to Mvomero district council to meet with the head of the Livestock Department. The project was introduced, and a request-for-permission letter was presented to gain permission to undertake the study in the district. The researcher was introduced through an official letter from the District Livestock Department to the specific study area (Ward's) livestock or extension officer who was the main contact person. The researcher started to undertake field data collection after being granted permission and having been introduced to the livestock officer. The interview process started with the researcher being connected by the ward livestock officer to the identified key informants. In most instances, the researcher and the ward livestock officer contacted the identified key informant a day or a few hours before the interview, through a phone call or physically, and set an appointment. Each of the key informants was given a brief introduction to the study and the researcher, and consent was sought and gained to be interviewed and recorded before starting the interview. The researcher used the information sheet to introduce himself and the project [See Appendix A].

Different approaches were employed during the interviews with dairying smallholders as the procedures were not as smooth as for the key informants. These differences were in the way of communication and seeking consent. As mentioned earlier, the three groups of dairying

smallholders belong to different tribes, namely Maasai, Sukuma, and Mbulu; while the other group is comprised of the employees of the public office, the prison. In most cases, the livestock officer from the ward used the village livestock officers to pass information to the intended participants for interviews or used the smallholder local leaders to do the same. Such procedures worked for most of the smallholders, and for the Sukuma, they had all gathered in one place together, and each of them took the researcher to their place. The same occurred for the Mbulu and some of the Maasai, who mostly helped the researcher to go to the next smallholder's household. However, the above procedures did not work out for some of the Maasai dairying smallholders, therefore the researcher and the livestock officer had to visit some places such as the livestock market, milk collection or selling points, or other centers where most of the Maasai preferred to stay or gather and ask for participants.

The researcher experienced some difficulties in gathering data from some female Maasai interviewees in the following instances. First, the household hierarchical protocols are such that the male head of the household had to give permission to the females to be interviews. Thus, women, being aware of such protocols, did not agree to a research interview until either their husbands, or any responsible elder men or a known male who had that mandate as head, gave permission. In such instances, the researcher sought assistance by doing one or other of the following. First, by going to the interviewee's household with a male Maasai, who lives in the area and is well known and respected and let him explain to the interviewee about the details of the study (based on the information sheet) until the consent is reached and signed. Second, by letting the female interviewee make phone contact with her husband, or any male (parent, elder brother or son) to explain and seek permission, and some could use their own mobile phone or use the researchers. Following up on such household protocols was convenient, as interviewees gained sufficient confidence to provide information the interviewer sought.

During one instance, the researcher also managed to overcome a challenge encountered with one of the female smallholders belonging to the Maasai group, who was at first, unwilling to participate in the interview. The researcher arrived at the participant's household and found her sitting outside with a group of her other female family members. After a brief introduction between the researcher and his assistant, the female smallholder said that she was unwilling to be interviewed. One of the reasons for that was that she felt uncomfortable having a session with me (us) and kept asking the whereabouts of the researcher. While in the conversation, a researcher received a video phone call (*Whatsapp* video call) from his wife, who was in New

Zealand. As the researcher's wife was aware that he was in the field work, she was interested to greet the smallholder and her group. With Swahili being the national language in Tanzania, the researcher's wife conveniently talked to them and turned out to be a happy conversation. The smallholder and her family members were amazed by the way technology was advanced and how the researcher could be able to see his wife from such a distance. They were also surprised to know that there is a difference in hours (it was a nine (9) hours' time difference) between Tanzania and New Zealand. The conversation between the researcher, his wife and female smallholder turned out to be interesting and took about 10 minutes for the smallholder to change her mind and participate in the interview.

Furthermore, despite Swahili being the official national language in Tanzania, it was a barrier for communication for some of the Maasai smallholders who were not fluent in Swahili. During the interview, it was challenging for some of the participants to clearly grasp from the researcher's questions, and to explain fluently information they wanted to share. During such cases, the researcher sought assistance from an assistant or other family members who could fluently speak and understand Swahili.

Apart from the above, data collection amongst the Prison group participants required another hierarchical procedure, other than consultation with the Mvomero district council. The researcher was required to send a copy of the letter to seek research permission to the Morogoro regional prison department first, get approval, and conduct the study at Dakawa prison (district level). The approval to conduct the interview was given within 14 days, through the Mvomero district council, livestock department which contacted the researcher. The researcher was required to pay a courtesy visit to the head of the Dakawa prison, with an extension officer from Mvomero district council during the start of the interviews and was introduced to the leader of the prison smallholders who helped to identify other smallholders.

Lastly, the researcher thanked the participants after ending each of the interviews. The snapshot of interview questions is presented in Appendices (See appendix C).

The sourcing of secondary documents

The researcher accessed information from the Mvomero district council. The accessed documents were mostly project and annual reports, and government documents related to plans, strategies, and policy. The documents accessed were limited but did assist the researcher in providing relevant contextual information related to the case villages and projects.

3.5 Data analysis

Data analysis in qualitative research involves the systematic organization of the data concerning the topics of interest, followed by learning and interpretation of the concepts and themes, to capture an understanding of the topics of interest (Grbich, 2012). Some established techniques for qualitative data analysis have been developed, but the complexity of the process remains challenging (Grbich, 2012; Miles & Huberman, 1994; Silverman, 2013). Data analysis in this study was done in Some stages, in line with recognized guidelines in qualitative research (e.g. Dey, 2003).

All the interviews were transcribed by the researcher as per the language used in the interviews (Swahili). Transcriptions were completed by the researcher for all the audio-recorded interviews, with the addition of notes made by the researcher at the time of the interview. The transcribed interviews tended to be structured in line with the interview guidelines, despite the use of open-ended questions. The descriptions covered the smallholders' context ranging from milk production and marketing (selling of the milk), and how smallholders' livelihoods circumstances, and processes are framed into such contexts. Once the researcher obtained a thorough understanding of the data, the initial production of codes, the classification process, was begun by manually working through the transcripts.

All transcribed interviews were intensively analyzed to obtain a systematic understanding of the data. The transcribed interviews were then summarized with descriptions. This was done to capture the overall picture of the data, associate the information with the study aim, and highlight the important insights from the data. Through this analysis into summaries, a general understanding (preliminary) of what was said during the interviews and their relation to the research objectives was obtained.

In the next stage, the researcher employed data coding of the transcripts. This was done electronically by application of the NVivo software (QSRInternational, 2018). This stage involved data entry where all the transcripts were copied (as raw data) into the NVivo database. NVivo software is a computer-assisted qualitative data analysis program, which enables tasks such as constant comparison analysis, classical content analysis, keyword-in-context, word count, domain analysis, taxonomic analysis, and componential analysis (Bazeley & Jackson, 2013). Thus, data coding was employed as an important stage of content analysis. In this study, several word frequency and text searches were employed to identify significant words, some concepts, and key quotes.

Categorization of keywords and developing concepts was undertaken through the creation of nodes in NVivo. This analysis was done as a follow-up stage after the above, through detailed reading of the individual transcripts, then text search and word frequency to explore the concepts and keywords throughout all the interview transcripts. Through categorization of the nodes, several working themes emerged, such as dairying activities, which included sub-nodes of getting hold of cattle, cattle health, and care, grazing of cattle, cattle feeding, grazing of the cattle, cattle milking, selling of the milk, sourcing extra milk, and use of income from selling milk. The other nodes included the traditions around cattle and milk, gender, family, tribal and commercial relations around milk, and marketplaces for milk.

In addition to using NVivo software during the process, detailed reading by cross-checking across the earlier identified themes and concepts was also manually conducted. Some of the earlier identified themes and concepts were revisited in each of the transcripts. The aim was to capture the depth of the information from the interview, by applying a deductive approach, where examples of themes or concepts were obtained from pieces of statements read from the transcripts as advocated by Dey (2003). Further scrutiny of the transcripts also occurred in this study, where a line-by-line reading of each transcript was done to make sure that all relevant material was identified. This detailed exploration of each transcript is also referred as an inductive approach (Dey, 2003), and Some emerging themes and concepts such as those associated with co-residential relationships between friends, neighbors and co-workers, as well as family relationships (co-sisters or co-wives) during the selling of milk, were identified. All the information from the analysis process was noted and recorded as nodes in the NVivo file.

The stage of connecting themes and concepts followed. This process was employed iteratively with revisions occurring following consultation with the researcher's supervisors, and reflections on the focus of the study, as well as in response to re-readings of the literature. Several reports were produced repeatedly, presenting the connection of themes and concepts from the NVivo database.

The final stage of data analysis involved the preparation of multiple versions of the results chapters including the inclusion of relevant quotes which were translated into English from Swahili language.

3.6 Ethical consideration

This research was approved by the Massey University Human Ethics Committee, and it was assessed as low risk. The following ethical issues that arose in this study include: (1) informed consent and participant rights and (2) confidentiality and anonymity.

In this study, the participants were informed about the research and their required commitment during the study process. The information sheets were provided to each of the concerned participants, and they were given time to read or sometimes assisted with the reading and translation (for participants who were unable to read in Swahili). The participants were individually requested to sign both the consent and information sheet before the beginning of the interview. The information sheet and the consent form are presented in the respective appendices (A and B). The researcher made sure that each participant understood their rights, including asking for clarity on anything unclear, as well as the right not to answer any question if they chose not to, and to decide whether to be recorded in the audio recorder or not, and to quit from the study.

Furthermore, all the participants were assured of the confidentiality of their information, as well as of the anonymity of their identity. The researcher assured the participants that all their information including audio tapes, transcripts, notes, and signed forms would be kept securely and could only be seen by the researcher and his supervisors.

3.7 Conclusion

This chapter outlines the methods used to explore smallholders' coordination during milk market participation in Tanzania. The research adopts constructivism which acknowledges that smallholders' dairying contexts, realities, and structures are to be considered as subjective interpretations of their distinct experiences, knowledge, and personal characteristics. The study employs a qualitative research strategy and draws on a single case study which is later fragmented into four sub-cases. The aim was to inquire in-depth information on how smallholders coordinate during their participation in milk markets and why. The study was conducted in the Eastern part of Tanzania, in the district of Mvomero located in the Morogoro region. Following the approval of ethical protocols by Massey University, field data collection was conducted through in-depth interviews, involving the individual smallholders and other key informants. Thematic analysis through NVivo data software was used to analyze the data collected. The obtained results are presented in the next chapter.

CHAPTER 4. CASE DESCRIPTION

4.1 Introduction

This chapter provides details of the area and the four groups of dairying smallholders who were involved in the study. The four groups include the Maasai, Sukuma, Mbulu, and Dakawa Prison dairying smallholders. The study was conducted in the Dakawa ward which is in the Mvomero district in the Eastern region of Morogoro, Tanzania. The chapter starts with profile descriptions of the Mvomero district covering the agricultural overview and agro-ecological characteristics. The overview of dairy production and marketing of the study area is also described. The ending of the chapter describes the social-cultural significance of dairying among the four groups of smallholders in the study area.

4.2 Study area profile

The population estimate according to 2020 projections is 382,658, where males and females are 189,924 and 192,734, respectively (MDC, 2017). According to the census report (NBS, 2012), the district had a total number of households 58,314 with an average household (HH) size of 4.5 persons and an average growth rate of 2.6%. The updated census data conducted in 2022 has not yet publicly released.

Mvomero is among the seven administrative districts constituting the Morogoro region. The district is in the eastern zone of Tanzania and covers a total area of 7,325 square kilometers, which is equivalent to 0.8% of the total area of Tanzania's Mainland (885,800 square kilometers). According to the Mvomero District Development Profile (MDC, 2013), the district constitutes 4 divisions, 28 wards, 130 villages and 681 hamlets. Agriculture is the main source of livelihood in the district, where about 90% of the population's labor force is engaged in agricultural activities, and 84 % of them are smallholders.

The district's five-year strategic plan report (MDC, 2015) indicates that Mvomero has three agroecological zones, namely; highland and mountains, *Miombo* woodland, and Savannah River basin zones. The highland and mountain zone occupies one-quarter of the district area. It has a high potential for agricultural production, mainly food and cash crops such as fruits, spices, and vegetables. Key occupations in the zone include agriculture and horticulture, and marginal livestock keeping. The *Miombo* woodlands zone is mainly flat lowland, occupies twenty percent of the district area, and is suitable for crop and livestock (mostly grazing) farming. The key occupations in the zone are agriculture and livestock, forestry, and wildlife.

The Savannah River basin covers the rivers of Mkata, Wami, Mkindo, and the like. The agricultural activities in the zone include irrigated dry season cropping, paddy, sugarcane and vegetable farming, and fishing.

The district is in large part tropical (semi and warm) with limited rainfall with an average range of 487-1951 mm per annum (MDC, 2017). The rainfall season is usually from January to July, while the dry season is experienced from August to November. The months of December and February experience variation as they sometimes lack or receive rainfall.

The district's main occupants (by 81%) belong to ethnic groups of Nguu, Zigua, and Luguru, and the remaining are migrants from other regions of the country, including the Makua, Sukuma, Chaga, Maasai and Mang'ati (MDC, 2017). Apart from the reported tribes, the study also identified other tribes which migrated to the study area who identified as '*Mbulu*' people, from Manyara region, Northern Tanzania. The Mbulu people are in Wami Luhindo village, in Dakawa ward. The dairying smallholders belonging to the Maasai, Sukuma and Mbulu were involved in the study.

According to the findings, the Maasai smallholders are pastoralists, mostly involved in cattle keeping as their main livelihood activity, while a few of them engage in both cropping and livestock keeping. The Maasai are located mostly in Wami Sokoine village because it was designated for them as a livestock keepers' village by the Mvomero district council. According to a key informant, Wami Sokoine village was designated because of the prominent conflict between Maasai livestock keepers and crop farmers along the Wami and Kilombero Basins which are key cropping zones, and within other villages in Morogoro. Wami Sokoine was along the public ranch, which was then re-allocated to livestock keepers for communal grazing. The Maasai key informant said:

> You know, we the Maasai ended up here because the government decided to re-allocate the ranch into smaller pieces of land for us to settle and get an area for grazing our cattle. Most of us were grazing cattle along the Kilombero and Wami basins, and we always had conflicts with crop farmers in those areas. The government gave us this land as a way to resolve, because we told them we have nowhere to go with our cattle (Kim).

Some other Maasai dairying smallholders were also located in other villages (Wami Dakawa, Milama and Kwamhunzi) in the Dakawa ward.

The study indicated that Sukuma dairying smallholders are in Milama village. The Sukuma are recognised as agropastoralists (Bukurura, 1995; Gitungwa, 2018). In the study area, they migrated mainly for the purpose of searching for arable cropping lands (mostly paddy and maize). According to one of the study participants, most of the Sukuma smallholders in the area migrated from Mbeya region in Southern Tanzania and engaged in cropping cereals and kept cattle for draught power, food and live sales. One interviewee outlined how, after migrating, they settled:

> Here in Milama, most of us came from Mbeya region. I came here in 2011 with my family, including my father. I started cultivating paddy, maize and millet, I was given 4 cattle by my relative who was living here, for cropping. After 1 year, I managed to buy my own cattle which helped in cropping, and I kept buying many more for food and other purposes (Sh.).

The Mbulu smallholders also migrated to Wami Luhindo, for the purpose of looking for arable land for cropping. They moved to the village because it was near the Wami river and close to where cropping of paddy and maize occurred. The study found out that Mbulu smallholders came from Mbulu district in Manyara region, north of Tanzania. Some smallholders indicated that they moved to the area, to look for cropping land because they faced conflicts with other pastoralists due to limited access to water in Mbulu district. The government could not resolve the conflict, and the water catchment ended up being depleted. One of the interviewees explained why they migrated to their current location:

> It is because of cropping that I migrated to this village. When I was in Mang'ola village in Mbulu district, there was a conflict with Mang'ati pastoralists about the water catchment area. They claimed that the water catchment belonged to them. So, the government intervened and planned to install water pumps and pipes but failed because the Mang'ati did some rituals which later caused the catchment to deplete of water. So due to that crisis, I could not do cropping again. I some of my cattle and migrated to this place (Na).

4.3 Agricultural overview

The district has a total of 50,069 households involved with agriculture, making up 85% of the total number of households residing in the district (NBS, 2002/2003). The report further

indicated that out of these agricultural households, 39,666 grew crops, 754 farmed livestock, and 9,650 were involved in both crops and livestock farming, where males and females totaled 190,109 (82%) and 42,747 (18%) respectively.

The district is a high-potential agricultural area with 75% of the total land being arable for agricultural crop production, and where most of the livestock keeping is done through grazing (Massawe, 2016). Out of the 75% of its arable land, 50% is under cultivation and settlements, 11% comprises 20 forest reserves, while the remaining proportion (14%) is used for livestock grazing (MDC, 2013) The district report further indicates that common crops grown in the district include maize, sorghum, sunflower, bananas, paddy, sugarcane, cassava, groundnuts, sesame, coffee and horticultural crops such as spices and vegetables (MDC, 2013). Mvomero District has climatic conditions that are considered adequate to support the production of most cereals, horticultural, and pulse crops. The district has fertile agricultural valleys, consisting of alluvial and loamy soils suitable for agriculture. Some of these fertile farming valleys are the Mvomero River valley in Mvomero Ward and the Wami River valley which covers parts of Dakawa Ward (MDC, 2013).

