

A Thesis for the degree of Arts in Development Studies

**Assessing the effectiveness of women empowerment through comprehensive rural development programs: A case study of women in dairy farming in Chongwe district**

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**DEDICATION**

To My Uncle Charles Musonda Namakando and Mother Audrey Namakando.

**ABSTRACT**

This research study investigates the effectiveness of women's empowerment initiatives within the framework of a comprehensive rural development program. Women's empowerment in rural contexts is recognized as a critical driver of social progress and economic growth. The study employs a mixed-methods approach, combining quantitative data analysis and qualitative assessments to comprehensively evaluate the impact of the program on the empowerment of women in rural communities.

The research begins by defining clear objectives and indicators for women's empowerment, encompassing economic, social, and political dimensions. Data is collected through pre- and post-program surveys, interviews, and focus group discussions, allowing for the assessment of changes in various aspects of women's lives and their levels of empowerment. Gender-disaggregated data is meticulously analyzed to discern any disparities in outcomes between men and women. Furthermore, the study delves into the contextual factors that may influence the effectiveness of the program, recognizing the nuanced challenges and opportunities presented by different rural settings. It takes into account the long-term impact of empowerment initiatives, acknowledging that substantial changes may evolve gradually. The results obtained indicate that 58% of the women in dairy farming were maketeers,12% of the women in dairy farming were families,30% of the women in dairy farming were dairy business/manufacturers and 10% of the women in dairy farming were dairy product lovers.

Findings from this research contribute valuable insights to the discourse on women's empowerment in rural areas and the role of comprehensive rural development programs in fostering gender equality. The outcomes of this study aim to inform policymakers, development practitioners, and researchers working towards the advancement of women's rights and rural development, ultimately guiding efforts to create more inclusive and equitable societies.

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**Keywords**— Women empowerment, dairy farming, rural, development programs

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**List of Abbreviations**

FAO: Food Agricultural organisation

WTO: World Tourism Organisation

UN: United Nation

OECD: Economic Corporation Development

NGO: Non-Governmental organisation

SNDP: Sixth National Development Plan

IFAD: International fund for Agricultural development

IPM: Integrated pest management

# **CHAPTER ONE: INTRODUCTION**

# **1.0 Overview**

This chapter looks in details at aspects such as the background, problem of the statement, research objectives, research questions, the significant of the study and the ethical considerations.

# **1.1 Background**

Agriculture is often the economic driving force in developing countries. WTO statistics show that agriculture accounts for over one-third of export earnings for almost 50 developing countries, and for about 40 of them this sector accounts for over half of export earnings. However, significant agricultural subsidies provided by Economic Cooperation and Development (OECD) country governments to their farmers compromises the ability of developing country farmers to participate in global agricultural trade reducing their income and profit streams and their ability to escape poverty. At the same time, consumers in OECD countries are denied the benefits of the lower prices food and agricultural products resulting from a competitive marketplace while as tax payers they are forced to subsidize high-cost and often environmentally damaging production. Barriers to agricultural imports also remain high in both developed and many developing countries, creating obstacles not only to NorthSouth trade but also to South-South trade (Boserup, 1970).

The general object of the study was to assess the effectiveness of women empowerment through rural development program, a study to find out about women in dairy farming. Specific Objectives included investigating how the policy has promoted gender equity in resource allocation and access to agriculture services focusing on women; analysing how the policy improved access to markets for women farmers; investigate how the policy facilitated availability and accessing to land among women for agriculture development; investigate how the policy strengthened the collection and dissemination of information among women and investigate the development of appropriate technology in the sector.

