Smallholder Dairy Farmers' Livelihoods: Opportunities and Challenges in Metta Robi Woreda, West Shewa Zone, Oromia Regional State, Ethiopia

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Research Article

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Abstract

In today's world, small-scale dairy farming has become commonplace. Farmers in Ethiopia, particularly in rural areas, have used it to supplement their income and ensure food security. This study aimed to assess the opportunities and challenges for the livelihoods of smallholder dairy farmers in Metta Robi woreda. A mixed research method was applied, with descriptive and cross-sectional research designs. A total of 372 SDFs (households) who performed dairy farming in the research area were selected using a systematic sampling technique. In addition, three kebeles in Metta Robi woreda were randomly picked from a total of 23 kebeles. The questionnaire was used to obtain quantitative data, while in-depth interviews, key informant interviews, and personal observation were employed to collect qualitative data. The quantitative data were analyzed using descriptive and inferential statistics, which were performed using SPSS Version 21. On the other hand, the qualitative data were transcribed and analyzed thematically. The findings showed that households in the study area engaged in a variety of livelihood activities. For more than half of the sampled households, on-farm activities are their primary source of income. The data also revealed that the study area's opportunities included appropriate environmental conditions, availability of land and water, market and road, social networks, access to information, crop residue availability, and credit service. However, land-use change, market fluctuations and inaccessibility, a lack of labor and sufficient competence, a lack of infrastructure, livestock diseases, and a scarcity of feed and water were mentioned as issues that affected SDFs' livelihoods. It was suggested that the government pay special attention to the challenges that affect SDFs' livelihoods in general and the study area in particular.

1. Introduction

Smallholder dairy farming is an economic activity in which a group of no more than seven milking cows is kept on less than one hectare of land (Henk et al. 2007). In many places in the world, it has become ubiquitous. More than 150 million households throughout the world rely on this form of dairy farming for a living (DGEA 2015). Smallholder dairy farming provides a vital source of income for around 20% of the world's population, primarily rural and peri-urban populations in various parts of the world, particularly in developing countries. It is gratifying to see that it is becoming progressively significant and contributing brilliantly to the improvement of the livelihoods of a minority of the peri-urban poor in many developing countries (Azage 2018; Katsande et al. 2009; McDermott et al. 2010).

According to Staal et al. (2008), smallholder dairy farming is common throughout Asia, Sub-Saharan Africa, and Latin America's developing countries. Ethiopia, too, is one of Africa's developing countries with the most cattle, and smallholder dairy farming is common in the country's rural areas. According to CSA (2015), Ethiopia's livestock population is expected to be around 55 million heads, with around a quarter of those being milking or dairy cows. On the other hand, the number of cattle kept by Ethiopian dairy farmers varies from year to year. For example, according to CSA (2010), Ethiopia's livestock population is expected to be 49.3 million people. Local breeds made up 99.28% of the population, while hybrid and foreign varieties made up the rest (0.72%).

According to several researchers and authors (Tsegay et al. 2015; Ulfina 2013; Tadesse and Mengistie 2016; Tegegne et al. 2013), smallholder dairy farming and dairy farmers in Eastern and Southern African countries face major challenges. These challenges include the prevalence of livestock diseases, seasonal fluctuations in the quality and quantity of feed and water, the low genetic potential for milk production, inadequate milk collection, and marketing infrastructure, and limited knowledge. Furthermore, low production and a manpower shortage have been identified as major challenges for Ethiopian dairy farmers (Tadesse and Mengistie 2016).

Furthermore, according to a study conducted by Duguma and Janssens (2018), the most significant challenges in livestock production identified by dairy farmers were a lack of feed and water, as well as the incidence of animal disease. According to Uddin et al. (2012), the disease is the most significant barrier for small-scale dairy farmers in Bangladesh, followed by an unpredictable milk market, high medicine and feed expenses, and the failure of artificial insemination. Instead of focusing on the constraints and prospects, this study ignored the opportunities for small-scale dairy farmers.