The common livestock kept in the district includes cattle, goats, sheep, pigs, chickens, ducks, and donkeys. The district had a total number of cattle around 71,988, where indigenous and improved dairy cattle were 71,372 and 616, respectively (NBS, 2002/2003). The agricultural census report further indicated that the total number of households rearing cattle was 747 and 246 indigenous and improved dairy cattle respectively.

Dairying in the Dakawa ward, Mvomero district in Tanzania.

Dairying in the study area is mostly dominated by indigenous rather than improved dairy cattle as indicated in the previous section. The smallholders in the district are engaged in dairying for their livelihoods, where it is practiced for subsistence purposes. The milk obtained from dairying is mainly used for consumption in the household and the surplus is sold for an additional source of income. The information obtained from in-depth interviews indicated that there is an increasing trend of more smallholders engaging in dairying, especially in the aspect of shifting towards selling milk for money and interest in keeping improved dairy cattle. Among the smallholder groups involved in the study, the Maasai were the most engaging increasingly in selling milk and keeping improved cattle. The Mbulu were also engaging in selling milk, while the Sukuma mostly sold during the wet season, but both were not in the

interest of keeping improved cattle for dairying. On the other hand, the prison workers mostly shifted into dairying as an additional income source.

Dairying in the district is practiced under different production systems, linked to the type of cattle kept, feeding system, land size, and cattle housing. The following production systems are common among the smallholders engaged in the dairying in Mvomero district.

- ***Extensive System:*** The dominant system practiced by Maasai, Sukuma, and Mbulu smallholders in the area. In this system, cattle are indigenous (mostly African Shorthorn Zebu and a few *Boran* breeds), are grazed on communal or rangeland areas, and are kept in kraals as their housing at night. Most of the smallholders practicing this system are pastoralists and agropastoralists i.e. engage in crop farming. The smallholders tended to move their animals away during dry seasons, but the practice remained occasional due to strict land policy changes.

Photo 1: A cattle kraal in the study area (Wami Sokoine, in Mvomero District, Tanzania).

- ***Semi-intensive system:*** This was practiced mostly by smallholders in the Dakawa prison. It is typical in that cattle were both improved and indigenous, mixed in a large group, and taken out to graze on the land owned by the prison during the day. The cattle

were kept in houses constructed with wooden materials, with a few kept in kraals. Each smallholder housed their cattle in their individually constructed housing, but all were in one area designated for keeping cattle by the prison authority. The smallholders provided their cattle with supplementary feeds apart from grazing. All cattle were provided access to water in the troughs constructed near the housing area.

Although there were improved breeds present, most of the smallholders in the district relied on milk produced from indigenous cattle with an estimated 95% of the total milk produced coming from these animals.

4.4 Milk markets in the study area

The district has a mix of formal and informal milk markets. The formal markets were mostly through milk collection centers (MCCs) which are owned by large privately-owned milk processors. The MCCs are referred to as formal markets due to their employment of quality standard procedures before they accept milk from suppliers. The informal milk markets include diverse channels such as local restaurants, local shops, neighborhoods, family networks, and milk vendors. For many smallholders involved in the study engagement in informal markets dominated. On the other hand, engagement in the formal market was mostly for very few smallholders, who still sold to informal channels but at very small amounts (volumes) of milk. In the study area, milk was sold in the common marketplaces such as the roadside, animal/livestock auctions, schools, police stations, spot ward/village markets, and in restaurants or shops.

The milk marketplaces in the study area

The common informal marketplaces where smallholders used to sell their milk in the study area were Mkongeni livestock auction, bus stops and roadsides, and public offices such as the Mvomero district council, Mvomero police center and Wami Luhindo Primary school in the Dakawa ward.

The Mkongeni livestock auction is the public marketplace, which is operated by the Mvomero district council. Here cattle and other livestock animals are sold at auction. In addition to the sale of livestock, other businesses such as food, drink, clothing, and veterinary drugs outlets, also operate in the place. The district council collects a tax for all the listed businesses. So, some of the smallholders in the study area use the opportunity of having such a marketplace to

sell their milk to different customers. The smallholders sell their milk here mostly as fresh and fermented milk.

Another common marketplace in the study area was around the Dakawa main bus station and the roadside bus stops. In such stops, different people get access to transport to different locations and are always crowded with people. Within those areas, just like the Mkongeni livestock auction, there are lots of businesses operating, including smallholders' selling of milk. At the bus stops, smallholders do sell their milk directly to other people, who are either traders or just travellers.

The public offices in the study were also identified as potential marketplaces for selling milk by smallholders. The public entities identified as marketplaces for selling milk included the Wami Luhindo Primary School, Mvomero Police Station, and the Mvomero District Council. The smallholders took their milk to sell to specific and different individuals who worked in those places.

The milk marketing channels.

The study area was found to have common market channels through which the majority of smallholders accessed milk buyers. As already indicated, the marketing channels include the milk collection centers, milk vendors, village restaurants, and individuals/neighbors.

Milk collection centers

The study area had various milk collection centers which were owned by private dairy processors, namely Tanga Fresh Limited, Dar Fresh Milk Company, and Nuhu Milk. Tanga Fresh was established in the year 2005 and was the largest collection center with the capacity to store about 2000 liters of milk per day. Tanga Fres's main parent company is in Tanga City and is also the leading dairy processor in Tanzania. Second was Dar Fresh Milk which was established in 2010, whose main station is based in Dar es Salaam city and has a storage capacity of 1500 litres of milk per day. The third collection center was called Nuhu, which was owned by an individual processor located in Dar es Salaam city, was established in 2014, and had a capacity of 800 litres of milk per day.

All the milk collection centers owned by the above-mentioned dairy processors were in the Dakawa ward. They all were buying milk at a common price which was set as 600 and 800 Tanzanian shillings, respectively for wet and dry seasons. They also collected milk from both large-scale and smallholder farmers in those areas. In addition, all the milk collection centers

relied on occasional milk supply from the smallholders, and they only had a few permanent suppliers, particularly the large-scale ones. Furthermore, the collection centers paid for milk in a 10-day range after collecting from the producers. Most of the milk collected is transported to their main processing plant. However, these milk collection centers also sell some milk to customers who need milk, directly through cash exchange.

Photo 2: A milk collection center located owned by Dar Fresh Milk Company at Wami Dakawa, in Mvomero District, Tanzania).

Milk Vendors

The milk vendors are the individuals who move around different areas in the village to buy milk from the producers, collect it, and then sell it to their customers. The vendors bought milk from smallholders informally by directly visiting farm households or moving around streets to seek out and buy milk, usually using motorbikes or bicycles as their means of transport. The vendors were locally known or referred to as '*wachuuzi'.* The common reasons smallholders sold milk to the vendors were the price they received, and the direct and on-the-spot payment method, that they could sell without having to transport milk to a market. Some of the vendors do not pay on the spot, because they supply milk collection centers which have a 10-day

arrangement. Thus, they pay to smallholders in a similar arrangement. Such kind of payment arrangements worked between vendors and smallholders who had a strong personal relationship, such as shared background, neighbors, or friends.

The Restaurant owners

The study area had several restaurants which were owned by residents who bought milk from the dairying smallholders. In the study area, there were several small restaurants where people used to sell tea, fermented milk, and other meals. These restaurants are normally small with the ability to serve 5 to 10 people at once. The smallholders' selling of milk to the restaurants in the study area was at the price of 1000 TZS per litre, and in the form of raw or fermented milk.

Individuals or neighbors

The study area also indicated that most of the smallholders were selling their milk to individual buyers who lived nearby or shared an employer or membership of a community group like a church. The individual buyers in the study area were a very common marketing channel for many of the smallholders interviewed. Through this channel, the smallholders commonly sold their milk at the price of 1000 Tanzanian shillings per litre, just like in the restaurants. Through this channel, the smallholders also commonly sold their milk on immediate cash pay-out, or weekly and monthly payment arrangements.

4.5 Socio-cultural significance of dairying

This section describes the significance of dairying among the smallholder groups that were involved in the study. The significance is contextualized within the social and cultural frameworks around dairying across the four smallholder groups, namely the Maasai, Sukuma, Mbulu, and those in the Dakawa prison area.

Nature of dairying among smallholders in the study area

Keeping cattle for producing milk for sale (dairying) was not the main source of income across all the four smallholders' groups in the study area. However, owning and caring for cattle and having access to milk from their cattle as a food source was important across all four groups. The Maasai smallholders entirely depended on cattle and milk for their livelihoods; while the Sukuma and Mbulu smallholders depended on crops and livestock; and those in Dakawa prison were entirely on off-farm employment, and cattle was for additional income generating purposes. In addition, the milk produced is mainly for food consumption purposes than other needs, across all four groups.

The smallholders who belong to the Maasai tribe engaged in cattle and livestock keeping as their main livelihood activity. Cattle are a main source of income, food (meat and milk), and social and cultural identity through aspects of marriage, saving, and prestige. On the other hand, the milk produced is primarily important as food (part of the main meal), and that not consumed by the household, was usually sold to cover minor cash needs, or disposed of. The disposal of milk occasionally s during wet seasons when there are limited markets but surplus production. The value of milk beyond food consumption was neglected to a large extent among the Maasai community with milk being primarily handled by women. The importance of livestock to the Maasai's identity is evident in the following quote from a Maasai male:

> Livestock is something that I would say, I was born in it. I was born in a family of livestock keepers. Since I was a child, I lived with cattle, goats, and sheep. By the time I was a child, our family had local livestock animals only, and I think almost all Maasai families were aware of the local livestock animals only (An).

The smallholders who belong to the Sukuma and Mbulu indicated that cattle keeping was important but primarily for helping them in crop production. Their primary intention for keeping cattle is to serve as draught animals as well as being a form of savings for crop production purposes. Animals would be sold to finance the purchase of inputs for crop production, such as buying seeds, as well as to acquire money for buying food when crop production is not sufficient to feed the households. However, the social and cultural importance of cattle was highlighted in a similar way as with the Maasai, in the aspects of marriage and prestige. One of the Sukuma smallholders pointed out the importance of cattle in crop production:

> Here the Sukuma are given cattle to start cultivating food crops and for milk at home. Here if you are given 5 cattle you are supposed to use them for the cultivation of crops to get food (Lu)

The milk produced from cows was similarly important to serve the consumption purposes as in the Maasai smallholders and was normally sold for cash needs whenever in surplus. Milk is mostly handled by women among these two groups, similar to how it applies to the Maasai.

For smallholders who were prison workers, cattle were important for producing milk for sale as their additional income, next to their employment salaries. Milk was important also for home

consumption (including as a protein supplement for children's growth) but the keeping of cattle was not as strongly culturally significant as for the other groups of interviewees. One of the smallholders from the Dakawa Prison group explains how he became involved in dairying:

> I moved to this prison when I was employed in 2014. I started keeping cattle in 2015. When I arrived here, I found many of my co-workers engaging in selling milk to earn extra money. So, after observing the environment here, I was convinced and bought one cow (Ay).

In the aspect of obtaining cattle for dairying, the study indicated that the smallholders who belonged to Maasai, Sukuma, and Mbulu commonly got their cattle through gifting and/or inheritance while those employed at the Dakawa prison most purchased cattle for dairying. Marriage and inheritance from family members (e.g., parents, grandparents, and husbands) were the most common means through which smallholders of the three mentioned groups were gifted cattle. Inheritance was also a common way through which many women especially the Maasai got hold of cattle. The smallholders from such groups were also gifted cattle as a means of support for those experiencing hardship for example due to cattle losses, climatic shocks (drought, floods), or other catastrophes. Below are some of the respective statements made by the Maasai, Sukuma, and Mbulu about obtaining cattle:

> I was given cattle by my parents when I got married. We are usually given cattle because we start to be responsible, and we have dependants (Ta).
>
> The first time to own cattle was during my marriage. I and my wife's parents gave us these cattle. In our tradition, the primary purpose for keeping cattle is for cultivation/ draught power. Then to get food from milk and to increase the herd size for selling to get income, and if you have sons, cattle are for gifting to them during their marriage (Lu).
>
> I got cattle from my parents after getting married (Ze).

The purchase of cattle was the most common way for the smallholders in Dakawa prison to get hold of cattle. They commonly purchased their cattle at the Mkongeni livestock auction and from large-scale dairy farms. The Mkongeni livestock auction is the weekly marketplace where smallholders get access to buy livestock from other farmers and livestock traders.

Management of cattle

Management of the cattle for dairying was mostly done by household labor for the Maasai, Sukuma and Mbulu smallholders, and waged labor for those in Dakawa prison. The tendency of sourcing labor from the household is grounded in the cultural arrangements of the Maasai, Sukuma, and Mbulu smallholders, though at varied levels.

In the study, the management of cattle for dairying was more significant among the Maasai smallholders concerning the existing tribal-based age and gender structures than for the Sukuma and Mbulu when it comes to their households' division of labor. Examples among the Maasai are the roles of the males from the age of five to twenty (5-20) years who are responsible for taking the cattle for grazing, girls, and women in milking of cows, and elders (male) who are responsible for handling animal health and care, and in making all decisions about cattle management. Decisions also include those associated with milk for sale. For the Sukuma and Mbulu, age-based structures were not so significant but the role of girls and women in the milking of cows was of importance as it appeared in the Maasai smallholders. Decisions about cattle management are also made by the male head of household, including those associated with milk for sale.

On the other hand, the smallholders in the Dakawa prison sourced waged labor in a collective arrangement among themselves, where they paid, to improve the management of their cattle. These smallholders joined together to manage their cattle in activities such as grazing of cattle, conducting vaccination and dipping, breeding, and even milking of their cows. The prison smallholders also collectively forged a collaboration with the nearby large-scale dairy farm owned by the Catholic Bishops Council to undertake vaccination, dipping, and breeding programs. In some cases, some of the prison smallholders milked their cows individually (done by women) while other management activities remained collective.

4.6 Conclusion

This chapter presents the general research context of the Dakawa ward in Mvomero district, as the case study. The first part introduces the general overview of the study area, indicating the insights of its geographical location, population, and climate. The second part describes the agricultural profile of the Mvomero district, illustrating the area's potential for the production of a variety of agricultural and horticultural crops, as well as its associated potentials. The details of the dairying are presented especially the dominance of the indigenous cattle breeds and the extensive production system. In the dairying, the descriptions of the four groups of

smallholders (Maasai, Sukuma, Mbulu and Dakawa prison) detailing their involvement during accessing and managing cattle are provided, followed by the context of milk markets ranging from marketplaces and informal and formal channels in the area. The last part provides glimpses of the social and cultural significance of the dairying in the area by sighting on the four groups of smallholders involved in the study.

CHAPTER 5. RESULTS

5.1 Introduction

This is the chapter of the main findings of the study. The research question for this thesis is 'How do smallholders coordinate to participate in the milk market, and why?' The focus on coordination in this study is associated with gaining an understanding of the individual smallholders in the study area. The individual smallholders are engaging in selling their milk in the existing mix of formal and informal markets. To sell their milk in such markets, the individual smallholders get to involve different people. This study attempts to understand the nature of such involvement between individual smallholders and other people, in the perspectives of their social relationships.

The interviewees involved in this study were found to belong to the groups associated with three tribes, namely, Maasai, Sukuma, and Mbulu, and another group was associated with their common employer, which was Dakawa Prison. After analysis of the findings, the interviewees' coordination around selling their milk was found to be associated with the position of dairying in their varied livelihood options. The findings showed that the interviewees' coordination around selling milk can be described based on their four identified livelihood groupings. The first involved the interviewees who depended entirely on livestock keeping as their main livelihood activity, and these were mostly associated with smallholders who belonged to the Maasai tribe. The second grouping involved interviewees who depended on both crops and livestock keeping for their livelihood and were mostly associated with smallholders who belonged to the Sukuma or Mbulu tribes. The last grouping involved the individual interviewees who depend on formal employment at the Dakawa prison for their livelihood, and they opted to engage in livestock keeping as an additional income generation activity.

According to the study findings, the coordination around selling milk in a mix of formal and informal markets is shaped by their socio-cultural perspectives associated with milk and cattle, and the market changes associated with the monetary value of the milk among their social groupings. Socio-cultural perspectives are associated with smallholders' socio-cultural norms and institutions, which play out in the varying ways in which their coordination around selling milk occurs within and across their social groupings. The ways that they vary relate to the significance of milk and cattle to their livelihood and their cultural norms and institutions. Such aspects, together with dynamics among the individual smallholders within the social groupings, are presented in the patterns of coordination around selling milk. Apart from sociocultural

perspectives, the market changes associated with the monetary value of milk entail the commercial relations that increasingly occur among dairying smallholders and other actors around milk, and how they are significant in contesting, challenging, and transforming their existing socio and cultural institutions and norms. Therefore, the structure of this chapter is as described below.

This chapter covers six sections. The first section describes the functions of cattle and milk among the four social groupings. The second section describes smallholders' coordination patterns around their tribal and kinship settings. The third section describes the smallholders' coordination patterns around their household roles. The fourth section describes the smallholders' coordination patterns around their membership roles in the community. The fifth section describes the smallholders' coordination patterns around their levels of market orientation. In the last section, the conclusion of the chapter is presented.