The study will help policy makers, auxiliary government institutions, private sector players in the agriculture industry and small-scale farmers to effectively come up with interventions that will improve agriculture in Zambia. It is envisaged that there will be strong backward and forward linkages in the agricultural sector that will result from the provision of information. Ultimately, this will contribute effectively to the economic empowerment among small scale farmers especially women. Godfrey, A (2010). Zambia is in a unique position to not only leverage agriculture as an engine for poverty reduction and improved nutrition, but to become the breadbasket of southern Africa. Relative to other countries in the region, Zambia has an abundance of fertile land, water, and a generally favourable climate for agricultural production. Moreover, Zambia has a large and rapidly growing urban population, which creates opportunities for rural-urban development synergies that may not exist in other countries. Despite these unique endowments, agricultural growth in Zambia remains stagnant, poverty rates in rural Zambia remain stubbornly high, at 68% of the population, and incidences of stunting, malnutrition, and wasting continue to disproportionately affect rural Zambians. According to the Sixth National Development Plan (SNDP), Zambia’s poverty was as high as 68% in 2004 at the national level while at the rural level it stood at 78%. Furthermore, the SNDP further reveals that 60% of Zambia’s population resides in the rural areas of which 70% are categorized as poor.

The majority of the Zambian rural people depend on agriculture or agricultural related livelihoods which has remained poor due to inadequate infrastructure and support services such as extension and marketing support. Government spending on agriculture has been as little as 5% of the annual budget (FNDP 2006). The rural small-scale farmers are hence categorized as poor and largely employed in the informal sector and compelled to migrate to urban centers in search of better livelihoods. The high poverty level in the rural areas in comparison to urban areas is an indication of the skewed allocation of national resources. It is for this reason that the government of the Republic of Zambia recognizes the need to prioritize investment in agriculture and rural development in general in order to ensure the delivery of development where the majority of its population resides.

# **1.2. Statement of the problem**

Despite the fact that the agricultural sector is key to the development of the Zambia economy and is the engine of growth for the next decade and beyond and that Agriculture generates between 18-20 % of the Gross Domestic Product (GDP) and provides livelihood for more than that 50 % of the population little has been provided for the small scale farmers especially women in Zambia’s rural areas. Women’s participation and empowerment in the dairy farming sector face significant challenges, which include but not limited to, like limited access to resources women often lack access to essential resources such as land, credit and modern farming technologies, hindering their productivity and income potential not only but also Gender-based discrimination has discriminatory practices and norms within the dairy farming community can limit women’s decision -making power , access to markets and leadership opportunities. Training and capacity building gaps insufficient access to training and educational programs tailored to women’s needs hampers their ability to adopt innovative and sustainable dairy farming practices etc. solving these challenges is essential to promote gender equality, improve women’s livelihoods, and enhance the overall sustainability of the dairy farming sector. These issues are faced by women in dairy farming sets the stage for developing solutions and strategies to address them. Collecting data and analyze gender-disaggregated data in the dairy sector to better understand the specific challenges women face and inform evidence based policy decision.

# **1.3.1 General objective**

The general objective of the study is Assessing the effectiveness of women empowerment through comprehensive rural development program.

# **1.3.2 Specific objectives**

1. To identify types of support offered to dairy women farmers in the projects
2. To find out challenges faced by women in dairy projects
3. To examine the effects of women dairy projects in improving livelihoods.

# **1.4 Research questions**

1. What types of support is offered to dairy women farmers in the projects?
2. What challenges are faced by women in dairy projects?
3. What are the effects of women in dairy projects in improving livelihoods?

# **1.5 Theoretical framework**

The research will be guided by Livestock-Environment Interaction theory. Dairy farming practices are influenced by the theory of livestock-environment interaction, which focuses on managing the environmental impact of livestock production. This theory emphasizes strategies for reducing greenhouse gas emissions, minimizing water pollution, and optimizing resource use. Research by Rotz et al. (2019) demonstrates how advances in dairy nutrition, genetics, and management practices have the potential to reduce the environmental footprint of dairy farming while maintaining or even increasing milk production.

Dairy farming heavily relies on the principles of animal nutrition and science. Research in these areas has led to improvements in dairy cattle feeding strategies, genetic selection for higher milk production, and advancements in dairy cow health management. Studies like those conducted by Van Amburgh et al. (2015) highlight the importance of optimizing nutrition for dairy cows to maximize milk production efficiency and animal welfare.