As a result, this study was conducted to fill the gaps in describing smallholder dairy farmers' livelihood activities, determining opportunities for smallholder dairy farmers to pursue dairy farming, examining the challenges affecting smallholder dairy farmers' livelihoods, and investigating the activities of concerned bodies in supporting smallholder dairy farmers in Metta Robi woreda, West Shewa Zone, Oromia Regional State.

2. Literature Review

Theoretical framework

This study used the Sustainable Livelihood Framework (SLF) theoretical framework to assess the livelihood of smallholder dairy farmers: opportunities and challenges in Metta Robi Woreda of West Shewa Zone, Oromia Regional State. DFID (2008) explains that SLF is a conceptual framework that connects and clarifies the numerous livelihood possibilities that disadvantaged households pursue. This theory helps in understanding how poor households improve their living conditions (Serrat, 2010). The sustainable livelihood framework focuses on the certainty that people require resources to attain positive livelihood outcomes. People combine several forms of capital to obtain the lifestyle they desire. Human, social, natural, physical, and financial capitals are examples of these types of assets. These five capitals are critical for people to be able to make a living.

In general, this theory focused on smallholder dairy farmers' ability to maintain dairy farming continuity. Smallholder dairy farmers' ability to ensure continuity in dairy farming is determined by their assets and opportunities. It was employed in this study as a tool to uncover the issues that SDFs face and how they might improve their livelihood chances. The framework is also utilized to reveal the vulnerability context for SDFs, which includes health issues (livestock illnesses), climate change (seasonality), land-use change, feed and water scarcity, market fluctuation issues, institutional issues, and infrastructural gaps in the study area.

3. Research Methods

3.1. Study Design and Setting

From March 23, 2019, to September 12, 2019, the researcher performed descriptive and cross-sectional research among smallholder dairy farmers in three kebeles in Metta Robi woreda, West Shewa Zone, Oromia Regional State, Ethiopia. The Metta Robi woreda is located 114 kilometers west of Addis Ababa, Ethiopia's capital city, and 100 kilometers east of Ambo, the zone's town. The woreda is made up of twenty-six kebeles, 23 of which are rural, and three towns. Shino is the capital of Metta Robi woreda. The woreda's estimated total population was 115,734. Almost the entire woreda population speaks Afan Oromo as their primary language.

Based on its relative location, the woreda is bordered on the south by Ejere woreda, on the southwest by Jeldu, on the northwest by Abuna Gindeberet, and on the north by Metta Welkitte woreda and Adea Berga woreda in the east direction. There are three major agro-ecological zones in the woreda: Wine-Dega, Dega, and Kolla. Rainfall occurs twice a year in the woreda (Metta Robi Woreda Communication Office, 2019).

3.2. Sampling Technique and Sample Size Determination

This study used both probability (simple random) and non-probability (purposive) sampling techniques. As a result, the study sites, interviewees, and key informants were chosen using a purposive sampling technique. The quantitative portion of this study, on the other hand, was conducted using a systematic sampling technique. Following a systematic sampling technique of selected respondents/SDFs, the researcher used Yamane's (1967) sample size determination formula. The confidence interval chosen for this study is 95% and the margin of error is 5%. The totals of 2146 smallholder dairy farmers were identified in three kebeles based on their sampling frame obtained from the veterinary clinics for each kebele. The required number of household heads/SDFs was chosen based on the following formula.

The formula is as follows:

$$n = \frac{N}{1 + N(\alpha)^2}$$

Where, N= sampling Frame, n = sample size, and α = confidence interval

$$\text{Thus, } n = 2146 / 1 + 2146 (0.05)^2$$

$$n = 2146 / 1 + 2146 (0.0025)$$

$$n = 2146 / 1 + 5.365$$

$$n = 2146 / 6.365 = 337.156$$

Therefore, n = 337.156; approximately around 338 + non-response rate (10%) = 338 + 34 = 372

In the below figure, the researcher presented the selected kebeles with their numbers of households and households selected for the sample of the study with proportion to each kebele.