5.2 The important functions of cattle and milk among the four social groupings in the study area

This section describes the functions of cattle and milk among the Maasai, Sukuma, Mbulu, and Prison social groupings, indicating the similarities and variations within and across them, and provides insights into the aspect of coordination around milk participation. According to the findings, milk has a common consumption function across all the social groupings, mainly as a nutritional supplement for children. However, the Maasai and Sukuma of all ages consumed milk as part of their main diet. The findings indicate a variation across social groupings in terms of the financial and social functions of milk. Cattle have a common financial function among the smallholders.

The household consumption function of milk and meat from cattle across the four social groupings

Across the four social groupings, milk is commonly consumed in the household to serve as a nutritional supplement for children. The children are provided with milk as fresh, boiled, and fermented. The consumption of milk for nutritional supplementation of children was common among the social groupings and mostly involved those below the age of 10 years old. According to the findings, the Maasai, Sukuma, Mbulu, and Prison smallholders ensured that milk was portioned and consumed by their children as an important health nutrient to support their growth.

For the Maasai and Sukuma milk is a traditional food that is consumed by all ages as a main meal. An example from one of the interviewees indicated the times and the amount of milk consumed within a Maasai household. The interviewee said:

> Every Maasai considers milk as their main food. That is why we take milk in the morning, afternoon and in the evening. It is only milk that we drink every day, about 3 to 5 litres (Ph).

Milk is used to make other traditional products (ghee and fermented milk). The ghee, apart from being consumed was also used as a healthy cooking oil. Such consumption functions of milk, the making of its products, and their uses in the households are explained by some of the interviewees belonging to the Maasai and Sukuma smallholders below.

> 'Milk is our main food. We use it to eat, ferment, and make it into ghee (LL Maasai)'.
>
> 'We as the Sukuma people usually spare some milk to make ghee. So, we usually ferment the milk and extract ghee from it. We eat the ghee and use it as a cooking oil as well (Sh Sukuma)'.

Another example from one of the Sukuma interviewees indicated how milk is used as a side dish (*Mboga* in Swahili) to the main meal. The interviewee said:

> Milk is like '*Mboga'* at home. Someone may drink 1 or 2 litres and take fermented milk in a cup or glass with other meals in the afternoon and night (Ug).

The consumption of meat is regarded as a traditional food among the Maasai only and one of their main sources of nutrition. This function of cattle contributes to the importance of cattle in the Maasai's livelihood. Such regard for the meat from cattle further illustrates the Maasai's cultural attachment to cattle as compared to other social groupings in the study area. According to the findings, the Maasai's keeping of cattle ensures sufficient food for their household, and this is reflected in the number of cattle they keep. An example from one of the interviewees during the study indicated that to meet household consumption needs Maasai keep the number

of cattle that will ensure they are self-sufficient in food (milk and meat) and this varies depending on the size of their families and number of dependants. The interviewee said:

> Apart from milk, I eat meat from my cattle. I have to reproduce more cattle to have assurance of getting enough food for my dependants. Look at the size of my family here, I need to have all these cattle and most of our food is meat and milk. (E).

Furthermore, the importance of milk and meat from cattle as a traditional food was indicated during the Maasai and Sukuma cultural gatherings. The Maasai smallholders consumed milk and meat as their main traditional food during ceremonies such as circumcision, marriage, funerals, and warriorhood. One of the interviewees explained how the consumption of meat and milk occurs among the Maasai during their tribal gatherings.

> If you could come during July in this village, you could see how a lot of cattle are slaughtered, and our people enjoy eating meat during our Maasai ceremonies. That is the right time when you can realize how meat and milk are important to us. You will find that all the meat is finished by the end of the day no matter how much of it was prepared, but other foods like rice or maize meal, will remain and be given to other villagers or disposed of. […] Milk is always finished earlier but meat is eaten all the time until the closing time of the ceremony (Ta).

The consumption of milk was also evident as a traditional food among the Sukuma smallholders, during their cultural gatherings. In the study area, the Sukuma smallholders gather during cropping seasons, where they help each other to cultivate and harvest. The findings indicated that milk is used as a traditional food during such gatherings, which they locally refer to as *'kaguya'*. The practice of *'kaguya'* was explained by one of the Sukuma interviewees who said:

> Kiguya is our tradition where we gather and help each other in farming crops. So, we normally help one of ours in his/her farm, and after finishing we move to another one until all our farms are completed (Lu).

During such gatherings, the Sukuma smallholders usually eat food together, and the hosting family (owner of the farm where cultivation/harvest takes place) are traditionally obliged to provide milk to other tribal members who participate in the cropping activities. As such gatherings normally occur during the early and late wet seasons when milk is usually produced in surplus of household needs. One of the interviewees said:

> We must provide food to all the people when they come to help on our farm. So, if it's a day or two, I make sure all the milk goes for farm work. But we usually do *Kiguya* during wet seasons, and milk is plenty for everyone who is participating in the activity to get (Ug).

However, the findings indicated that the regard for milk as a traditional food among the Maasai smallholders is shifting. Maasai smallholders are increasingly reducing the amount of milk retained in their households for consumption and increasing the amount that goes for sale to earn money. Despite such changes, milk remains an important food especially for children. The shift from consumption to selling preferences is covered in more detail in a subsequent section.

The social functions of milk and cattle in the study area.

The social functions of milk and cattle are significant to coordination among the Maasai, Sukuma, and Mbulu as compared to the Prison social groupings. Milk emerged as significant in coordination within the Maasai, Sukuma, and Mbulu influencing social relationships that played out within their tribal and family networks. In addition, non-tribal networks (e.g. neighbors and friends) were common across all groups.

The space created around milk emerged as important for women who belong to the Maasai (widows) and Mbulu (neighbors) social groupings. Milk was the basis for interactions, establishing within group networks and links with other actors and it provided economic opportunities for women. Traditional obligations place milk in the domain of women in the Maasai and Mbulu social groupings. Traditionally women milk the cows and manage the allocation and preparation of milk for the household. This tradition has provided worm the opportunity to engage in milk markets. Some examples from the interviewees belonging to the Maasai and Mbulu respectively indicated the strong attachment between women and milk, and their traditional responsibilities of handling and managing the product. The interviewees said:

"In our tradition, milk is for a woman, for her to manage it, or sell it and get some little cash. I normally don't interfere; she may decide whether to sell or not (Ta Maasai)".

"She can decide 5 litres to remain home or 7 litres to be for sale, or anyhow. It is usually the women's role to manage milk in our tribe (Re Mbulu)".

Reflecting these traditional obligations Maasai and Mbulu women established tribal (such as the Maasai widows' group and the Mbulu women) and family networks to participate in milk markets. The Maasai widows mobilized among themselves to form a group and started to collect milk from each of their members, search for markets, exchange milk for money and pursue other economic opportunities, as well as accessing other dairying related services. The Mbulu women mobilized among themselves as tribal members and neighbors, they together searched for milk markets and set higher prices for exchanging their milk for cash with different buyers. In addition, most women belonging to the Maasai used the milk handling and management space to establish networks with other women within their families. Such family relations were significant in increasing the involvement of women in formal market participation, as well as their engagement in informal market channels. These tribal and family networks are described in detail in the following section.

Among the Sukuma smallholders, milk was also the traditional domain of women as is indicated in an interview with a Sukuma smallholder:

For us in Sukuma, a woman is responsible for milk; she looks after it and makes sure there is milk for home (Mh).

However, this role of women was not reflected in any tribal or family networks linked with milk market participation as was reported across the Maasai and Mbulu social groupings.

The Maasai strongly valued their cattle as a symbol of their tribal identity, a reference of respect and authority within their community, as well as marriage. The Maasai regarded themselves as people of cattle and being born into livestock keeping, and specifically, they refer to the local cattle breeds, illustrating how they are strongly attached and what it means for them to keep cattle. One of their interviewees said:

> Cattle keeping is something that I would say I was born with it. I was born into a family of livestock keepers. Since I was a child, I have lived with cattle, goats, and sheep. Since I was a child, our family has kept local livestock animals only, and I think almost all Maasai families keep such cattle (An).

Furthermore, the Maasai smallholders expressed the way that cattle signify respect and authority within their community, especially among the men. The findings indicated that when a young Maasai man is given cattle by his parents during marriage, it signifies a stage of maturity and strength, he can start and become a leader of his own family and household. Such was described by one of the Maasai interviewees below.

> When a young Maasai man is given cattle during marriage, he knows that he gained that strength as a mature man and is ready to start a family and lead his new home. That is why I must keep all these cattle, to make sure each of my sons gets some when they grow up (Ko).

Maasai, Sukuma, and Mbulu value cattle in this way and traditionally include cattle as part of the marriage process. In addition, the findings indicated that it is the traditional cattle that hold this social value across the three social groupings. The key difference between the Maasai and the other two social groupings is that the Maasai use cattle as a source of food and as a form of capital (they seek to expand the number of animals they have) whereas the Sukuma and Mbulu use cattle primarily for draught power.

The social functions of milk and cattle appeared to be regarded higher among the Maasai than Sukuma and Mbulu social groupings. Milk was indicated to have significant regard in the way it has influenced women, while cattle's functions were related to the cultural institutions within the Maasai social groupings, and the Sukuma and Mbulu.

The exchange function of milk and cattle

Unlike the three tribal groupings the main function associated with milk for the Prison smallholders was exchange for money which supplemented their income from the prison. The Prison smallholders realized monetary value of milk to their household economy which was made possible by their proximity to a milk collection center and a large-scale dairy farm. The nearby milk collection center belonged to one of the large-scale processors in Tanzania (Tanga

Fresh), while the dairy farm was owned by the Catholic Bishops' Council. Being close presented opportunities for smallholders to access the formal market and access improved dairy cattle, as it was explained by one of the Prison smallholder interviewees below.

> When I arrived to work in the prison, I realized there was a nearby milk collection center owned by Tanga Fresh that buys milk throughout the year. Furthermore, there is a large dairy farm nearby, where there is a collection center. This made me think of doing dairy, and I bought good dairy cattle that produce sufficient milk that I can sell and generate some extra money (Jo).

On the other hand, although most Maasai, Sukuma and Mbulu smallholders exchanged milk for money, the primary function of milk was as a traditional source of food. Milk was sold when it was surplus to household needs. For the Sukuma social groupings, this tended to occur mostly during the wet/rainy seasons when more milk was produced.

The four social groupings commonly sell cattle for income generation, although the circumstances for sale vary across them. For the Maasai, Sukuma and Mbulu, the findings showed that they sell cattle to gain money mostly to cover their needs for food and for covering other financial needs within their households. The Maasai sold live cattle to buy food (mostly stapple food), as was explained by one of the Maasai interviewees:

> I also had to sell cattle sometimes to buy other foods like maize (E).

The Sukuma and Mbulu commonly sold cattle to meet food consumption needs, especially during times when they experience lower crop yields. This was explained by some of the interviewees belonging to the Sukuma and Mbulu social groupings, respectively:

> Keeping cattle helps us. For example, during the year 2015 there was drought, and I could not get enough harvest to cover the food for my family throughout the year. So, I sold two bulls and got money which enabled me to buy several bags of maize and rice for home food (Ng. Sukuma interviewee).

When I moved to Wami Luhindo, before I got a place for cropping maize or paddy, I used to sell some of my cattle and get money for buying food (Ze. Mbulu interviewee).

5.3 The patterns of smallholders' coordination during milk market participation in their tribal and kinship settings.

This section describes the patterns of smallholders' coordination around selling milk evident among the Maasai, Sukuma, and Mbulu. The tribal and kinship settings of these social groupings are associated with the smallholders' cultural institutions and norms that influence their coordination around selling milk. Cultural institutions shaped the coordination around selling milk across three social groupings (the Maasai, Sukuma, and Mbulu) in the study area with this most strongly evident amongst the Maasai. In the following sub-sections, the details of the findings are presented.

Kinship relations and smallholders' coordination during milk market participation.

Coordination around selling milk was found to have a strong association with kinship relations. Such associations were evident due to the existence of strong relationships among the dairying smallholders in the study area, among tribal and family members. The significance of kinship relations in the coordination during milk market participation was evident across all the identified social groups and varied according to the nature of their networks. Among the Maasai smallholders, the significance of kinship relations was evident in both milk production and marketing, mostly within their tribal and family networks. The most significant tribal networks consisted of the Maasai widows in the marketing of milk, while family networks included siblings, parents, and co-wives. Among the Sukuma, the significance of such relations was mostly within family networks and mostly in milk production. The family networks consisted of partners mostly, and parents and children during milk production. Among the Mbulu smallholders the tribal and family members formed networks through which they coordinated, especially during the marketing of milk. The tribal relations consisted only of networks of women who lived as neighbors belonging to Mbulu tribe, while family networks comprised parents and children. Detailed descriptions of the tribal and family relations is presented in the following sub-sections.

The smallholders' tribal relations and their coordination during milk market participation

Smallholders' tribal identity and tribal networks were indicated in the coordination across the Maasai, Sukuma and Mbulu social groupings. The Maasai stood out as the social grouping whose identity around cattle keeping shaped how they produce and marketed milk, as compared to all the other social groups. Among the Maasai and the Mbulu smallholders' coordination among tribal networks was strongly evident in their milk market participation. For the Maasai tribal relationships constituted the network of widows, who coordinated in the marketing of their milk, as well as a mix of men and women who coordinated in both milk production and marketing. For the Mbulu the tribal network of women who lived in close neighborhoods coordinated mostly in the marketing of their milk. The following sub-sections present the detailed description on tribal identity and tribal networks, and their associations with coordination during milk market participation.

Tribal identity and smallholders' coordination during milk market participation.

Smallholders' coordination around selling milk is shaped by their tribal identity for the Maasai, Sukuma, and Mbulu smallholders. The influence of tribal identities was associated with the functions of cattle and milk amongst smallholders and shaped how milk was produced and marketed. Belonging to the Maasai, Sukuma, or Mbulu tribes was associated with traditional regard for livestock (cattle) keeping which varied across these social groups.

For the Maasai social grouping their regard for cattle was strongly associated with their identity as livestock keepers and the traditional practice of livestock keeping (including cattle). As indicated earlier, the Maasai smallholders identified themselves as 'born and raised with cattle and in livestock keeping'. So, for the Maasai smallholders their tradition of being with cattle and regarding cattle keeping as a key traditional practice shaped their coordination during the selling of milk. For example, the Maasai smallholders access cattle for dairying in a way that reflects this strong link to identity as cattle keepers. As was explained by interviewees, it is a common traditional practice for each Maasai male child to be given cattle when they are born. Such was explained by one of the Maasai interviewees:

> It is common for us the Maasai, especially every male child, when we are born a certain number of cattle are allocated for us (EK).

For the Sukuma and Mbulu social groupings, their regard for cattle was associated with their traditional identity as crop farmers and livestock keepers. Such groupings traditionally kept cattle for draught power to support their crop farming, as mentioned earlier. These social groupings' identity concerning cattle differs from the Maasai in this way and it influences the way the Sukuma and Mbulu access cattle for dairying. The Sukuma and Mbulu commonly accessed cattle by purchasing them or or by obtained by selling or exchanging crops and dowry during marriage.

The social groupings' identities around cattle were evident in their division of labor based on age-structures. For the Maasai, grazing cattle is traditionally regarded as an important role for young males. This role signifies their identity as cattle keepers and is a crucial learning stage when cattle keeping practices are passed down between generations. When a young Maasai make is given the responsibility of grazing cattle, it is regarded as a crucial stage in their development to warriors. However, despite such practices, the findings indicated changes in these traditional roles within the Maasai smallholders. The Government recently made it a required obligation for every child to access and attend primary school education. To substitute for this loss of a source of labor from their families and households, some of the Maasai smallholders employed waged labor from within their tribal group and beyond (non-Maasai members of the community) rather than allocating the roles to themselves. An example below was illustrated by one of the Maasai key informants indicating the impact of government policy in shifting their traditional obligation around the involvement of young males in the role of grazing of cattle.

> In the past for us Maasai, it was a traditional obligation for our children to do grazing of cattle. We have got someone for whom we pay money because in the past our sons were grazing cattle. But now they are all attending school, so we hired a waged laborer to do grazing (Si).

The age-structured labor roles among the Maasai were not evident in the other social groupings. For example, the Sukuma smallholders differentiated themselves from the Maasai in terms of the age of those undertaking certain roles with cattle, as a Sukuma interviewee explains:

> We are not like the Maasai, they only graze cattle at a young age but when they reach an older age they can't do it anymore, and that's why it costs them money when they find themselves aged. For us Sukuma, we have no limit even the aged men can still do grazing of the cattle (Sh).

The identity of Maasai as traditional cattle keepers was also evident in the practice of gifting milk and cattle to other members of their tribe. It was a common Maasai tradition to gift fellow tribal members a cattle or milk as a means of support, especially to those who had incurred cattle losses and were unable to access cattle. Maasai tribal members tend to support each other as a means of restoring and maintaining their identity as cattle keepers which is also linked to the fundamental value of cattle as a source of food for the family. The practice of gifting (exchange for social reasons) influences smallholders' participation in milk marketing in terms of the access to cattle for dairying and the amount of milk allocated for sale. Some smallholders who have lost cattle may re-engage in dairying through cattle gifted to them by a Maasai tribal member retaining their identity as cattle keepers and ensuring food for their household. Such examples were common as was explained by one of the Maasai smallholders:

> We Maasai have a saying "If someone has no milk today, you don't have to give him/her in a cup, but you call and allow him/her to milk your cows". So, you donate at least 1 or 2 cows to the person, for him/ her to be able to milk every morning and evening. That's why people say that every Maasai has cattle. Like now, some of our people lost their cattle and they went to ask from other Maasai who gave them a few animals for milk and re-stocking their herd (An)".