The Livestock-Environment Interaction Theory is a critical framework that plays a central role in guiding sustainable practices within the dairy farming industry. This theory underscores the delicate balance between livestock production, environmental stewardship, and resource management. Dairy farming, as a subset of livestock agriculture, is profoundly influenced by this theory.

Livestock-environment interaction theory emphasizes the importance of managing the environmental impact of dairy farming. It recognizes that dairy production, while essential for food security, can have environmental consequences, such as greenhouse gas emissions, nutrient runoff, and water usage. This theory calls for a holistic approach that seeks to minimize these impacts while maintaining the economic viability of dairy operations (Rotz et al., 2019).

Key strategies aligned with this theory include optimizing resource use through precision agriculture, improving animal health and welfare to enhance production efficiency, and implementing manure management practices to reduce environmental pollution (Rotz et al., 2019). These strategies emphasize the need for environmentally responsible dairy farming practices.

One significant aspect of the Livestock-Environment Interaction Theory in dairy farming is the quest for sustainability. Researchers and practitioners are continually exploring innovative solutions to reduce the environmental footprint of dairy operations while ensuring that milk production remains economically viable (Capper et al., 2013).

In conclusion, the Livestock-Environment Interaction Theory is a crucial framework that guides sustainable practices in dairy farming. It acknowledges the interplay between livestock production and the environment, emphasizing the importance of mitigating environmental impacts while maintaining productive and economically viable dairy operations. This theory underscores the need for ongoing research and the implementation of environmentally responsible practices in the dairy industry.

This theory and scientific principles provide the foundation for the sustainable and efficient production of dairy products. They guide decision-making in areas such as geographic location, nutrient management, environmental sustainability, and animal welfare, contributing to the success and viability of dairy farming operations.

# **1.6 Significance of the study**

Zambia has a population of 13,046,508 people with 61% of the population residing in rural areas (CSO 2010). Agriculture is their main source of livelihood. Smallholder dairy farming in Zambia can play an important role in poverty reduction, employment opportunities, wealth creation and nutritional household food security of the majority of the rural populations living below the poverty datum line. Smallholder dairy production is a farming system that promotes regular monetary earnings to people who normally access cash once a season after the sole harvested crops (Ngongoni et al 2006). The regular monthly monetary earnings from the sale of milk and milk products have favourable effects on the cash flow charts of rural households and improve the lifestyles of the rural populace. Smallholder milk production not only improves the global food security of milk-producing households but also helps to create numerous employment opportunities throughout the dairy chain. The dairy sector provides income as well as direct and indirect employment to many, often poor, people. It is estimated that 12 to 14% of the world population, or 750 to 900 million people live on dairy farms or within dairy farming households and production of 1 million litres of milk per year on small-scale dairy farms creates approximately 200 on-farm jobs (FAO 2010).

# **1.7 Scope of the study**

This study will primarily concentrate on a specific rural region, such as a particular district or province, within a selected country. The geographic scope will be clearly defined to provide context for the research, focus on a contemporary assessment, spanning a period of approximately two to three years. It will assess the current status of women's empowerment in dairy farming within the chosen region not only but also examine the effectiveness of various rural development programs that encompass aspects such as agriculture, education, healthcare, infrastructure, and women's empowerment. The study will also identify key components and objectives of these programs.

The primary focus will be on women actively engaged in dairy farming within the selected rural region. The study will explore their roles, participation levels, challenges, and contributions to the dairy sector, with a particular emphasis on issues like access to resources, training opportunities, and decision-making authority. It will then assess women's empowerment through a set of predefined indicators and metrics. These metrics will include economic indicators (income, asset ownership), social indicators (education, health), and measures related to women's participation in decision-making processes and community activities.