3.3. Instruments for Data Collection

Questionnaires, in-depth interviews, key informant interviews, and personal observation were used to collect data. To ensure reliability, the questionnaire was initially written in English and then translated into the local language (Afan Oromo). After that, the researcher re-translated it into English. As a result, 372 smallholder dairy farmers were given both open-ended and closed-ended questionnaires to complete. To make the interview process run more smoothly, the researcher used an interview guide written in English and then translated it into Afan Oromo. Each participant was given a brief description of the nature of the study and its purpose before the interview began. Face-to-face interviews were used, using semi-structured questions that allowed participants to express themselves on their terms.

To gather information for the study, eighteen (18) model and six (6) non-model farmers, three (3) kebele administrators, three (3) veterinarians, two (2) experts from the Metta Robi Woreda Agriculture and Rural Development, and two (2) from the woreda's Livestock Bureau, as well as three (3) agricultural extension workers, one from each kebele, were interviewed. The interviewers and informants for the interviews were chosen based on their knowledge of dairy farming in their area. For this study, a total of 37 people were interviewed.

3.4. Data Processing and Analysis

Without adequate structuring and analysis, raw data is worthless. Both quantitative and qualitative data were correctly analyzed to answer the research questions. In the quantitative case, SPSS Version 21 was used to analyze the data using descriptive and inferential statistics with a 95% confidence interval. In this study, descriptive statistics such as percentages and tables were used to describe the socioeconomic and demographic characteristics of smallholder dairy farmers. The chi-square test, on the other hand, was used to investigate the relationship between the livelihood condition of smallholder dairy farmers and thirteen (13) independent variables, including sex, age, marital status, educational status, land size, family size, experience in dairy farming, household income, number of dairy cows, distance to the market, saving, and access to credit service. As a result, a 95 percent confidence interval was used, and the results of these variables were statistically significant at the 0.05 significant level.

During the interview, the researcher took notes in a notebook and recorded audio on a personal cell phone. By reading the notes and listening to the recorded sounds, the written and recorded data were thoroughly transcribed. The data were recorded and the records were reorganized. Thus, the findings from qualitative data were rigorously triangulated with the results from structured questionnaires based on their commonalities. The qualitative information gathered from the participants in the study was transcribed and translated into English. As a result, the researcher was able to complete all of the study's objectives promptly. Qualitative data was properly categorized to corroborate the quantitative data. As a result, thematic analysis was applied to meet the study's objectives.

3.5. Ethical Considerations

Relevant and appropriate ethical considerations were made throughout the research process. As a result, before beginning the data collection process, Jimma University's sociology department provided a supportive letter written in Amharic to secure legal authorization from the necessary authorities. Permission was sought from smallholder dairy farmers and informants. The farmers were given all of the information they required about the study's purpose and its procedures. Furthermore, information confidentiality and the privacy of study participants were guaranteed. Finally, the numerous sources of information and literature used in this study, including books, journals, articles, and studies, were properly cited and acknowledged.

4. Results And Discussion

The quantitative data collected through questionnaires from smallholder dairy farmers and the qualitative data collected through in-depth and key informant interviews and personal observations are accurately analyzed per the study's objectives.

4.1. The Study Participants' Socio-economic and demographic Characteristics

This study had 372 participants, both men, and women. Males made up 84 percent of the study participants, while females made up only 16 percent. Since the majority of homes in the study area are headed by men, this is the case. In terms of age, the majority of respondents (49%) are between the ages of 36 and 55, 15% are between the ages of 18 and 35, and 36% are 56 or above. In terms of marital status, 86% (316) of respondents were married, 2% (eight) had never married, and 9% (34 respondents) and 4% (16 respondents) were divorced and widowed, respectively. In terms of education, 52% had completed primary school, 34% had no education, 9% had begun high school, and 5% had completed vocational training.