Milk is a traditional food of Maasai and is an important component of traditional tribal events and ceremonies. Milk would be donated for use at such events rather than retaining to sell for cash. Such was indicated by one of the key informants who buys milk from Maasai producers in the study area:

> "The Maasai milk producers are sometimes not reliable to sell milk to us. I was so surprised when they refused to sell milk only because they must use it for consumption in their circumcision ceremonies. So, during June or July, we normally face such challenges in

accessing milk from these people. They say that sharing that milk with other Maasai people during those ceremonies is more beneficial than selling for money. So, even if you come with a higher price, you can't buy their milk" (KI).

Maasai, Sukuma, and Mbulu social groupings link milk to women's identity. The statement "*milk is for women"* was commonly mentioned among smallholders from all three social groupings and was reflected in coordination around the selling of milk in the study area. It was evident in the sourcing of labor within their households during milk production and affected the involvement of men and women in selling milk. The gendered roles around milk were most strongly evident among the Maasai.

Within the Maasai their tradition of milk being in the domain of women was reflected in their households' labor allocation in some of the milk production activities. Men are traditionally prohibited from engaging in the milking of cows, as one of the interviewees belonging to the Maasai social groupings said:

Usually, it is the females who are taken to do milking every day because according to our Maasai morals, the male children don't do milking of the cows (Sa).

In general, the findings illustrate how tribal identity shapes the coordination around milk and how this varied among the three tribal groups. Of all the groups, the Maasai's strong association with cattle and milk was most evident in how they coordinated when participating in the milk markets.

Tribal networks and coordination among female smallholders during milk market participation.

Tribal networks shaped coordination across the Maasai and Mbulu female smallholders especially in milk production and marketing. Within the Sukuma smallholders, their tribal networks did not emerge significantly among the women because their traditional gathering (*Kiguya,* as described previously in section 5.2*)* involved both males and females.

In this study Maasai widows had established a strong tribal network that coordinated for the marketing of milk. As women, the widows had traditional domain over milk within their households which enabled them to collectively participate in milk markets. Through this

network the Maasai widows collected milk together, searched for milk buyers, shared price information, and decided on where to sell their milk. The widows managed to link with different milk buyers in both informal and formal market channels. Through their network around milk the widows contributed to, and had improved, their household income, and gained access to other opportunities including knowledge on improved dairying and improved dairy cattle breeds. According to an interview with one of the Maasai female smallholders, the cultural institution that places milk in the women's domain facilitated their networking which was initiated by two widows (previously married in the same clan) and expanded across many other female tribal members. The interviewee said:

> You know, our widows group started with me and another lady, we were both married in the same clan. Then we started mobilizing other widows in our tribe. We thought of starting with selling milk because it was easy for most of us, as we are all livestock keepers, and we handle the milk but not the cattle (An).

For the Mbulu female smallholders, their tribal network emerged in their cultural grounds that also allow the milk to be in the domain of women but was further harnessed by their other traditions that encourage mutual support among them as tribal members who they reside in neighborhood. The findings indicated that such networking emerged strong because most of such women (tribal members) had a shared historical background as they lived in the same village in Mbulu district before they migrated to the study area. The findings indicate that the Mbulu women's network coordinated in the marketing of their milk by sharing information about prices, linking with buyers, and setting together the price for selling their milk. The network of Mbulu women influenced other tribal members to engage in dairying and selling milk for cash. One of the interviewees belonging to the Mbulu social grouping explained the strong cultural grounds for establishing their women's network, the mobilization towards engaging in selling milk and the collaboration during linking with buyers, among the female tribal members. The interviewee said:

> "It was my neighbors who I found living here and they were already selling milk. I and my neighbors live like '*ndugu' [*close relatives*]*. So, when I found them selling milk, I was convinced that I could also start a business like them".

"My neighbors are not my blood relatives, but we take each other as *ndugu*. I talk about my women neighbors, and all of them come from the same village as us. We usually collaborate on many issues, in case there are problems or when there are ceremonies, we always support each other, we are very close".

"I normally collaborate with these neighbors, so sometimes when milk orders come from the teachers and I don't have enough to sell, I tell them, and they sell their milk to such buyers" (Ch)

The smallholders' family networks and their coordination during milk market participation

The findings indicated that family networks were significant in influencing the coordination around selling milk across the four social groupings. Such networks were associated with different patterns of relationships that existed among the family members across such social groupings. The findings indicated the existence of a common pattern of family relationships between parents and children, and between partners across all the social groupings. Although common across all four social groupings, within family coordination was illustrated as being stronger amongst the Maasai and Mbulu during milk production and the marketing. This was evident in the sharing of information, gifting, decision-making, and division of labor. The influence of family members' relationships emerged in the activities associated with milk such as accessing markets, cattle, and labor, and in the use of money obtained from selling milk.

In the sharing of information, the findings indicated that the Mbulu and Maasai smallholders showed a strong reliance on their children and their partners in the sharing of information while accessing milk markets. Such coordination is associated with proximity to the marketplaces (public school and the centre of the village/ward), where there is a convenient space for interactions with different milk buyers. This was indicated by smallholders and their children connecting to milk buyers as indicated by the quotes below. The two quotes indicate how close family (parent to children) relationships play out in sharing information during milk market participation, among the respective Mbulu and Maasai social groupings.

"At the primary school where my children study, they are usually asked by their teachers about milk. That was the way we got in contact with teachers and started selling milk (Ch. Mbulu interviewee)".

"My son sometimes tells me about a new buyer where milk is sold at a good price. He spends most of the time at Dakawa village center, with his friends (Le. A Maasai interviewee)".

Married partners also coordinated in accessing milk markets among Mbulu smallholders. Male and female partners shared information about the milk markets and searched for milk buyers. In the example from the interviews below, the Mbulu smallholders illustrate how they shared information with their partners, which was useful for linking to milk buyers, as well as for influencing the smallholders to engage in selling milk.

"My husband is also responsible. Like last year he brought a buyer who collects 5 litres of milk, and he is from Morogoro urban. So, we work together, if any of us gets a milk market it is ok because we are one (Ch)".

Some Maasai siblings and co-wives also coordinated in milk market participation. Female siblings mostly collaborated among themselves in sharing milk market information. In addition to that female smallholders who were married to the same man, or different men in the same family, also collaborated in accessing milk markets. The illustration below provides details of such family members and the way they collaborate in accessing milk markets in the study area.

"We started together, me, my sister, and my co-wife. My sister lives around this area, we are neighbors. We met, shared our ideas, and agreed that we should try to start selling milk. Every day we go together to sell milk at Dakawa center (Ko)".

The same interviewee further explains about her and her co-wife:

"She is the first wife, and I am the second to our husband […] I and she normally share about milk buyers, and she even told me about plenty of buyers demanding milk then we started selling together, and we always go with her and my sister (Ko)".

The interviewee further explains how they sell the milk in the village:

"When we go, we usually divide among each of us in separate streets and later re-join together and go back (Ko)".

Among the Maasai parents gifting cattle to their children was a common traditional practice which facilitated their children into dairying. As described previously, the tendency of gifting cattle between family members is associated with the smallholders' traditional obligations of maintaining their traditional institutions of identity and as a main means for sustenance. The statement below indicated how family member relationships between parents and children facilitate the gifting of cattle among the Maasai.

> "My parents gave me some cattle for starting to live on my own (Sa)".

On decision making by marital partners, findings indicated that men dominated decision-making amongst the Maasai smallholders and there were very few cases of both partners being involved in decisions, unlike the other three social groupings. The joint decision-making among the marital partners belonging to the Maasai social grouping emerged among those who were shifting away from regarding their traditional roles between men and women around milk. The decisions jointly made among the few Maasai's marital partners were associated with choice of the milk market and use of the money obtained from milk. One of the Maasai interviewees said that,

> I and my husband collaborate in selling milk. Since he joined me in this business we agree on where to sell and what we can do with the money that we get from milk in our household (El).

For other social groupings (Sukuma, Mbulu and Prison) joint decision-making was common across them but varied in the aspects they were made. The variation was in the use of money from the sale of milk and the purchasing of cattle. Some of the smallholders belonging to Mbulu and Sukuma social groupings made joint decisions in the planning and expenditure of the money obtained from milk. Decisions associated with finances and cattle were made jointly among the marital partners of the Mbulu and Sukuma smallholders. Such smallholders tended to keep and share records and negotiate, in the process of making decisions. The examples below illustrate in detail as explained by the Mbulu and Sukuma producers, respectively.

I and my husband always share about the money we earn from selling milk. I always record our earnings, and the amount of milk sold. So, we always plan together whenever we want to use that money (Am. Mbulu interviewee).

"My wife is also part of this, why not? She milks our cows, we sell milk together and earn a certain amount of money, and then we make all other plans together at our home (EK. Sukuma interviewee)".

For the Prison smallholders, it was common for most of them to view dairying as a good opportunity for additional income generation and husbands and wives jointly made decisions about purchasing cattle. Such a case is illustrated by one of the producers from the Prison group below.

"I started keeping cattle in 2005 when I was working in this prison. I and my wife found that many people were keeping cattle, so we agreed to also buy our cattle for drinking and selling milk (Pe)"

The significance of family members' relationships was also evident in the aspect of accessing household labor during milk production and tended to be strongly associated with the tribal-based age-structures existing among the Maasai smallholders. The age-based roles were not evident across Sukuma and Mbulu social groupings (which are also tribal-based) when accessing household labor around milk. In addition, the Prison social groupings did not rely on family members for most of the milk production activities but worked together to pay for hired labor.

The neighborhood and friendship relations among dairying smallholders and their coordination during milk market participation

The neighborhood and friendship relations played a role in the coordination of smallholders during milk market participation. This section considers the neighborhood and friendship relations beyond the tribal settings that emerged (refer previous section) among the Maasai and Mbulu social groupings in the previous section. In the previous chapter, it was indicated that in the study areas (5 villages) other residents belonging to a mix of different tribes, apart from the Maasai, Mbulu and Sukuma, also live there. The neighborhood relations described in this

section are associated with those that emerged among the Prison smallholders who live closely as workers belonging to the same employer; as well as those that involve some Maasai and Mbulu smallholders with other people who do not belong to their tribes or social groupings. In addition, the friendship relations are associated with those that emerged to involve some of the smallholders belonging to Maasai and Sukuma social groupings with other people who are not their tribal members. The findings indicated the importance of neighborhood relations among the Prison smallholders during milk production and management of cattle. However, the findings indicated that the some of the smallholders belonging to the Prison, the Mbulu and Maasai also used their neighbourhood relations to link with both the formal (Maasai) and informal (Prison and Mbulu) milk markets.

Neighborhood relations and collective access to waged labor during milk production

The neighborhood relations were indicated as significant among the smallholders belonging to the Prison social groupings, as they mobilized as a group to access waged labor for managing their dairying cattle. The Prison smallholders' relations with their neighbours were a result of them work in the Dakawa prison and living together in the vicinity of the prison. Based on their network, the Prison smallholders collectively arranged to pay the monthly salary of a waged laborer, where each member of their group paid on rotation. One of the Prison smallholders explained the grounds in which their group network was established and their involvement in milk production activities as a group. The interviewee said:

> "You know all prison workers live around this area, and the housing is provided by our employer. We know everyone because it's a small community and it was easy for those of us who keep cattle to organize ourselves. Because we keep all our cattle in one area, we agreed to employ two waged laborers who take care of our cattle, and every month two of us have to cover the cost from our salaries (Jo)".

Neighborhood and friendship relations in accessing milk markets.

Neighborhood relations among dairying smallholders was common in the access to milk markets among the Maasai, Prison, and Mbulu smallholders' social groupings. In addition, the friendship relations were also important the access to the markets among the Maasai and Mbulu smallholders. The importance of neighborhood and friendship relations was evident in the aspects of choice of the market channel and sharing information related to milk markets.

Some Maasai smallholders connected to neighbors who were not Maasai to exchange and share information about accessing other milk market channels. Neighborhood relations facilitated for some smallholders the exchange of milk for cash, and the obtaining of information that enabled them to link with other milk buyers. In one of the interviews, a Maasai smallholder explained,

> I managed to start selling milk to the buyers at the Mvomero district police department because the head of police was my neighbor. We met in the church, and he said he needed to buy milk, and I started selling milk to him. Later, he said there were his colleagues in the office who were also looking for milk. He then connected me to his four colleagues, and from there I started supplying milk to them (An)".

The study indicated that it was common among Prison smallholders to exchange milk for cash with their neighbors who also worked at the prison, in addition to selling milk in other market channels.

> I sell some of my milk to my neighbors here in the barracks (Ale).

Neighbors and friends also influenced smallholders' choice of milk markets. among the Maasai and others who lived in Dakawa village. These types of relationships influenced smallholders' preference to sell milk to different milk markets (formal and informal). Such relationships were grounded in mutual support. During the study, some of the interviewees belonging to Maasai social grouping indicated that the neighborhood relations influenced their choice to engage with a formal milk market. The interviewee said:

> I always supply my milk to the Dar Fresh collection center, because [name of collection center supervisor] is my friend. I have known him for a long time, we grew up together in the same neighborhood (E).

Friendships facilitated coordination in accessing informal milk markets for some interviewees among the Mbulu social grouping. A friendship grounded in regular interactions in a common marketplace was an important incentive for linking with a milk buyer, as is explained below by one of the interviewees belonging to Mbulu social grouping.

We sell about 5 litres to a buyer from Morogoro urban. He is a friend of my husband; they always meet at the Dakawa livestock auction and buy or sell cattle together. So, he either takes it directly or sends it through a minibus, and he picks the milk up in Morogoro town (Ch).

5.4 The smallholders' patterns of selling milk in their formal and informal markets.

This section describes the patterns associated with selling milk among the dairying smallholders in the formal and informal markets. The findings indicated existing patterns across the smallholders' groups during their selling of the milk and are described in the dynamics around household milk consumption, roles of men and women, and the participation of men and women in the markets and diversification in dairying. Across all the smallholder groups, the Maasai and Prison smallholders emerged as the most associated with such dynamics as compared to others.

The dynamics of household milk consumption

In the study area smallholders commonly valued milk as their source of nutrition for consumption. However, for the Maasai consumption of milk emerged as more strongly linked to their traditional obligations within their households than for other groups. Milk constitutes a predominant component of daily diet of the Maasai. For most, a large portion of the milk produced tended to remain in the household for consumption needs and only the surplus was sold to the market. Participation in milk markets and regularity was hence affected by the amount of milk portioned for sale or retained for consumption. Some of the interviewees belonging to the Maasai social grouping explained:

I sell milk in the morning only, and the milk we obtain in the evening is planned for home consumption (LL).

For example, when I get 15 litres of milk, I use 7 litres for feeding my family and the remaining amount may be used for selling (Pet).

Across the Maasai and Sukuma tribal groupings the preference for portioning the milk for household consumption over sale influenced their coordination around selling milk particularly

during the dry season when the level of milk production dropped. Some of the smallholders either stopped selling milk or just sold small amounts but made sure the milk for home consumption remained sufficient for their households. The example below is an illustration from one of the Maasai producers:

> During the dry season, we remain with few cows at home which only produce milk for our family consumption (Po).

The Sukuma smallholders also showed a similar pattern of prioritizing milk consumption during the dry season. During dry season the Sukuma smallholders normally don't engage in selling milk due to lower amount produced and thus portion all they have for household consumption. Due to this, even milk buyers who are mostly vendors, tend not to engage in buying milk from such smallholders. One of the interviewees belonging to the Sukuma social grouping explained:

> This time of the year is the dry season, and there is a shortage of milk produced, so we use it for my family's consumption only. You will not find any one in our place bothering to sell milk in the dry seasons, and even those vendors stop coming to buy in this area (Ku).

The preference for retaining milk for consumption rather than selling emerged as prominent during the traditional festivals and ceremonies, and this was mostly evident amongst the Maasai and Sukuma smallholders. In such cases the milk produced was consumed both in the household and at these events with none being sold. Such traditional ceremonies normally involve consumption of a large amount of milk and meat. A milk buyer?? interviewee explained the challenge they have in securing regularly amount so milk from the Maasai. The buyer said,

> During the dry seasons, it is also the time most of these Maasai producers attend their traditional ceremonies. So, we miss a lot of milk from them. They may not come to sell their milk for even two days, and they say all the milk is gone for the wedding or circumcision ceremony at their homes. So, they usually must give milk and slaughter a few animals to make sure the participants enjoy the ceremonies. (KI2).

Like the Maasai, the Sukuma also allocate milk for consumption during traditional gatherings during the wet season rather than sending milk for sale. One of the interviewees from this social grouping explained the common traditional of providing and consuming milk during farm gatherings.

> We must provide food to all the people when they come to help on our farm. So, if it's a day or two, I make sure all the milk goes for farm work. But we usually do it during wet seasons, and milk is plenty for everyone who is participating in the activity (Ug).