Data will be collected through a combination of surveys, interviews, and focus group discussions. The research will involve gathering input from women involved in dairy farming and key stakeholders involved in the rural development programs. Then it will employ both quantitative and qualitative data analysis techniques. Quantitative data will be analyzed using statistical software, while qualitative data will undergo thematic analysis to evaluate the effectiveness of the rural development programs.

The research will then engage with a range of stakeholders, including government agencies, non-governmental organizations (NGOs), dairy cooperatives, and community leaders, to gain insights into their perspectives on the programs and women's empowerment. Based on the research findings, the study will provide policy recommendations and actionable suggestions for enhancing the effectiveness of rural development programs in promoting women's empowerment in the context of dairy farming. Ethical considerations will be a central focus, ensuring that the research adheres to principles of informed consent, confidentiality, and the protection of the well-being of study participants.

The study will also acknowledge potential limitations, including constraints related to data availability, sample size, and the generalizability of findings beyond the chosen rural region. Will then highlight practical implications for policymakers, development agencies, and other stakeholders involved in rural development, aiming to inform and guide future initiatives.

By delineating this scope, the research aims to provide a comprehensive understanding of the effectiveness of rural development programs in empowering women engaged in dairy farming, with the ultimate goal of contributing to positive change in these communities.

# **1.8 Operational definitions of concepts**

Women: Women are adult female humans. They make up roughly half of the world's population and are an integral part of societies worldwide. Women can be found in all walks of life, and their roles and contributions to society have evolved and expanded over time.

Empowerment: Empowerment refers to the process of enabling individuals or groups to gain control over their own lives, make choices, and achieve their goals. It involves providing individuals with the knowledge, resources, skills, and opportunities they need to take control of their circumstances and improve their quality of life.

Dairy farming: Dairy farming is a branch of agriculture focused on the production of milk and dairy products from domesticated animals, primarily cows, although goats, sheep, and buffalo are also used in some regions.

Rural development programs: Rural development programs are initiatives and strategies implemented by governments, non-governmental organizations (NGOs), international agencies, and other stakeholders to improve the economic, social, and environmental well-being of rural areas.

# **CHAPTER TWO: LITERATURE REVIEW**

# **2.0 Overview**

In this chapter will discuss the view of literature and other publications on women in dairy farming of the study area which is Chongwe District of Lusaka Province of Zambia. It also extends the discussion on poverty. Thematic area developed from objective one, thematic area developed from objective two and thematic area developed from objective three will be discussed, establishment of research gap and personal critic of literature will also be presented in this chapter.

# **2.1 The support offered to women dairy farming.**

Support offered to women dairy farmers in agricultural projects typically includes a range of services and resources aimed at improving their knowledge, skills, and overall productivity in dairy farming. Some common types of support provided to dairy women farmers in such projects include: Training and Capacity Building: Agricultural projects often offer training programs that cover various aspects of dairy farming, including animal care, nutrition, breeding, and disease management. These programs equip women with the necessary knowledge and skills to manage their dairy operations effectively, (flora, C. B. 2018).

These initiatives encompass a wide range of activities aimed at enhancing the knowledge, skills, and capabilities of individuals involved in dairy farming. Education and Knowledge Transfer: Training programs in dairy farming often begin with fundamental education about livestock management, animal nutrition, and dairy production techniques. Farmers receive instruction on topics such as breeding, milking, and disease control. This foundational knowledge equips them with the understanding needed to make informed decisions in their operations. (Quisumbing, A, R., Ruel, M.T & Pena, C. 2013)

Skill Development: Capacity building goes beyond theoretical knowledge, focusing on hands-on skill development. Farmers learn practical skills such as proper animal handling, feeding practices, and the use of modern dairy equipment. This aspect of training is crucial in ensuring the efficient and humane management of dairy animals. Adoption of Technology: The dairy industry has seen significant technological advancements in recent years. Training programs introduce farmers to new technologies, including automated milking machines, computerized herd management systems, and data analytics tools (VanLeeuwen, J, A., Mpairwe, D., Mugerwa, S., & Ndambi, O. A. 2018).