The families of the respondents were divided into three groups based on their size: 1-4 family members, 5-8 family members, and 9 family members or more. According to the data, the majority of respondents (50%) had 5-8 family members, while the remaining (41%) and (9%), respectively, had 1-4 and 9 or more family members. According to the size of their farmland, 42% own 2.1-3 hectares, 23% own 3.1-4 hectares, 18% own 1–2 hectares, 12% own 4.1 and above hectares, and 5% own less than one hectare. In terms of monthly total income from all sources, 38 percent of the sampled households earned between 1100 and 1500 ETB, 35 percent earned between 1600 and 2000 ETB, 15 percent earned between 2100 ETB and above, and 12 percent earned between 500 and 1000 ETB.

The researcher specifically enquired about the respondents' monthly total income from dairy products during data collection. As a result, 68 percent of respondents said their dairy farming income ranged from 500 to 800 ETB (the sale of milk products such as butter, ayeb, and, to a lesser extent, milk, which a small

number of respondents sell informally to neighbors). 16 percent of respondents said they didn't make money from dairy farming because they didn't have milking cows for some time in their households. The remaining 13% and 3% of respondents had monthly incomes of less than 500 ETB and more than 900 ETB, respectively.

According to the findings, most smallholder dairy farmers in the research area generate more money from dairy products than from other sources. As a result, it may be concluded that dairy products are the primary source of income for the study's sampled households. Dairy farming, the sale of dairy products, live livestock sales, and crop production were recognized as the primary sources of revenue in the study area. Petty trade, beekeeping, handicrafts, charcoal selling, and everyday labor activities were also mentioned as other sources of income in the research area.

The majority of the sampled households (87%) had saved their income in various ways, including cash at home, in an informal rotating saving system (ekuib, iddir), purchasing animal species, and saving in a formal saving method (bank). However, a small percentage of respondents (13%) answered that they did not save any of their income (money) because they have a poor income and prefer to use what they have to meet their family's needs rather than save. The study reveals that traditional savings methods are the most popular type of saving used in the study area.

4.2. Dairy Farming Practices in the Study Area

Smallholder dairy farmers in the research area mostly kept three types of dairy cows: indigenous breeds, cross-breeds, and mixed breeds. Smallholder dairy farmers in the research area kept the most common type of dairy cow, indigenous-breed cows, at 63 percent. According to the survey, 18% of respondents have a combination of indigenous and mixed-breed cows in their household, and 13% have indigenous, cross-bred, and mixed-breed cows at the same time. Furthermore, four percent of respondents keep both indigenous and cross-bred cows at the same time, while two percent keep solely mixed-bred cows. According to the findings, indigenous breeds of cows are widely reared in the research area. This is attributable to a paucity of dairy technologies and a lack of cross-breed cow distribution in the research area. Crossbred cows, according to the respondents, are not adapted to environmental conditions.

4.3. Livelihood Activities carried out by SDFs in Metta Robi Woreda

The study's findings revealed that the sampled households in the study area engaged in mixed livelihood activities (a combination of on-farm, non-farm, and off-farm livelihood activities). More than half of the sampled households rely on on-farm activities, primarily smallholder dairy farming, as their primary source of income. The majority of respondents (43.1%) relied on a combination of dairy farming, livestock, field crops, and horticultural crop production to make a living. The study also found that 27.7% of respondents used a combination of dairy farming, crop production, and livestock production/trading as a source of income.

On the other hand, 17.7% of respondents stated that dairy farming, crop production, livestock production/trading, and non-farm livelihood activities were their primary sources of income, while 11.1 percent of sampled households stated a combination of dairy farming, crop production, livestock production/trading, and non-farm livelihood activities as their primary source of income. The findings of the study corroborated those of Kassu (2016), who found that the most important sources of livelihood for smallholder dairy farmers in the study area were dairy farming, crop production, and livestock trading, followed by crop, livestock trading, and non-farm activities, livestock and off-farm activities, and livestock production only.