Despite the above, the findings indicated that some of the Maasai were shifting towards allocating more milk for cash exchanges and reducing household consumption. Such findings indicated that some of the Maasai were increasingly selling more milk for cash to formal and informal markets while reducing the amount of milk retained for household consumption. This change in household milk consumption is in line with a shift to more diverse dietary patterns than was traditionally the case. The increasing demand for milk, which was due to emerging formal markets in the area, was among the factors that drove the Maasai smallholders to increase the amount of milk to be sold for cash. One of the Maasai producers explained:

> When it reached a time when milk was in demand for sale in the community, many Maasai smallholders started to reduce drinking milk at home and sell it. So, instead of 4 litres they just had 1 litre for home, thinking that they could sell 3 litres and get money for meeting other needs. So, it went on like that until our people started learning to eat other kinds of food like *chapati* [4]and *mandazi*[5] (Ph).

The roles of men and women and the selling of milk

The findings indicated the dynamics around the roles of men and women in the aspects of managing and decision-making around the milk to be sold. Across the smallholder groups in

[4] Flat pancake-like bread, usually of whole-wheat flour or like Indian flatbread but made in Tanzania

[5] It is a form of fried bread that originated on the Swahili Coast. It is one of the principal dishes in the cuisine of the Swahili people who inhabit the African Great Lakes.

the study area, milk emerged as the sole traditional domain of women, especially across most of the Maasai, Sukuma, and Mbulu smallholders. The evidence during this study was shown in women's responsibilities during the milking of cows, portioning of milk for different purposes within the household and beyond, as well as in taking the surplus milk to sell for minor cash needs. Traditionally, the findings indicated that most of the men from those groups considered milk the domain of women and women were allowed to control what was to be done with the product. The interviews from male smallholders belonging to the Maasai, Sukuma, and Mbulu groupings indicated the realization for the traditional obligation that milk is in the domain of women. These respective interviews from a Maasai, Sukuma and Mbula man illustrated that:

> "In our tradition, milk is for a woman, for her to sell it and get some little cash. I normally don't interfere; she may decide whether to sell or not (Ta)".
>
> After milking, and balancing for home consumption and other uses, she may decide on what to do with the remaining milk (Ng).
>
> She can decide on 5 litres to remain at home or 7 litres to be for sale, or anyhow. It is usually the women's role to plan on milk (Re).

Despite the women being responsible for managing the milk, there are dynamics in the roles of men and women in the Maasai group. The allocated roles and decision making around milk varied from the traditional for some smallholders who had realizes the potential earnings from selling milk. For some smallholders the earnings from selling milk had become valuable to their households and men were interested in being part of the business. In some cases, the decision-making became obviously in the control of men, and they decided on the amount of milk to sell, at what price, where and when to sell, and what was done with the money earned from selling. The shift in roles for some Maasai around milk is evident in the following quotes:

> She must involve me because traditionally a woman is under a man. Though she receives the money from selling milk, I have the right to make decisions about that money (Ib).
>
> Some women around here can't sell their milk unless their husbands decide to. So sometimes they bring it to me secretly and I help to sell and to keep money for them (EL).

> My husband is very involved in deciding on my selling of milk. There was a time the milk price was 500 TZS per litre. So, he decided that I should stop selling milk at that price and suggested that I had better use that milk to make ghee. He emphasized that the price is very low, and I can't do anything with that money (Le).

For the Prison smallholders, there was no association between the traditional obligations and the roles of men and women around milk but was rather a shared responsibility in terms of making decisions. One of the interviewees belonging to the Prison social groupings explained:

> I and my wife decided together about engaging in the selling of milk when we moved to this Prison (Yu).

However, in a few cases, the milk fell in the domain of women because of the formal employment commitments of the men in the Prison social groupings, as it was explained by one of the female interviewees who makes all decisions around marketing of milk.

> This is my business; I find the buyers and sell milk by myself. All the decisions are mine; my husband is busy with his employment (Ma).

The involvement of men and women in selling milk

The findings indicated that there was significant involvement of the women in the selling of milk, as compared to the men, across the Maasai and Mbulu smallholders as compared to other social groupings. However, in some cases, there was also a significant increase of men engaging in selling the milk for cash among the Maasai smallholders than other social groupings. The increase in women selling milk was associated with their traditional obligations to managing the product. Through their traditional obligation many women used the space to explore opportunities for generating income through milk. The increase in the number of emerging formal milk markets (particularly milk collection centers) as well as connection to urban areas were among the opportunities that women used for selling their milk for cash exchanges. Examples from the study indicated that the Maasai women such as the widows and individuals, were able to link with different formal and informal milk market channels. In an

example from the study, it was shown that there was a significant interaction among the individual Maasai female smallholders during their selling of milk, where they also use to exchange information about milk prices. One of the female Maasai producers explained:

> Most of those who sell milk to my buyers are women, we normally meet while delivering milk and we talk about the prices as well. Most of these women live in the same area where I come from (ES).

Apart from the involvement of women, the findings indicated a significant trend in the involvement of men from the Maasai smallholders, in the selling of milk especially in the formal markets. Such involvement was indicated to be associated with the increased awareness around commercial dairying and the demand for milk due to emerging formal markets, which led to increased earnings obtained through milk in their households. Such changes in the milk markets appeared to influence the Maasai smallholders into realizing the valuable contribution of milk to their household economy, apart from selling live cattle. Below is an explanation from a Maasai traditional leader illustrating some scenarios that led to an increase in men involved in selling milk.

> You know before, if a man was involved in selling milk others used to laugh at him. But nowadays things are changing. After the projects on dairying came, then the establishment of the milk collection centers in our area, we were seeing other people selling milk and getting a lot of money. We started realizing that even milk can provide us with enough money, and we don't have to wait until we sell live cattle. So, I also started to sell milk, and some of us Maasai are slowly realizing the value of milk for money (Ph).

5.5 Conclusion

This chapter presented findings that indicate the varied and diversified circumstances of the smallholders in their coordination to participate in milk markets. The chapter highlighted the existence of patterns associated with smallholders' coordination in the following aspects. First, the findings indicated how the smallholder groups' tribal setting shaped their coordination during milk production and marketing, and across the groups, the relative influence of tribal dynamics varied. In that matter, the Maasai group was linked more strongly to institutional

settings (around milk) than the Sukuma or Mbulu. Second, the findings highlighted the association between tribal?? family, neighborhood, and friendship arrangements and the coordination of smallholders in the milk market participation. The findings indicated how smallholders derived (at varied levels) such arrangements to establish networks that enabled or limited their coordination through accessing markets, cattle, and labor and in making decisions related to milk, and how the associated dynamics shape within and across their social groups. Third, the findings indicated the dynamics around household milk consumption, the roles of men and women, and the involvement of men and women in selling milk in the formal and informal markets. The influence of emerging formal markets in the area has been a catalyst for the selling of milk for money, while at the same time, increasing the value of milk in contributing to the household economy, especially among the Maasai who emerged to be strongly attached to their traditional institutions around milk. However, some of the traditionally derived roles around milk and the consumption function of the product, although changing, remain strongly present in smallholders' participation in milk marketing.

The theoretical and practical contributions of these results are discussed and explored in the following chapter.

CHAPTER 6. DISCUSSION

6.1 Introduction

This chapter discusses the key findings that answer the research question of the study, how do smallholders coordinate to participate in the milk market, and why? The discussion in this chapter addresses the findings that emerged in the research context and reflects what is found in the relevant scholarly literature. Before addressing the research question, this case study is argued to be usefully contextualized as existing in a transition that includes a shift to market-led dairy production.

Contextually, the findings indicate that smallholders in the study area were living and responding to what can be described as a transition that was multi-dimensional but included a shift towards market-led dairying. This shift reflects and is supported by the market-led dairying policy in Tanzania (Mbwambo et al., 2019; Stephen Michael, Makusaro, Negassa, & Stapleton, 2017; MLD, 2006) and is recognized by other scholars (Kihoro, 2022; Lyatuu et al., 2022; Rao et al., 2019). Evidence of a market-led transition was indicated in the study area, where policies advocated for commercialization, market formalization, and intensification of dairying. Some smallholders belonging to the Maasai group were engaging in milk exchanges for cash, which signified a shift towards commercialized dairying rather than simply subsistence pastoralism. The Maasai's growing engagement in the cash economy is reported in other studies, particularly concerning live cattle and milk marketing (Allegretti, 2017; Gitungwa, 2018; Loos & Zeller, 2014). This study also evidences the trend to greater access to knowledge associated with improved dairy technologies such as the use of and access to improved dairy cattle, feed, and feeding among some smallholders in the study area. The dairy transitions associated with intensification were reported by studies conducted in Tanzania in aspects such as the use of and access to improved dairy cattle breeds (MacLeod, Waldron, & Wen, 2015; Weaver et al., 2015) and improved feeds and feeding (G. Fischer et al., 2018; MacLeod et al., 2015). Furthermore, land reforms that occurred during the pre-and post-colonial era bring another dimension to the transition being experienced by the pastoral-based communities like the Maasai in this study. The study indicates that there is a reconfiguration of the Maasai communities with a reduced tendency to practice nomadism but rather to live as permanent settlers in some villages, mixing with other community members. The significance of land reforms associated with the reconfiguration of the Maasai and other pastoral communities' settlement patterns, has also been reported in other studies (Damonte, Njagi,

Kirimi, Glave, & Rodríguez, 2019; Rweyemamu, 2019; Sendalo & es Salaam, 2009), where it resulted in migration to urban and other potential agricultural rural areas. The tendency of reduced nomadism is evident among the pastoral communities as most of the land reforms that occurred in Tanzania promoted sedentarization rather than nomadic herding (Sendalo & es Salaam, 2009). The implications of this as evidenced in this study include the the forging of new neighborhood and friendship relations by some of the Maasai dairying smallholders, with other members of the community. These relationships framed the coordination of some Maasai in their participation in the milk markets.

The concept of market participation in this study is associated with integrating smallholders, who are at the subsistence level, into input and output markets for their agricultural products, to improve their income and alleviate poverty (Otekunrin et al., 2019). This study strongly supports the argument that smallholders' market participation must be understood from a wider perspective where both market and non-market processes are recognized for improving livelihoods, rather than only the former. Many studies have focused on market participation and assumed improved income as a key livelihood goal for smallholders. In these studies, smallholders' market participation is mostly framed in perspectives of commercialization, where income needs are placed at the core of their livelihood achievements (N. Poole, 2017; N. D. Poole et al., 2013). Many scholars have focused on understanding smallholders' market participation through economic aspects, like studies exploring the determinants of the level of participation in various agricultural products (Berem et al., 2015; Kurgat et al., 2023; Leonard et al., 2016); the influence on decision-making in market participation (Berem et al., 2015; Kadigi, 2013; Kurgat et al., 2023); and the associated impacts on livelihood outcomes (Thenuwara Acharige, 2022). This study brings emphasis to the role of both market and non-market factors in contributing to the understanding of smallholders' milk market participation in Tanzania. This study highlights the importance of social and cultural capital as non-market factors that contribute to understanding smallholders' participation in milk markets. In addition, the study highlights the increase in cash transactions around milk, and it's influence on the existing social and cultural dimensions of the smallholders as also an important market factor contributing to understanding their participation in milk markets.

The concept of coordination from the livelihood pathways approach is drawn on in this study, to widen the understanding of smallholders' milk market participation. The concept of coordination, in its simplistic expression, is associated with the way smallholders involve other

people in their dairying. In addition, such coordination (involvement of other people) emerges from individual strategic behavior embedded both in a historical repertoire and in social differentiation, including power relations and institutional processes, both of which pre-structure subsequent decision-making (de Haan & Zoomers, 2005). Coordination fits in the study because it enables this researcher's argument that understanding smallholders' market participation requires an in-depth exploration of their self-driven processes that reflect the actual circumstances in which they engage with existing milk markets and the way they engage. The rationale for drawing on the concept of coordination is based on the following arguments. First, it is grounded on smallholders' self-driven processes which contribute to defining or understanding their livelihood. Second, it is a form of social agency expressed in people's daily activities and interactions (such as negotiations and bargaining) that result in collective livelihood decisions. Therefore, coordination plays a useful role in bringing out more understanding of how smallholders participate in markets, and why they participate in the ways they do, by focusing on within and across their social groups.

Therefore, in addressing the main research question of how smallholders coordinate to participate in milk markets, this chapter highlights that smallholders' participation in markets is shaped by multiple dimensions that extend beyond the regards of income and include the social and cultural institutions and norms associated with gender, and their level of dependency on cattle and milk for their livelihoods. Thus, this research indicated that the smallholders who existed in their tribal groups valued the milk differently and had varied levels of dependence on milk and cattle for livelihoods, and this shaped their participation in the milk markets. Thus, key findings indicated that smallholders coordinate through different patterns that are associated with gender roles, the extent of dependence on cattle and milk for livelihood, and the relative adherence to traditional sociocultural norms. Further, coordination varies within and across smallholders' social groups as they engage in a mix of formal and informal milk markets in Tanzania. In addressing why smallholders coordinate in the way they do when participating in milk markets, this chapter discusses the impact of cultural capital for different smallholder tribal groups such as Maasai, Mbulu, and Sukuma, concerning the varied levels of dairying is woven into their cultural fabric. Furthermore, this chapter discusses the impact of social capital by indicating the significant influence of the bonding and linking networks on facilitating milk market participation in Tanzania, at varied levels among the smallholders' groups. Lastly, this chapter discusses the increasing cash transactions around milk among dairying smallholders in Tanzania.

In the light of the above introduction, this chapter is organized into the following sections. The first section (6.2) discusses the patterns of coordination in smallholders' milk market participation. Section 6.3 discusses the influence of market and non-market changes on smallholders' coordination during participation in the formal and informal milk markets. Section 6.4 discusses the significance of increasing participation in the formal milk markets on the future of smallholders' existing cultural institutions and norms, Section 6.5 presents a summary conclusion for the discussion chapter.

6.2 Patterns of coordination in smallholders' milk market participation.

Dairying smallholders coordinate when they participate in milk markets in Tanzania through patterns associated with gendered roles, level of dependency on cattle and milk for livelihood, and adherence to sociocultural norms. This study highlights how such patterns of coordination shape smallholders' participation in milk markets, and the variation within and across different social groups. As suggested above, this variation is also associated with the ongoing transition being experienced and lived by dairying smallholders, and also, it reflects strongly on how they live and who they live with in the study area.

The transition associated with the findings of this study is multifaceted and is framed by not only economic, but also, significantly, social, and cultural dimensions of the dairying smallholders' livelihoods. Several livelihood studies have supported the multiple dimensions of the transition that smallholders undergo (Snyder et al., 2020a; K Tavenner et al., 2019). Evidenced in this research is a change among smallholders in terms of their engagement in the cash economy through the exchange of milk for money but also their reliance on livelihood and income from milk, cattle, and other traditional pastoralist activities. Also evidenced is a variation and trend toward less adherence to traditional social and cultural norms including traditionally gendered roles in households, labor sharing arrangements, family, and tribal affiliations, and what constitutes 'community'.

Further, the social and cultural dimensions of the transition are reflected in the variety of ways dairying smallholders interact with different actors, as well as contest, challenge and transform their existing sociocultural institutions and norms, during their participation in milk markets. The social and cultural dimensions of the transition are evident in the ongoing social relationships that dairying smallholders maintain and create/recreate in their daily living, which influence their involvement (who) in selling milk, the amount of milk sold, and the relative value of milk in their livelihood. The influential role of social relationships in rural livelihood

transitions is reported in other studies (Sachs, 2019; Snyder et al., 2020b; K Tavenner et al., 2019; M. Vicol, Pritchard, et al., 2018). The dynamics related to such cases are reflected in the variation within and across different smallholder social groups as discussed in the next sections.

Gender roles associated with milk.

Gender dynamics associated with the roles of men and women and the power relations around milk emerged as one of the patterns influencing the Maasai, Sukuma, and Mbulu smallholders' coordination when they participate in milk markets in Tanzania where smallholders live and align with tribal norms.

Women play a more significant role than men in harvesting (milking) and managing the use of milk within and beyond the household for the Maasai smallholders and for the other groups (Sukuma and Mbulu), but to a lesser extent. This is because roles associated with milk remain strongly gendered and culturally anchored in favor of women but to varying degrees across the groups. Women mostly coordinated with other women in the selling of milk by sharing market information and establishing groups or networks for gaining milk, transporting, and marketing milk, rather than other actors. Some examples from the study indicated that women smallholders from the Maasai tribal group who sold milk mainly used their widow's group, networks of co-wives and female siblings to collaborate in selling milk, while those from Mbulu used networks of their neighbors who are women of similar tribal affiliation. A few studies in Tanzania and other countries in East African countries have acknowledged how management of milk within and beyond the household strongly falls to women, especially among the pastoral and agro-pastoral communities. In Tanzania, a study was conducted only among the Maasai smallholders (Allegretti, 2018) and highlighted that women have extended their domain around milk beyond household consumption, as they have gained access to sell it for cash. Also, other studies conducted in Kenya highlighted among the pastoralists engaging in dairying, where women are taking advantage of their role around milk in the household to excel beyond, by increasingly engaging in selling milk (Galiè et al., 2021; Katie Tavenner, Crane, et al., 2018; Yurco, 2023). This research has extended understanding by providing detailed dynamics of women's management of milk in the context of multiple tribal groups in Tanzania.