According to the findings of the study, smallholder dairy farmers in the study area were involved in a variety of activities for their livelihood. They mix a variety of activities and, hence, are not entirely reliant on one activity to support themselves. Furthermore, dairy farming and crop production are inextricably intertwined in rural areas in general and the study area in particular. As a result, the most important livelihood activities in the study area were on-farm livelihood activities. Among these activities, dairy farming, which was the study's main emphasis, is used as a source of income by many people.

According to my interviewee, a 48-year-old Gola Gurji kebele resident,

My primary source of income is a combination of three activities. Crop production, dairy farming, and livestock production are three of them. On occasion, I also use horticultural crop production methods, such as growing vegetables and planting garlic. My wife and daughter, in particular, are focused on non-farm activities such as brewing and marketing alcoholic beverages.

4.4. Opportunities in the Study Area for Smallholder Dairy Farmers

The second specific objective of this research was to ascertain the opportunities for smallholder dairy farmers in the study area to pursue dairy farming. The availability of land/feed, market accessibility, road and water accessibility, access to information, the availability of human capital/labor and crop residues, credit service availability, and social network accessibility were all identified as opportunities to practice dairy farming in the study area, according to the findings. These findings support a study by Azage et al. (2013), which found that the country has a wide range of opportunities, including large and diverse animal genetic resources, extension service centers for veterinary health and artificial insemination, agricultural extension services, and high demand for dairy products.

According to the data, smallholder dairy farmers in the research area have a wide range of opportunities to engage in dairy farming. Several of the opportunities were spotted during the researcher's field visit. The respondents, on the other hand, described several challenges they encountered while supplementing their income by raising dairy cows. Even though having these opportunities in the study area is critical for households to engage in dairy farming, farmers in Metta Robi woreda need assistance in developing modern dairy farming.

4.5. Challenges to Smallholder Dairy Farmers

The research found that dairy farming was the primary source of income for smallholder dairy farmers in the study area. Various issues that affected the livelihoods of smallholder dairy farmers while engaged in dairy farming were identified during data collection. The respondents in the study area identified poor access to veterinary drugs and services (91 percent), a lack of artificial insemination services (86 percent), a lack of skill (76 percent), a lack of labor (77 percent), land-use change (59 percent), feed shortages (75 percent), high feed costs (72 percent), disease prevalence (31 percent), and inadequate water supply (41 percent) as challenges.

These findings were found to be partially in line with Habtamu's (2018) findings, in which he said that the key issues encountered by dairy producers included a lack of concentrate feed and water, enhanced breeding, milk marketing, dairy animal health, and manure disposal. During the interview phase, interviewees were asked to state the challenges faced while pursuing dairy farming for their livelihood.

My interviewee, a 67-year-old Baka kebele resident, stated that,

While I am engaged in dairy farming, I am confronted with several challenges that I am unable to overcome since they are above my ability. For example, both my wife and I are becoming older. Tiksee hin qabu. This means that I am without a laborer. As a result, I am unable to engage in various tasks to support myself. I have two sons and one daughter. My daughter got married, and both of my sons have moved to the city. The only person who resides with me is my wife. I have plenty of grazing land. However, no one is supporting me with the care of my animals. Due to a scarcity of labor, I'm also having difficulty selling dairy products. Manni koo kilinika beeyladaarraa fagoo waan ta'eef, namni horii koo mana yaalaa naaf geessee akkamsiisu hin qabu. That is to say, no one has taken my cattle to the veterinarian clinic for treatment because I live so far away. Furthermore, the clinic's veterinarians may not be accessible when I arrive.

4.6. Concerned Bodies' Activities in Support of SDFs

The study's fourth objective was to investigate the activities of concerned bodies in assisting smallholder dairy farmers. The researcher conducted key informant interviews with chosen kebeles administrators, veterinarians, extension workers, livestock officers, and experts at the Metta Robi Woreda Agricultural and Rural Development office to obtain data for this specific purpose. The following is a qualitative analysis of the outcomes of key informant interviews on this objective.