However, the findings indicate a growing influence of men in the management of milk within and beyond the household, reflecting the increasing significance of the exchange of milk for cash in both formal and informal markets. This shift was mostly evident among the tribal

groups and shows the extent to which the increased realization of the monetary value of milk has influenced changes in traditionally gendered roles around milk in such groups. The level of change in the dynamics between men and women around milk was most strongly evident among the Maasai as compared to other tribal groups. Examples from the study indicated that men were increasingly involved in decision-making associated with the volume of milk, the market, and how the money received from selling milk was managed. Several studies report on pastoral smallholder men's (including Maasai, Sukuma, etc.,) disregard for the financial value of milk, with a focus rather on income from the sale of live cattle and other sources of income (Allegretti, 2018; Katie Tavenner, Saxena, et al., 2018; Yurco, 2023).

Furthermore, this study highlights the disruption of the gender norms associated with milk and animal husbandry, with a shift to using employed or hired waged laborers. The market-orientation is influencing smallholders' involvement in dairying, as the roles of women such as milking the cows, and of men such as herding cattle are replaced by waged laborers. Despite such changes, within the Maasai and other tribal groups (Sukuma and Mbulu), some other smallholders maintain their traditional gendered norms, where animal husbandry roles are still performed by men (husbands or elder sons), and milk handling decisions are primarily the domain of women.

Level of dependence on cattle and milk for livelihoods.

The level of dependence on cattle and milk for livelihoods varied across social groupings and was associated with the smallholders' coordination during market participation. The findings indicated a common pattern across all the smallholders' social groupings in terms of their primary dependence on milk for household consumption needs. Milk was an important asset for maintaining household food security within and across all the social groups in the study area. Milk served as part of the main food for the Maasai, Sukuma, and Mbulu tribal groups, similar to what has been reported by scholars on pastoralists (Amenu et al., 2019; Galiè et al., 2019; Massoi & Saruni, 2020) and agropastoralists (Benti, Birru, Tessema, & Mulugeta, 2022; D. W. Benti, W. T. Biru, & W. K. Tessema, 2022a) in Sub-Saharan Africa. In addition, milk was a key protein source or supplement for children in smallholders' households, as reported in other studies (D'Haene et al., 2019; Galiè et al., 2021; Galiè et al., 2019; Kidoido & Korir, 2015).

Smallholders whose livelihood was primarily dependent on cattle and milk exchanged surplus milk through gifting and for cash. In such cases, the exchange of milk for cash was of less

importance than the social function of gifting. The study indicated that the smallholders tended to coordinate with members who belonged to their tribes during the exchanges of milk for social functions. Examples from the study indicated that the smallholders from the Maasai tribal group exchanged milk for social purposes including mutually supporting other tribal members and as an offering in traditional ceremonies. As a result, their engagement in milk markets was mixed (formal and informal), and the regularity of selling milk was uncertain, as well as the volumes of milk being sold. Similarly, the example from the study indicated that the Sukuma smallholders also exchanged milk for social purposes, as an offering in their traditional gatherings (during crop farming), which influenced the regularity of selling and the volumes sold. Several studies have reported on the importance of the functions of milk other than financial, with most focused on consumption (Benti, Birru, et al., 2022; Massoi & Saruni, 2020; Yurco, 2023), and less on the social function through gifting and use during traditional ceremonies (Allegretti, 2018; Loos & Zeller, 2014). Limited studies have reported on the practice of gifting milk to support other families in Tanzania. Some smallholders belonging to Maasai tribal groups are shifting towards exchanging more milk for cash in the formal markets, possibly in response to the promotion of commercial dairying in formal markets and improved dairy technologies. Thus, milk offers economic opportunities to some smallholders from such groups, including women (including widows) to integrate into commercial relationships and improve household income.

The dairying smallholders whose livelihood was not primarily dependent on cattle and milk, exchanged minimal amounts of milk for cash and it tended to only occur when they had a surplus in the wet season and was only in the informal markets. The social function of milk was also important, but gifting was mostly during on-farm labor-sharing gatherings (planting and harvesting) and not for supporting other families. Examples from the study indicated that Sukuma smallholders engaged mostly in informal milk markets (vendors and neighbors) and seasonally (only wet season) when they had surplus production, selling varying volumes of milk. Several studies have reported on the prominence of seasonal milk sales among dairy smallholders in Tanzania (Kaminski, Christiaensen, & Gilbert, 2015; Wassena et al., 2015) and other countries (D'Haene et al., 2019; Kurgat et al., 2023; Leonard et al., 2016). However, increasing trends of exchanging milk for cash emerged among the Mbulu tribal group year-round, but remain prominent in the informal rather than formal dairy markets as compared to the Maasai.

The smallholders least dependent on cattle and milk for their livelihood, exchanged surplus milk for cash only. These smallholders' engagement in dairying was primarily associated with generating additional household income as well as supplementing nutritional needs. Dairying has been reported as a form of income diversification for some smallholders engaged in off-farm activities, especially in peri-urban areas of Tanzania (Allegretti, 2018; Rao et al., 2019) and in other countries like Kenya (Berem et al., 2015; Galiè et al., 2021; Kilelu et al., 2016) and India (Kaur & Kaur, 2016). The findings indicated that most of the smallholders in the Prison group moved into dairying due to increased demand for milk in the formal markets, and they used the resources available to them to access improved dairy cattle, animal health, and extension services. The smallholders who belonged to the Prison group sold most of their milk to the formal markets, and less to neighbors. Their engagement with formal markets was mostly associated with commercial relations and was influenced by their proximity to the dairy processor's milk collection center. On the other hand, Prison smallholders' exchanged milk with neighbors for cash and this informal market activity was mostly grounded on their social capital built through close community and employment relationships. The Prison smallholders worked to improve their dairy cattle and used improved animal health methods such as vaccination and dipping, and they used to mobilize waged labor. As a result, some of the smallholders in the group sold constant volumes of milk to the formal markets throughout the year. Similar findings were also reported in Sri Lanka, where smallholders' whose dairying was part of their livelihood portfolios, were engaging in selling their milk on a year-round basis (Thenuwara Acharige, 2022).

Adherence to cultural institutions and norms

The variation in the extent to which dairying smallholders adhere to traditional cultural institutions and norms, including around cattle and milk, emerged to be strongly associated with their coordination during milk market participation in the study area. The strongly adhering smallholders coordinated by drawing on their culturally constructed social relations which were defined through diverse interactions within and across kinship (tribal and family), friendship, and neighborhood networks during milk production and marketing, and for the Maasai these tended to be restricted to tribal members whom they live together within their bomas and villages. Such relationships emerged during accessing and managing cattle, as well as in the collection and exchanging of milk, and sharing market information. There is limited information from studies reporting on the use of within tribal or ethnic-based networks for marketing milk in Tanzania. A relevant study was reported among the Maasai smallholders

who draw on their ethnic-based networks for marketing their live cattle in Tanzania (Allegretti, 2017).

Within tribal group networks also emerged during milk production among the Mbulu and Sukuma tribal groups, although not in much wider diversity or extent as compared to the Maasai group. Thus, strong kin relationships were only evident during milk production in managing cattle and handling milk in such groups. On the other hand, strong neighborhood relations emerged within the Mbulu tribal network during the exchange of milk market information among women smallholders. The Mbulu, Sukuma, and prison groups used friendship and neighborhood networks which tended to be beyond their tribal group. In such a case, the prison group used networks to manage their cattle and access to animal health services which were employment-based, while the Mbulu and Sukuma used networks based on living in the same locality (village).

The institutions associating cattle with marriage (Maasai, Mbulu, and Sukuma) and tribal identity (Maasai), significantly influenced the smallholders in accessing certain types of cattle. Thus, dairying smallholders in the study area mostly accessed local or traditional cattle, rather than improved, resulting in lower volumes of milk produced and limited integration to milk markets. Some studies have associated the type of local cattle owned by smallholders in Tanzania and Kenya, as one of the limitations to their effective integration into dairy markets (Berem et al., 2015; Dizyee et al., 2019; Kadigi, 2013; Kurgat et al., 2023; Lyatuu et al., 2022; Rao et al., 2019). However, the Maasai, Sukuma, and Mbulu tribal groupings mostly access dairying cattle from their tribal and family members, through inheritance, marriage, and in fewer cases through cash or non-cash exchanges. Contrary to the above, the Prison group smallholders mostly access cattle for dairying through cash exchanges, as they were relatively weakly bound to cultural institutions as compared to the other social groups.

On the other hand, the strong adherence to the norms associating milk with women has positively enabled female smallholders to integrate into milk markets in the study area. Women have managed to collectively organize in informal and formal groups, share knowledge and market information, increase the volumes of milk they sell, and link to potential markets. In this case, the widows belonging to the Maasai tribal group within cultural norms collectively organized and participated in selling their milk. Similarly, the women from Mbulu tribal grouping established a network for sharing milk market information and linking each other to different buyers. In contrast to the literature, cultural norms that associate milk with women

have enabled market access and participation for many smallholder women across all groups in this research. Scholars tend to highlight the constraints cultural norms place on accessing and/or participating in milk markets (Bain, Ransom, & Halimatusa'diyah, 2020; Kurgat et al., 2023; Katie Tavenner, Saxena, et al., 2018). However, as has already been discussed the empowerment of women through market access is being paralleled with changes in gendered roles and ultimately a broader disruption of household and relationship dynamics.

6.3 The influence of market and non-market changes in smallholders' coordination during participation in the formal and informal milk markets.

Smallholders' engagement in formal and informal markets is embedded within a wider transition involving both market and non-market changes that also shape smallholders' coordination and their milk market participation. The shift towards formalization of milk markets is reflected in increasing cash transactions around milk among the smallholders' households which this research suggests is also a catalyst for changes within traditional household and community relationships and cultural institutions. This section discusses the following key findings. First, the association between increasing cash exchanges around milk and smallholders' coordination during milk market participation in Tanzania. Second, the impact of cultural capital in facilitating smallholders' coordination during milk market participation. Third, the role of cultural institutions and norms in increasing women's participation in milk markets in Tanzania. Last, is the challenged, undermined, and transformed cultural institutions and norms associated with smallholders' coordination during milk market participation.

The association between increasing cash exchanges and smallholders' coordination during milk market participation in Tanzania

The findings indicated that the increase in cash exchanges around milk has empowered women with access to formal markets and resources for contributing to the smallholders' household economy and has attracted the participation of men into formal milk markets and decision-making around the management of milk within and beyond the households. Market changes that have been promoted through policy and development agencies, and associated interventions in Tanzania, encourage commercial dairying for improved income and reduced poverty among smallholders (Lyatuu et al., 2022; Mbwambo et al., 2019; Morton, 2023).

The increasing ability to, and acceptance of, cash exchanges around milk have allowed women to establish or create market relations with other actors (some new), such as fellow smallholders (women), and milk buyers in the study area. Thus, the dairying smallholders for whom milk and cattle have significant cultural values managed to coordinate beyond their existing social networks during their engagement with formal and informal milk markets. Access to markets for milk has empowered most women to access formal milk markets and information. In addition, women in the study area can access income from milk and mobilize resources (cash, livestock) which are essential incentives for contributing to the household income. These findings concur with other studies which acknowledge that integrating dairying into markets can be a pathway out of poverty for most vulnerable women in Tanzania (Dizyee et al., 2019; Kilelu et al., 2017; Rao et al., 2019; Edgar Edwin Twine, 2016). Women belonging to the Maasai tribal group were able to directly link with formal markets, generate regular income, and access resources such as improved dairy cattle, which have the potential to contribute to the households' livelihood.

In addition, increasing cash transactions around milk has influenced more men to become involved in selling to formal markets as they are realizing the value of milk in contributing to the household economy. This result was particularly evident among the tribal groups where men were starting to focus not only on cattle but also milk as a source of income. Such shift in men's involvement in selling milk was paralleled with some men taking greater roles in aspects of milk production and consumption including animal husbandry, decisions as to the volume of milk to sell, choice of market, the exchange of milk, and managing the income gained. However, the extent to which men will seek to dominate the milk marketing space in the future in Tanzania is as yet, unknown. Given the multiple dimensions of the social, cultural, and economic change occurring in Tanzania a renegotiation of the role of men and women in smallholder households may occur. Along with changes in men's involvement around milk, there was also evidence of other changes that occurred in the study area. One example is the use of cash to employ labor to look after animals, traditionally a role retained by men in family groups. Other studies conducted in Kenya (Katie Tavenner, Saxena, et al., 2018; Yurco, 2023) also report the increasing participation of men in formal markets, and men's control over milking decisions, as they think such markets offer more cash, and as heads of households they seek control over all resources.

Increasing cash exchanges associated with milk have also influenced those employed in off-farm work and not dependent on farming for their livelihood to engage in dairy production and marketing. In this study, the prison workers had the opportunity to graze cattle and sell milk and most took up this opportunity. The example from this study indicated that, through cash exchanges around milk, dairying smallholders belonging to the prison worker group, were able to create market and non-market relations with other actors such as the milk collection centers, fellow workers (neighbors), their employer, and wage laborers, in accessing improved dairy cattle, land for grazing, cattle management, and animal health and extension services, to participate in milk markets.

Therefore, cash value of milk provides an economic opportunity for some smallholders, including important women (widows and non-widows), to integrate into commercial relationships and improve household income, as well as for men as they realize the value of milk in their households' livelihoods. This has led to changes in coordination patterns associated with milk within households and beyond households and tribal groups.

Impact of Social Capital

Social capital facilitated smallholders' coordination during their participation in both formal and informal milk markets, through a mix of networks in both tribal and non-tribal groups. Strong bonding capital within tribal groups including with family and neighbors, and friends, saw coordination within networks during the production and marketing of milk. Strong networks (bridging capital) also existed among the prison workers who coordinated during the management of cattle. The significance of neighbors was also apparent as a network many smallholders drew on for support and coordination. In the tribal groupings, this tended to be strongly based on kin and tribe, particularly for the Maasai but even when not kin or of the same tribe, smallholders coordinated with neighbors in both the management of animals and the selling of milk. This study contributes to highlighting the role of social capital in facilitating participation in milk markets among smallholders' tribal and non-tribal groups in Tanzania, through different informal network mechanisms. Such network mechanisms involve tribal and family members, friendship, and working relationships between smallholders of the same employer, and between smallholders' employer and other institutions, widows/women, and institutions.

The findings indicated a mix of mechanisms used by smallholders within their tribal networks. First, smallholders mutually organize and access support from other tribal members during

milk production activities such as grazing cattle (herding and exploring grazing areas during drought season) and in providing animal health services (vaccination and treatment), as well as on associated activities such as crop harvesting. Second, smallholders mutually share or exchange milk (and cattle) market information and support each other in collecting and exchanging milk to the market destination, as well as through gifting to other tribal members individually or collectively during tribal gatherings. Examples of such findings were indicated in the study among the Maasai smallholders who have strong bonding capital within their tribal networks during the production, marketing, and gifting of milk and cattle. Other examples were also indicated among other social groups (to a lesser extent compared to the Maasai), the Mbulu women smallholders in their sharing of milk market information and linking to the milk buyers, and the Sukuma who gather during crop harvesting. Thus, smallholders coordinate to maintain their shared values, trust, and reciprocal relationships which are built within their strong ethnic relations and institutions. Trust and reciprocal relationships are reported as among the key components of networks (Lyon, 2000; Woolcock & Narayan, 2000), including in those empirical studies related to smallholders' market participation (Allegretti, 2017; C. Mwema & Crewett, 2019a; Soares, 2018). This study provides further evidence of the facilitative role of bonding capital in enhancing smallholders' market participation in formal markets but only when combined with bridging and linking networks. The study also illustrates how engagement in formal markets can be a catalyst for broadening networks and building social capital. Such findings support a study conducted in Malawi (Craig, Hutton, Musa, & Sheffield, 2023) that indicated that despite strong bonding capital, women were constrained or limited in accessing market information due to their small geographical range and the internalized focus of their networks. In addition, another study in Kenya (C. Mwema & Crewett, 2019b) indicated that strongly tied networks (associated with bonding capital) are associated with redundant market information as compared to weakly tied networks (related to bridging capital) because the former can only access information within the village reach. Furthermore, the strength of the bonding capital among women in the study area spurred both individual and collective innovation, as they could exchange and develop new knowledge on improved dairying technologies and entrepreneurial behavior and managed to explore further economic opportunities through their traditional network, and beyond. The association of social capital and bonding ties has been found in other studies to have a significant role in stimulating and strengthening innovation among farmers in terms of technology adaptation and knowledge

exchange and learning (Cofré-Bravo et al., 2019; Guerrero-Ocampo & Díaz-Puente, 2023), as well in market access (Melesse, Tirra, Tui, Rooyen, & Hauser, 2023).

The findings also indicate a mix of networks used by smallholder tribal groupings in coordinating within their family networks in the study area. A common and predominant relationship within the family network across the smallholders' tribal groups was between smallholders and their sons in the management, gifting, and marketing of cattle and milk. Both male and female smallholders worked with their sons in the management and gifting of cattle, while predominantly women sought their son's input in the marketing of milk. Examples from the study indicated parent-to-son linkages were evident during the grazing, vaccination, and treatment of cattle, gifting of cattle through inheritance and marriage, and the selling of live cattle across Maasai, Sukuma, and Mbulu tribal groups. On the other hand, sharing of milk market information and delivering milk to market destinations (for exchange) were common among the Maasai and Mbulu groups. Most of the female smallholders especially the Maasai, are involved with their female siblings or fellow wives (co-wives) in sharing market information and collecting and exchanging milk. Some male smallholders relied on having broader networks (i.e., their close family siblings) through which they access market information.

Networks forged on the grounds of working relationships among dairying smallholders and other actors emerged as an important form of coordination around milk market participation in the study area. This was a form of coordination by organizations linked to a social grouping that is non-tribally affiliated that was significant in facilitating access to improved dairy cattle. One example from the results showed that dairying smallholders from the Prison social grouping were enabled to access improved dairy cattle and animal health services, which are crucial incentives for their market participation through the existence of collaboration between their employer (the Prison Department) and a neighboring large-scale dairy farm owned by a private institution. In addition to the above, bridging capital was important in facilitating smallholders' access to land, animal health services, and labor, all key resources for improving milk production and integrating into the formal milk markets. Smallholders belonging to the prison workers' group who share the same employer (Prison Department) and live in one area as neighbors (prison barracks), accessed land and animal health services such as vaccination through their employer. In addition, they (as a group of prison workers) accessed labor as they mobilized waged labor for herding and milking their cattle. This research suggests that

smallholders (possibly like most people), maintain, foster, and seek networks through which coordination occurs. These are not restricted to family or close bonding networks but are based on trust and reciprocity which this research suggests can be associated with living in the same locality.

The study indicated the significance of friendship networks in shaping the smallholders' coordination during participation in both formal and informal milk markets. In such a case, smallholders draw on their friendship networks to access milk markets through sharing of the information and direct exchanges of milk. In both scenarios, the friendship networks influence the choice of the markets for the smallholders, and such was evident in both formal and informal markets. Examples from the study indicated that some of the smallholders preferred to exchange milk with a particular formal (e.g., a milk collection center owned by a large-scale processor), or an informal milk market, for the sake of maintaining their existing friendship relationships. Such cases are associated with trust and reciprocity which this research suggests is associated with shared background or history, as well as repeated exchanges. Other studies have also reported on how the networks based on trust and reciprocity associated with a shared history and repeated exchanges have influenced the participation of smallholders in the marketing of agricultural products, such as vegetables in Kenya (C. Mwema & Crewett, 2019a; C. M. Mwema, Crewett, & Lagat, 2021) and chili in Indonesia (Untari, 2023).

Drawing from above, social capital facilitated coordination among smallholders in both formal and informal milk market participation, through a mix of bonding, bridging, and linking capital. Tribal and family links dominated the coordination among the Maasai and were evident in cattle management, milk production, and marketing. However, these bonding networks were not the only networks through which coordination was organized. Bridging capital shaped coordination among both tribal and non-tribal smallholders' groups, however, it tended to dominate the non-tribal group where links were based around work colleagues and neighbors. The linking capital also shaped coordination among some tribal groups (i.e., Maasai widows), during their engagement with formal milk markets (in selling and sourcing extra milk). The opening up of bonding networks, identified by some as being a constraint to market participation (Craig et al., 2023; C. Mwema & Crewett, 2019b), to include bridging networks where trust and reciprocity are not limited to kin and tribe would appear to be a social dimension of the transition dairy smallholders in Tanzania are experiencing, associated with, or in parallel to, the expansion of market-led dairying.

6.4 The significance of smallholders' cultural institutions and norms on dairy commercialization in Tanzania

Dairying in the study area is strongly interwoven with the smallholders' cultural institutions and norms. Traditionally, milk was valued for its consumption and social functions only. As is evident in this research, the growing regard for the economic value of milk is shaped by its broader cultural value. The economic valuing of milk for those smallholders who have strong cultural associations with milk also appears to be a disrupter and/ or a catalyst for change in cultural institutions linked to milk and more broadly. Cultural capital is shown to facilitate and limit commercialization in the dairying sector, among smallholders in Tanzania, a finding supporting the work of other scholars (Allegretti, 2017, 2018; Balayar & Mazur, 2022; Soares, 2018; Katie Tavenner, Crane, et al., 2018; Thenuwara Acharige, 2022; Yurco, 2023). This research provides more evidence of how smallholders' market participation is embedded in their cultural fabric.

Cultural institutions associated with the value of cattle and milk defined the extent of participation of smallholders in the formal markets. Other scholars argue cultural institutions limit smallholders' participation in the formal market. Using the word 'limit' carries a negative connotation with an implied assumption that participation should be higher. Whereas in this research it is recognized that cultural institutions define the participation of smallholders in the formal dairy market, but this does not infer that it negatively impacts smallholders' livelihoods. The smallholders belonging to the tribal groups in the study area were practicing dairying as pastoralists and agropastoralists and cattle and milk were not their primary sources of income. The literature points out the social and cultural foundations of pastoral and agro-pastoral dairying practices of smallholders, and as a result, cattle and milk are not valued highly for profit maximization (Benti, Biru, et al., 2022a; Lind, Sabates-Wheeler, Caravani, Kuol, & Nightingale, 2020). Dairying smallholders' coordination around market participation is influenced by milk as a food source and/or for maintaining social relationships, rather than solely for pursuing income benefits, as is also argued in other studies that have researched culture and market orientation among pastoral and agro-pastoral smallholders (D. W. Benti, W. T. Biru, & W. K. J. S. Tessema, 2022b).

The next section discusses the institutions of marriage and identity, norms associated with women and milk, and the gifting of milk, to understand the association between dairying and

culture among tribal groups and highlights the impact of cultural capital in the coordination of smallholders during milk market participation.

Institutions of Marriage and identity around cattle

The association of cattle and the institutions of marriage and identity emerged as significant in understanding smallholders' coordination during their participation in milk markets, and hence in influencing dairying commercialization in Tanzania. The findings indicate that such institutions determined how milk and cattle were valued in the smallholders' livelihoods which also shaped the way they coordinated and participated in the milk markets.

Marriage was a key institution symbolized by owning traditional cattle and was common among smallholders belonging to the tribal groups in the study area. Marriage is an important cultural institution and linked to the institution is the acquiring of dairying cattle. When a couple is married, they are obliged to maintain several traditional cattle to support future generations, and then pass on through gifting or paying as dowry when their children are married. Thus, cattle are preferably and predominantly symbolized as assets for marriage more than for commercial purposes in the study area. The example from the study indicated that most of the smallholders belonging to the Maasai, Sukuma, and Mbulu predominantly practiced traditional dairying, with local breeds of cattle and poor use of improved dairy technologies which resulted in low and seasonal volumes of milk produced. This level and pattern of production can be viewed as limiting their potential engagement in the milk market. Such institutional obligations influenced smallholders' coordination because access to cattle is predominantly through tribal and family members through gifting and less common from commercial exchanges. The symbolic role of traditional cattle for marriage is also reported in other studies related to Maasai, Sukuma, and Mbulu (Gitungwa, 2018), and Maasai specifically (Allegretti, 2017; Nilsson, 2016; Nkedianye et al., 2019).

There is a strong link between the cultural identity of many smallholders and owning traditional cattle. Some smallholders who strongly associate cattle with their identity tended to only keep traditional cattle. Thus, such smallholders practice dairying in ways that maintain their cultural identity around cattle, rather than focusing on profitable or commercial purposes. This cultural value also influenced the management of cattle, the amount of milk produced and made available for exchange, and their marketing of milk. Maasai smallholders have strong associations with traditional cattle, what some of them refer to as "*cattle are part of their life*", or "*born as cattle keepers*", and in such cases cattle symbolize their tribal and livelihood status.

Most of the dairying smallholders belonging to the Maasai tribal group keep local cattle for dairying, rather than improved ones, and their dairying practices are quite traditional, with the use of low-input technologies. However, a change from solely traditional practices was evident with some Maasai smallholders accessing improved dairy cattle, while retaining traditional cattle to maintain their cultural obligations. Several studies have acknowledged the association between the Maasai pastoralists and their cultural identity (Homewood et al., 2009; Nkedianye et al., 2019; Yurco, 2018), as well as its significance around market participation, especially in the sale of live cattle (Allegretti, 2017; Soares, 2018). In addition, it also emerged that milk was strongly associated with women's identity and the right and expectation to manage milk in the household. Furthermore, women appeared to make use of such rights to advance their engagement in selling milk to both formal and informal markets. A similar study was reported among the Maasai smallholders in Tanzania (Allegretti, 2018), where milk not only identifies women as controlling milk within but also enables them to sell the product beyond their households, for cash.

Cultural norms associated with women and milk.

Cultural norms placing milk in the domain of women have significantly empowered women to integrate into commercial relationships around milk, which has increased their economic contribution to the household, as well as their participation in formal milk markets. Women who belonged to the tribal groups now participate in milk markets and have access to resources such as money and cattle which have contributed positively to their household's economy. Through their access to milk, women have established and strengthened their networks among themselves and with other actors. This has enabled them to access information on the milk market improved dairying technologies and link directly to the milk markets. Examples from the study indicated how women belonging to the Maasai tribal group used their networks to collect (accumulate) milk and sell it to both informal and formal markets, while at the same time accessing knowledge on improved dairying from other actors. Another example indicated that smallholders belonging to the Mbulu tribal group established a network of women among neighbors and used this to set prices and market information for their milk (mostly informal markets). Through such examples, women were able to generate income and accumulate cash and other resources such as knowledge and cattle, which are essential economic opportunities for improving their livelihoods. Through income generation from milk, women's economic contribution to their households has improved and increasingly become realized.

Improvements in income, and access to information, knowledge, and other resources among women are essential incentives for dairying commercialization. A few recent studies associated with dairying commercialization in Tanzania have highlighted how women could make use of their roles in managing milk as an economic opportunity for integrating into formal milk markets. One of the studies was conducted among the Maasai in Tanzania and highlighted how the role of women in managing milk could be of advantage to them in integrating into the cash economy (Allegretti, 2018). Similar studies were conducted among dairying smallholders in Kenya (Katie Tavenner, Crane, et al., 2018; Yurco, 2023), and discuss how women's milking spaces are limited by men's control over resources, especially around their participation in formal milk markets. Other studies acknowledged how women are facilitated by gender norms which allow them to control milk, create spaces to network with other women and sell milk (Yurco, 2023), and create networking and support systems for vegetable market access (Balayar & Mazur, 2022).

Cultural norms associated with the gifting of milk.

The cultural norms around gifting milk influenced the Maasai and Sukuma coordination during their participation in the milk markets. Smallholders allocated a large proportion of the milk volume produced for gifting a social function. Gifting milk is a form of reciprocity among tribal members gifting when someone is experiencing hardship or during traditional gatherings. This practice and the social function of gifting are well reported in the (Koczberski et al., 2018; Thenuwara Acharige, 2022). Retaining the social function of milk inherently reduced the potential volume of milk that could be exchanged for cash. Several other studies have indicated how gifting of the milk affected the volumes of milk that could be allocated for cash exchange (Thenuwara Acharige, 2022). But as in this study viewing milk's functions solely in terms of financial fails to recognize the social value afforded smallholders and their livelihoods.

6.5 The significance of increasing participation in the formal milk markets on smallholders' existing cultural institutions and norms

The market changes that have been imposed on smallholders' livelihoods are associated with ongoing market-led transitions in Tanzania dairying. This study highlights some potential implications of a market-led transition among smallholders by discussing the renegotiations that may arise around gender norms associated with the roles of men and women, and power relations around milk. The detailed discussion is presented below.

The renegotiations around existing gender norms associated with the roles of men and women around milk.

The role of gendered norms around milk among smallholders has been made clear, and so too has the trend of participation among women and men in the formal milk markets. In such cases, women are increasingly empowered through engaging in the formal milk markets, while men are increasingly realizing the potential economic value of milk. Such shifts are likely to pose challenges to the dominant gender norms. Examples from the study indicated the increasing trends in collaboration between husbands and wives or family members in making decisions together concerning the volume of milk to be sold, delivery of milk to the buyers, and planning for income expenditures. Such is an indication of the shifting trends towards collaborative participation in intra-household power relations around milk among smallholders. Evidence of such shifts has already been reported in Kenya (Katie Tavenner, Crane, & Saxena, 2021), where increased participation in informal and formal milk markets is empowering women, as they can co-operate with their husbands in intra-household decision-making, hence enabling them to access control over income. Another study, also conducted in Kenya, indicated how the participation of women in informal and men in formal dairy markets, legitimizes the cultural gender norms around power relations, which discourage women from engaging in commercialized activities because selling in informal markets is considered as not for profit (Katie Tavenner, Crane, et al., 2018).

Furthermore, there are indications of emerging shifts in the roles of men and women around milk, especially in the aspect of labor during management of cattle, and in the economic contribution of women in the household. In such cases, the women's and men's involvement around milk has shone a light on the traditional gender norms that limit and enable men and women. One of the examples in the study indicated how participation in milk markets has enabled women to demonstrate their ability to generate income and contribute to their household income, thus challenging the existing gender norms that positioned them against such benefits and economic roles. On the other hand, the participation of men in milk markets has also enabled them to pursue income benefits through milk. Evidence from previous studies conducted in Tanzania (Allegretti, 2018; Gitungwa, 2018; Loos & Zeller, 2014), Ethiopia (D'Haene et al., 2019), and Kenya (Katie Tavenner, Crane, et al., 2018; Katie Tavenner, Saxena, et al., 2018), have indicated that men have a restricted role in milk because it is perceived as of less commercial value and its contribution to the household economy is downplayed. This research would argue that this is changing.

Men's influence over women and its implications for their engagement in the milk market was also evident in examples where the men controlled the women's movements within and beyond households. This then limited women's ability to deliver milk regularly and build links with other actors. Examples from the study indicated some cases where women from the Maasai group participated in markets through networking with other women (their siblings and friends) within their family and tribal structures, and they secretly aggregated (collected) volumes of milk and sold together, or directly help one another to deliver milk to the market. Such cases indicate how networks were used by women as a means of avoiding space-restrictive gender norms. A similar case was recently reported in a study conducted in Kenya, among the dairying pastoral communities (Yurco, 2023).

Therefore, as transitions towards commercial dairying are on-going in Tanzania, evidence from this study highlights the likelihood of emerging contestations around milk, especially among the smallholder tribal groups whose dairying is strongly attached to cultural institutions and norms.

6.5 Conclusion

The discussion in this chapter highlights the key theoretical and practical findings and contributions of the thesis in responding to the research question: how do smallholders coordinate during milk market participation and why? The discussion highlighted the patterns through which smallholders coordinate during their participation in milk markets. In addition, the discussion highlighted that market and non-market changes around milk were influencing factors for shaping the coordination of smallholders in the ways they participate in a mix of formal and informal milk markets. Finally, the discussion highlighted the significance of the increasing dairying commercialization on the existing smallholders' cultural institutions and norms.

Based on the above discussion, the emergence of different patterns of coordination during milk market participation, and their variation within and across existing smallholders' social groups highlight the complex circumstances in which their livelihood actions occur. Such complexity provides a broader reflection of the ongoing transition towards dairying commercialization in Tanzania, and the extent to which smallholders commonly and differently engage with existing milk markets in the context of such transition.

Apart from the above, the discussion also highlighted that market changes have had a significant influence in shaping smallholders' coordination during milk market participation in Tanzania. The indicated increases in cash exchanges around milk emerged as key in influencing smallholders' coordination in milk market participation. Cash around milk led women to forge and create commercial relationships with other actors and eventually empowered them with access to resources which are useful incentives for increasing their contribution to the household economy. In addition, cash around milk attracted the participation of men in formal markets and decision-making around the management of milk within and beyond households, as they are increasingly realizing the value of milk in their households' economy.

Furthermore, the bonding, bridging, and linking capitals were reflected in smallholders' coordination in accessing milk market information, directly linking to the buyers, and in the use of production resources (land, labor, and cattle). The study indicated the emergence of a mix of network mechanisms which tended to be within their tribal groups and extended beyond, including shared employment and locality which were used by smallholders to coordinate during their participation in milk markets. The aspects of trust, reciprocity, and shared support remain important elements for bonding and bridging smallholders when participating in the milk markets in the study area.

The study indicated that dairying has remained strongly attached to the smallholders' existing institutions and norms which are associated with cattle and milk, and these have influenced smallholders' coordination during milk market participation. The institutions of marriage and cultural identity around cattle, as well as the cultural norms associated with women and milk, influence smallholders' coordination during market participation. In general, the study indicated that smallholders' participation in milk markets is profoundly embedded within their culture (institutions and norms) and defines and reflects why they coordinate in the ways they do when they participate in markets. Therefore, an understanding of smallholders' market participation cannot be separated from an understanding of their embedded social and cultural fabrics.

The final section discussed the significance of increasing the participation of smallholders in formal milk markets on the existing cultural institutions and norms around milk. The section highlights how institutions and norms could be renegotiated in the future, as indications from the study show the trends in dynamics of the roles of men and women around milk, increasing

adaptation towards improved dairying and how it will result in shifts in labor patterns and identity of smallholders around traditional cattle and the increasing economic value of milk against its consumption value. The overall conclusions that can be drawn from the research are now presented in the final chapter of this thesis.