My informant, a 37-year-old man who works at a veterinary clinic in Gola Gurji kebele, stated:

Dairy farming would be impossible without the help of veterinary extension services. However, I cannot say that the farmers in Gola Gurji kebele were satisfied with the veterinary extension services given in the clinic. This is due to the lack of the required facilities. As much as possible, I was never far away from helping the farmers using the resources available at our clinic. Farmers know my phone number and can call me whenever they want. Then I look after their animals and offer them plenty of guidance on modern dairy farming and other dairy cow-related issues. If their animals become ill, I notify them and treat them appropriately. I also provide free services to them because the clinic was built for them and belongs to

them. In addition, I provide artificial insemination services to Baka kebele farmers. However, the majority of farmers are unwilling to use artificial insemination services, preferring instead to use natural mating and breeding their cows with bulls.

5. Variables Related To The Sdfs' Livelihood Conditions

The Chi-square test was used to investigate the relationship between smallholder dairy farmers' livelihood conditions and explanatory variables. In this study, thirteen (13) independent variables were used, as depicted in the conceptual framework. The sex, age of the household head, marital status, education level, family size, land size, number of dairy cows owned, experience in dairy farming, monthly income from all sources, saving, distance to the market, access to credit services, and exposure to extension services were all found to be significantly associated with the livelihood conditions of SDFs.

The results of the chi-square test demonstrate that the sex of the family head and their livelihood conditions are associated. The p-value for the two variables is 0.02, which is less than 5%. (0.05). As a result, enough evidence exists to reject the null hypothesis. Therefore, it's reasonable to conclude that sex affects household income. This implies that the farmers' sexes have an impact on their living conditions.

The outcome of the chi-square test between age and SDF livelihood conditions was 0.046, which is less than 0.05. As a result, enough evidence exists to reject the null hypothesis. This data shows that the age of smallholder dairy farmers has an impact on their livelihood conditions. Adult and elderly living situations are drastically different. Adults are people who are in their prime of life and are more productive than others. They do not face the same challenges as the elderly in terms of sustaining their livelihood. The possibility of better living conditions decreases as one becomes older.

This could be because as household heads get older, their living conditions remain unchanged, and it becomes more difficult for them to enhance their living conditions. According to FAO (2019), unstable sources of income, instability in their livelihoods, a lack of diversified livelihood possibilities, and restricted access to social and health services make it difficult for older people in Ethiopia to achieve household security. According to the chi-square test, the p-value between marital status and SDFs' livelihood conditions is less than 5%, $p = 0.025$. As a result, the null hypothesis is invalidated. This finding suggests that a person's marital status influences their living circumstances. That is to say, married people have a greater edge in terms of their livelihood situations than their counterparts.

The educational status of the household head, on the other hand, is linked to their living conditions in this study. Two variables have a p-value of 0.006, or less than 5%. (0.05). Two variables have a p-value of 0.006 or less than 5% (0.05). Based on this result, there is sufficient evidence to reject the null hypothesis. The findings imply that educated households are more likely to have better living conditions than their non-educated counterparts. This is because those who have received an education have gained knowledge and skills that are critical for improving the household's livelihood. Education also allows people to be exposed to a variety of information sources. Furthermore, educated individuals are more likely than uneducated individuals to improve their livelihood situations. According to Solomon (2014),

education has a significant impact on dairy producers' revenue, dairy technology implementation, and family socioeconomic status.

The size of the family has also been linked to the household's livelihood conditions. For the two variables, the chi-square test p-value is 0.0017, which is less than 0.05. As a result, there is sufficient evidence to reject the null hypothesis. It can be stated that the size of a family has an impact on the household's livelihood situation. This means that smallholder dairy farmers with a large family size have a better probability of engaging in a variety of livelihood activities because they are projected to have more laborers. In contrast, due to a labor shortage, homes with fewer family members may face different challenges than their counterparts.

The results of chi-square tests demonstrate a strong association between land size and SDF livelihood conditions. The p-value is 0.04, which is less than 0.05. This means that there is sufficient evidence to rule out the null hypothesis. The findings show that households with more land are more likely than their peers to have a better standard of living. They have greater options to make money through various livelihood pursuits. In the absence of dairy cow feed, smallholder dairy producers with sufficient land, particularly grazing areas, may find it quite easy.

The study also discovered a link between the number of dairy cows kept by smallholder dairy farmers and their livelihood conditions. The chi-square test has a p-value of 0.0010, which is less than 0.05. As a result, there is sufficient evidence to reject the null hypothesis. The findings show that smallholder dairy farmers with a sufficient number of dairy cows have better living conditions than those with a small number of dairy cows. Households with more dairy cows have a better chance of increasing their revenue and meeting their family's needs.

In this study, saving was suggested to be associated with the livelihood of smallholder dairy farmers in the study area. According to the Chi-square test, the p-value of the variable is 0.014, which is less than 0.05. As a result, the result supports the rejection of H_0 . This statistic implies that households who save their money are more likely to improve their living conditions than those who do not. Saving is, without a doubt, one of the most vital aspects of a person's livelihood. It enables people to overcome financial difficulties in times of need. "Olkaa'an malee olkaa'anii hin fuudhan," says an Oromo proverb, implying that you can't simply take if you haven't stored.

In this study, access to credit and the livelihood situation of the sampled households were found to be associated. The chi-square test on these two variables yielded a p-value of 0.0062, which is less than 5% (0.05). As a result, the study provides sufficient evidence to reject the null hypothesis. This suggests that smallholder dairy farmers who have access to credit have a better living situation than households who do not have access to credit. This is because smallholder dairy farmers may obtain various household inputs due to the availability of financial resources (credit). Access to credit services may encourage smallholder dairy farmers to buy what they need, especially what their dairy cows require, such as feed and other supplies. It also makes it possible for them to use modern dairy technologies.

The chi-square tests between distance to market and SDFs' livelihood conditions yielded a p-value of 0.004, which is less than 0.05. As a result, there is sufficient evidence to reject the null hypothesis. This finding indicates that smallholder dairy farmers who live a long distance from the market are less likely to live in better conditions than smallholder dairy farmers who reside close to the market. The market is critical for smallholder dairy farmers to purchase and sell inputs and products, which could explain this conclusion. Smallholder dairy farmers that live a distance from the market find it difficult to sell their products by transporting them over large distances. They may have difficulties when it comes to selling and purchasing items and inputs. This result is similar to that of Gizachew (2005), as cited by Wondim (2019), who found that milk market participation had a negative association with distance from home to market.

Finally, the study discovered an association between exposure to extension services and the livelihood conditions of SDFs. According to the chi-square test results, the p-value for the variable is 0.049, which is less than 0.05. As a result, there is sufficient evidence to rule out the null hypothesis. This means that smallholder dairy farmers need to be exposed to extension services to learn about dairy farming and other livelihood activities.

6. Conclusion

The research showed that the study area's livelihood is complex, diverse, and distinct. It differs depending on the agro-ecological zone and the season. As a result, the study demonstrates mixed livelihoods (a mix of diverse livelihood activities) in the research area. Smallholder dairy farmers in the research area mostly engage in dairy farming. The study further concluded that undertaking different activities concurrently is important for the livelihood of smallholder dairy farmers in rural areas.

Non-farm and off-farm activities, in addition to on-farm activities, are used by smallholder dairy farmers as a source of income; although not all smallholder dairy farmers in the study area have access to these three activities. In some areas, a wide range of livelihood activities can be found. Even within a single kebele, farmers' livelihood activities were not uniform. Respondents who engaged in three activities at once, as well as those who relied only on on-farm or non-farm activities, were included. As a result, rural families make do with what they've got. On-farm activities are still highly valued by many of the households in the study area.