CHAPTER 7. CONCLUSIONS

7.1 Introduction

Smallholder dairying in Tanzania is undergoing rapid growth with investment being made in different aspects including research and development. The growth of the sector is anticipated to contribute hugely to improving the livelihoods of the poor and the economic development of rural areas. The dairy sector in Tanzania is transitioning towards being market-led, where commercialization, livestock intensification, and formalization of markets are emphasized as better options for improving smallholders' livelihoods and eventually alleviating poverty. This study contributes to explaining how and why smallholders practice dairying and engaging in the marketing of milk in the current context in Tanzania. Using a case study of dairying smallholders in Mvomero district, Tanzania, this study answered the research question: how do smallholders coordinate to participate in milk markets, and why? This study explored the livelihood circumstances and experiences of smallholders in their dairying, by focusing on how and why they engaged with formal and informal milk markets. Smallholders undertake dairying activities grounded in the social and cultural fabric of their lives, and this space is undergoing multiple dimensions of change. The key conclusions, theoretical contribution of this study, and associated implications for dairy sector development and research are presented in the following sections. The study uses the livelihoods approach in answering such a research question. The indicated findings from this study are useful for rural development policymakers and associated agencies, as well as other scholars, who are focusing their efforts on improving smallholders' livelihoods and reducing rural poverty.

7.2 Key conclusions and theoretical contribution

Smallholders' coordination in milk markets is diverse.

Smallholders are heterogeneous, and in this study, their diversity is indicated in the varied ways in which they coordinate during their participation in milk markets. In terms of their milk market participation, the study illustrates the diversity associated with the ways smallholders,' of varied tribal affiliations, engage differently with markets. Looking at Tanzania as a country, the reflections of smallholders' diversity have strong implications for the ways they participate in the formal and informal milk markets.

Gender norms shape how many smallholders engage in milk markets and translate into varying roles for women and men smallholders and the power relations around milk. The ways

smallholders engaged in the milk market varied depending on the extent to which the smallholders remained bound to traditional cultural norms. The shift to a more market-led dairy sector is occurring in parallel with changes in the social and cultural norms of many Tanzanians, and access to markets is shaped and shaping these changes.

The diversity among smallholders exists within and across social groupings. Within social groupings, personal circumstances and characteristics influenced market engagement (including gender, age, and marital status). The variation across social groupings reflected varying levels of adherence to cultural norms (including norms that define the role of women and men and milk and the significance of cattle to identity and marriage) and the level of dependence on cattle for their livelihood. The market engagement among smallholders varied in terms of the type of cattle they farmed, how they managed cattle and produced milk, the relative amount of, and regularity of selling milk, the sharing of market information, and the choices of milk markets in which they participated.

The findings of this study highlight that rural development interventions that target dairying to transform livelihoods need to acknowledge the wide diversity of smallholders and make sure planning and strategies reflect the different livelihood choices and experiences, and the associated contextual dynamics. This research argues strongly for the need to account for the cultural capital of milk and cattle and the implications of this on intrahousehold and intra-social group dynamics and coordination.

Bonding relationships dominate in smallholder milk market participation.

Strong bonding relationships dominates Tanzania smallholder tribal groups when they engage in milk markets. Such was reflected in the way bonding relationships that existed within smallholders' tribal and family networks shaped their participation in formal and informal milk markets. However, the presence of a formal and informal milk markets and the growing significance of milk as a source of income to the household was a catalyst for extending networks to linking and bridging. These networks were reflected in who and how smallholders coordinated in their milk market participation. Strong bonding relationships, which tended to be within tribal (i.e., Maasai widows and Mbulu women) and family networks were significant in facilitating their coordination during milk market participation in Tanzania. In addition, the influence of bridging and linking relationships complemented the existing bonding networks, as the smallholders had and continued to seek and build relationships with actors beyond their tribes in association with selling milk to informal and formal markets. Counter to this, those

smallholders whose networks tended to be dominated by bridging capital in their coordination and engagement in milk markets did not engage in pastoral and agro-pastoral dairying as their primary livelihood activity. Linking capital was significant among some smallholders as their coordination was based on affiliation between their tribal networks (i.e., Maasai widows) and actors in the formal milk markets (e.g., Milk Collection Centres). In general, coordination among smallholders was facilitated with a mix of bonding, bridging, and linking capitals, hence networks of family, tribe, as well as of work colleagues, neighbours as well as commercial-based actors.

The smallholders, especially those practising pastoral and agro-pastoral farming in Tanzania, remain highly fabricated within their social and cultural frameworks and for these smallholders bonding social capital dominates

Cash transactions around milk are a catalyst of social and cultural change.

Changing the functional value of milk to include that of exchange for cash can disrupt, and be a catalyst for changes in, existing social and cultural norms. In this study, the commercialization of dairy for smallholders is shown to lead, for many smallholders, to a renegotiation of cultural norms and roles within, across and beyond household relationships and coordination. Participating in the selling of milk, in this research, sits within a broad transition with evidence of social, cultural, and economic shifts at levels from within the household to the community and beyond. The extent to which the presence of a commercial market for milk has been a catalyst for change for smallholders in the study area is unclear. What was made very evident by the diversity across the social groups who participated in the research is that Tanzania is experiencing massive change across multiple dimensions including market-led initiatives, culturally embedded responsibilities among the tribal groupings, and policy changes like land reforms that are influencing the lives of pastoral and agropastoral communities. The relevant examples were illustrated among the Maasai during the study. These changes include the reconfiguration of their settlement patterns, the weakening of tribal and kinship networks and the building of linking and bridging networks, a shift from a reliance on pastoralism and agropastoralism for livelihoods and the growing acceptance of the value of cash at the household level and broader level.

Cultural capital facilitating and constraining market participation

Cultural capital can both facilitate and constrain commercialization among smallholders. This study indicated a strong association between dairying and smallholders' cultural institutions

and norms, that enabled some to engage in selling milk but also constrained the proportion of milk made available for sale.

The facilitating role of cultural capital was evident in the empowerment of women in the study area. The existence of strong cultural norms associating milk with women for many of the smallholders has enabled women to engage in income generation through selling milk which resulted in women making economic contributions to the household which in turn has led to changes in the household relations between men and women. What this research suggests is that the commercialization of an agricultural product aligned to a distinct group (gender or otherwise) within a community can provide a mechanism for empowering that group and providing a potential catalyst for broader social and cultural change. This is a useful finding for informing the ongoing initiatives which are promoting dairy commercialization in Tanzania. Where other scholars argue (Assefa & Tegegn, 2018; Chawala, Banos, Peters, & Chagunda, 2019; Dizyee et al., 2019; Katie Tavenner, Crane, et al., 2018; Katie Tavenner, Saxena, et al., 2018; Wangu, Mangnus, & van Westen, 2021) that cultural norms limit access and engagement in markets this research illustrates a distinctly different stance. Cultural norms can facilitate a transition to more market-led dairying.

Cultural norms can also constrain the full-scale shift to market-led dairying. When milk has existing social functions that contribute to household well-being and social resilience the shift to solely valuing milk for its commercial value will take time and broad-scale cultural and social change.

7.3 Practical implications

Effective policy initiatives for reducing poverty and improving the rural economy through agriculture in Tanzania need to account for the complexity and diversity of smallholders. In promoting dairy commercialization in Tanzania, and progressing efforts aligned to the poverty reduction strategies, context-specific categorization of dairying smallholders into distinct groups could be an effective approach towards successful interventions. These groups may not align with tribal affiliations but clearly also need to recognize intra-family and household distinctions between men and women and young and old. This study has provided insights into the different livelihood circumstances in which smallholders exist and make decisions about integrating into commercial dairying.

Rural development and poverty reduction strategies and policies at the local (grassroots) levels must be designed and tailored to the specific circumstances of the smallholders, and to be conveniently flexible to ensure such designs accommodate and adapt to the diverse needs and circumstances of the people. Assuming smallholders are a singular homogeneous group will result in some groups being disadvantaged and the outcomes sought by the development initiative will not be achieved.

This study strongly emphasizes the need for rural development policies in Tanzania (and other developing countries) to understand smallholders' market participation in perspectives of both market and non-market insights, rather than the biased market-based views only. The study indicated that market participation of dairy smallholders not only draws on the financial perspectives of their livelihood, but rather, it involves other social and human factors. The research showed evidence of the increasing influence of the market factors in transforming the livelihoods of smallholders, due to increasing cash transactions (as discussed around milk), as well as providing more opportunities for them to access economic benefits (e.g., women empowerment through milk) through engaging with formal markets.

Furthermore, the study has highlighted the need for multiple values of agricultural products beyond money to be considered by development policy, in their efforts to address poverty in Tanzania and other developing countries. The research has indicated how smallholders variably value milk in their different livelihood circumstances. Among the tribal groups where dairying emerged to be strongly attached to their cultural fabrics, their milk, and cattle are much more valued for consumption and social needs than its financial role. In the non-tribal groups, milk is valued beyond providing additional income only, but also for consumption as an important protein supplement in their diets.

The study has highlighted how culture is important in shaping smallholder's livelihood decisions, under the market-led transitions. The cultural capital has importantly influenced women by facilitating their access to essential incentives that could aid their integration into commercialization. Such a finding is a useful contribution to policy, as it will aid in identifying potential entry points and the target groups in the dairy commercialization interventions. On the other hand, understanding culture also provides insights as to why development interventions do not attain the desired outcomes in the way expected and reinforce the need to include culture as a consideration when designing and implementing dairy-related policies.

Future trends suggest increasing smallholders engaging in exchanging milk for cash. This is promising for market-led policymakers and implementers. In such instances, proper strategies and approaches need to be put in place with both short and long-term support, to make sure that the groups of smallholders transitioning to selling milk commercially are accommodated by the process. Currently, there is limited institutional development to support the formal dairy markets in terms of the physical infrastructures and appropriate technologies, among others, in Tanzania.

It is of utmost importance that all strategies and approaches suggested above go in hand with capacity building through sensitization and education/training among those different groups of dairying smallholders. Such will increase the chances and confidence of these groups to understand commercialization in dairying and be able to prepare and effectively integrate into formal dairy marketing systems.

7.4 Future research

Cultural capital emerged as a very useful aspect in understanding smallholders' market participation. This study has shown a diversity among tribal groups existing within one locality (a ward and district). Similar research is needed to be undertaken in other contexts, with other tribal groups known to have different cultural norms associated with milk. Such could build up more evidence which could be useful in the planning of rural development interventions, which consider the wider cultural diversity associated with milk.

This study has also indicated how cultural norms and institutions associated with milk have empowered vulnerable groups such as women and widows, to gain benefits related to commercialization. Further research is to identify similar opportunities where vulnerable groups have access through their cultural norms and structures, to agricultural activities that could be targeted for commercialization to enhance their development and act as a broader catalyst for social change.

The participation in milk markets among men and women has emerged as dynamic in this study and has been associated with the context where formal and informal markets are highly interwoven. As a result, there is still limited detail as to what extent men and women engage in such markets separately, and what are their perceptions of such markets in the context of their mix and concerning their livelihood goals.

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APPENDICES

Appendix A: Information sheet

Smallholder Livelihoods and the Marketing of Milk: A case study of dairying in the Mvomero district of Tanzania.

My name is Fred Jacob Wassena. I am a Tanzanian. I am currently a student at Massey University, pursuing a PhD in Agricultural Systems at the Institute of Agriculture and Environment. I am undertaking this research to fulfil the requirements for a doctoral degree. My research topic is titled smallholder livelihoods and the marketing of milk. I will focus on the case of dairying in the district of Mvomero in Tanzania. This research aims to understand how coordination is produced around milk, by smallholders in the Mvomero district, and to understand the implications of coordination for the future of dairying in Tanzania. I would like to invite you to participate in this research.

In this research, I intend to do one-to-one in-depth interviews which are open-ended and pre-structured, and to do participatory group interviews/ discussions where necessary**.** In addition, I intend to use relevant secondary information from different sources like reports from government bodies and NGOs. I expect to recruit two categories of participants for this research. The first category will include the village extension officer, village executive officer, village chairman, village local leader/s, a representative local trader, a representative from the milk collection center, a person/s from religious institution/s and other key people who will be identified as important to provide initial information for this study. The second category will include the smallholders who practice dairy production in the village. The first category is selected to help provide the initial general information which will show a map of the existing paths of milk and what shapes these paths and will help as entry points for understanding the coordination process, within the village. The second category is selected to get detailed information on how coordination around milk is produced, about their livelihood activities, and are implications of the coordination process for future dairying. The Mvomero district has been selected because it is among the milk-producing areas and the area where several dairy projects have been undertaken.

The listed participants in the first category will be involved in the first phase of data collection, and the smallholders in the second category will be involved in phase two. As you have been selected as a participant in this research, you still have the right to decide on your willingness to participate. The duration of the interviews is expected to be 2.5 hours, and the recording of the interview, time and place will depend upon your consent. I expect to transcribe the information for analysis, and the quotations will not be included without your consent. All the information obtained from you is only for this research. The information will be stored under all safety precautions and only the researcher and supervisors will be allowed to access it. Storage of the recorded interviews will be only for five years and will be destroyed thereafter.

You are free to decline when you feel that the questions make you uncomfortable and to ask for any clarifications. You are free to withdraw your participation in this research anytime you

feel to do so, and you can inform the researcher beforehand. You are also free to decide whether your name can be used in the reports, and you have the right to ask for feedback on the summarised findings of this research.

This research has been ranked as low risk according to the evaluation of the peer review. It has not yet been reviewed and approved by the Massey University Human Ethics Committee. The above-named researcher is responsible for the ethical conduct of this research. For confirmation and other concerns on the conduct of this research beyond ethics, please contact Dr. Brennon Wood and Dr. Janet Reid. Below are the contact details of the researcher and supervisors:

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Appendix B: Participant consent form

Smallholder Livelihoods and the Marketing of Milk: A case study of dairying in the Mvomero district of Tanzania.

I have read the Information Sheet and have had the details of the study explained clearly to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree/do not agree to the interview being sound recorded.

I agree/do not agree to the interview being image recorded.

I wish/do not wish to have my recordings returned to me.

I wish/do not wish to have data placed in an official archive.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: …… Date:…….

Full Name – printed …….

Appendix C:

Data Collection – Phase I

Interview guideline: Key informant interviews.

Smallholder Livelihoods and the Marketing of Milk: A case study of dairying in the Mvomero district of Tanzania.

I. To collect profile information of the key informants.

1. Position of the participant
2. Occupation of the participant

II. To get general information of smallholder dairying in the village (past to present, and in seasons)

Question: Tell me how dairying gets done around the village?

1. Ways or types of dairying in the village i.e., breeds, modern practices, feeding etc.
2. What activities associated with dairying in the village and how?
3. The dairy programs and projects and actors in the village (what, when, who and how)
4. The best and worst stories associated with dairy in the village e.g., climate, technology, policy, market etc.
5. Who are the main actors associated with dairying in the village?
6. How do people produce milk?
7. What are the main changes that have taken place in the way people practice dairying in this village over the past 20 years? What has changed and how? What are the reasons for the change/ if experienced any?

III. To understand about milk in the village (past to present, and in seasons)

Question: tell me what do people do with milk around the village?

1. What do people do with milk, and what are the reasons for doing what they do?
2. Where do people take their milk to, how and why?

IV. To understand about how the farming practices associated or linked to dairying.

Question: how is dairying associated with other farming practices in the village? E.g., related to feeds, income to run dairying? (Past to present, and seasons)

1. Other farming practices in the village, types and why?
2. Is/ are there any traditions or culture associated with dairying in the area, and how?

V. Information from local traders and collection centers

Question: Can you explain to me how you are involved with smallholders in dairying (i.e., milk production and marketing/ exchange)?

1. How you engage with smallholders?
2. What are opportunities and constraints?
3. What you think of the future around milk or dairy in general.

Data Collection - Phase II

Interview guide for smallholder dairying farmers

I. To collect contextual information of participants.

1. Participant role in the community

II. To understand the smallholder's involvement with milk production (past to present, and in seasons)

Question: tell me how do you keep your cows?

1. The number and type of cows for milk and why
2. The amount of milk produced.
3. Purposes of producing milk
4. The roles of other household members and what they do
5. Involvement of other actors in and outside the village and what they do
6. The best and worst events associated with dairy.

III. To understand what smallholders do with the produced milk, about the formal and informal channels of milk (past to present, and in seasons)

Question: tell me what you do and how you deal with milk? What are the main changes that have taken place in the way you practice dairying in this village over the past 20 years? What has changed and how? What are the reasons for the change/ if experienced any?

1. Where does the milk go? To whom? Why?
2. The amount, frequency, and seasons of the year
3. Who are involved in your household and what they do?
4. Who are involved in the village and what they do?
5. What about the benefits (income and non-income)

IV. To understand other farming practices done by smallholders (past to present, and seasons)

Question: Tell me how and why dairying is the way it is, compared to other farming you do?

1. Besides, farming what is/are another/other form (s) of farming do you practice? What are the reasons?

2. What is the relationship between other forms of farming and dairying (if practiced)
3. How do you produce (land, other resources)?
4. Who is involved, how and why?
5. What are the social-cultural practices that affect your form of dairying practice? Choice of breed, milking, consumption, marketing?
6. What do you think of the future around milk or dairy compared to other farming practices?