Furthermore, the study reveals that smallholder dairy farmers have a variety of opportunities to undertake dairy farming, as well as challenges that affect their livelihoods. As a result, opportunities for some of the sampled households may provide a challenge for others. Above all, the expansion of infrastructures such as markets, roads, and transportation allows rural communities to access available resources. They are steadfast in their efforts to enhance rural people's living conditions (smallholder dairy farmers in this case). Smallholder dairy farmers close to marketplaces are more likely to engage in a variety of income-generating activities. Extension services are critical in rural areas for improving people's living conditions.

7. Recommendations

The researcher made the following recommendations based on the findings and conclusions reached in the research: Primarily, the study area's smallholder dairy farmers ought to use the opportunities available to them. They should be aware of the consequences of planting eucalyptus trees on their land and should refrain from doing so. To avoid feed shortages, it is necessary to boost grass and fodder crop output while maintaining feed quality control. It is also preferable to save forage (hay) for seasons when feed shortages arise. They must improve their ability to employ local brewery by-products, crop leftovers, and hay from their grazing areas. It is preferable to develop different water sources to address the difficulties of water scarcity during the dry season.

In collaboration with veterinarians and other livestock professionals, the SDFs should endeavor to adapt and implement modern dairy technologies. It's crucial, for example, to employ improved-breed cows rather than indigenous-breed cows, which don't produce as much milk. In the study area, the government should offer enough veterinary services. In addition, essential training for veterinarians is required to address the issues with veterinary services. Finally, future researchers are encouraged to conduct a comparative study on dairy farming and the challenges that affect dairy farmers' livelihoods in Ethiopia, particularly in rural areas.

Abbreviations

CSA: Central Statistical Agency; DFID: The Department for International Development; ETB: Ethiopian Birr; FAO: Food and Agriculture Organization of the United Nations; SDFs: Smallholder Dairy Farmers; SLF: Sustainable Livelihood Framework; SPSS: Statistical Package for Social Sciences

Declarations

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Consent for Publication

Not applicable

Conflict of Interest

The author states that the publication of this work is free of any conflicts of interest.

Statement on Data Availability

Due to potentially identifying information, all relevant data is available upon request from the corresponding author.

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Table 1

Table 1: The socio-economic and demographic characteristics of SDFs in three kebeles

Characteristics		Frequency(N=372)	Percentage (%)
Sex	Male	314	84%
	Female	58	16%
	Total	372	100.0%
Age	18-35	56	15%
	36-55	182	49%
	56 and above	134	36%
	Total	372	100.0%
Marital status	Never married	8	2%
	Married	316	85%
	Divorced	34	9%
	Widowed	16	4%
	Total	372	100.0%
Educational status	Didn't get any education	125	34%
	Attended primary school education	193	52%
	Joined secondary school education	35	9%
	Attended vocational training	19	5%
	Total	372	100.0%
Respondent's Size of Family Members	1-4	156	41%
	5-8	184	50%
	9 and Above	32	9%
	Total	372	100.0%
Respondents' Farm Land Size	Less than one hectare	19	5%
	1-2 hectare	70	18%
	2.1-3 hectare	156	42%
	3.1-4 hectare	85	23%
	4.1 and Above	42	12%
	Total	372	100.0%
Respondents' Grazing Land Size	Less than 1 hectare	116	31%
	1-2 hectare	199	54%
	2.1-3 hectare	43	11%
	3.1 and Above	14	4%
	Total	372	100.0%
Monthly Total Income of the Household From all Sources	500-1000ETB	46	12%
	1100-1500ETB	139	38%
	1600-2000ETB	132	35%
	2100ETB and Above	55	15%
	Total	372	100.0%

Figures

Figure 1

Study Site and Sampling