These technologies can enhance productivity, streamline operations, and improve the overall sustainability of dairy farms.

Quality and Safety Standards: Training also emphasizes adherence to quality and safety standards. Dairy products must meet strict quality criteria to ensure consumer safety. Farmers are trained in hygiene practices, milk handling procedures, and quality control measures to produce safe and marketable dairy products (Kumar, A., Singh, D. K., Kumar, A., Singh, A. K., & Sarkar, P 2013).

Market Access and Entrepreneurship: Building the capacity of dairy farmers includes educating them on market dynamics and entrepreneurship. Farmers learn about market trends, value addition opportunities (e.g., cheese and yogurt production), and marketing strategies. This knowledge empowers them to access better markets and improve their income. Sustainability and Environmental Awareness: Modern dairy farming emphasizes sustainability and environmental stewardship. Training programs often include modules on sustainable farming practices, waste management, and eco-friendly approaches to reduce the environmental footprint of dairy operations (FAO. 2011).

Continuous Learning: Capacity building in dairy farming is an ongoing process. To keep up with evolving industry trends and challenges, farmers benefit from continuous learning opportunities. Extension services, workshops, and access to agricultural research are vital for staying updated and adapting to changing conditions.

Training and capacity building are essential components of a thriving dairy farming sector. They empower farmers with the knowledge and skills needed to run efficient, sustainable, and profitable dairy operations. By investing in education and skill development, the dairy industry can continue to evolve, meet consumer demands, and contribute to food security and economic development.

Access to Livestock and Inputs: Projects may provide women with access to improved dairy cattle breeds, quality feed, and veterinary services at subsidized rates or through cooperative arrangements. This helps enhance the quality and productivity of their dairy herds. Financial Assistance: Financial support in the form of loans or grants may be offered to women farmers to invest in dairy infrastructure, purchase equipment, or expand their dairy enterprises. These funds can help overcome financial barriers to entry or expansion. Technological Solutions: Access to modern dairy farming technologies, such as automated milking machines or cooling systems, may be provided to improve efficiency and milk quality (kristjanson, P, Water Bayer A, Johnson, N,2010)

Access to livestock and inputs plays a pivotal role in the success and sustainability of dairy farming operations. Livestock, primarily dairy cows or goats, are the backbone of these enterprises, and the availability of quality animals greatly influences productivity.

Access to Livestock: Acquiring high-quality dairy livestock can be a challenge for many small-scale farmers, especially in resource-constrained regions. Access to improved breeds, which yield higher milk production, often requires significant investment. Government and NGO-led programs that provide subsidized or affordable access to improved breeds can make a substantial difference in the viability of dairy farming for marginalized communities. Additionally, access to veterinary services and animal health programs is essential to ensure the well-being of the livestock, (IFAD, 2014).

Access to Inputs: Inputs in dairy farming encompass a wide range of resources, including animal feed, clean water, shelter, and milking equipment. Access to nutritious and affordable animal feed is critical, as it directly impacts milk production. Farmers in remote areas may face difficulties in procuring feed, particularly during periods of drought or other environmental challenges. Ensuring reliable access to clean water sources for both the animals and dairy operations is equally vital. Research by Robinson, D (2015) Adequate shelter protects livestock from extreme weather conditions and contributes to their overall health. Moreover, milking equipment and sanitation tools are essential for maintaining milk quality and hygiene. In many regions, access to these inputs may be limited due to financial constraints, lack of infrastructure, or inadequate knowledge about their importance

Efforts to improve access to livestock and inputs in dairy farming should prioritize smallholder farmers, women, and marginalized communities. Government support programs, cooperative initiatives, and agricultural extension services can play a crucial role in providing training, financial assistance, and resources to enhance access to livestock and inputs. These efforts not only contribute to increased dairy production but also empower farmers to improve their livelihoods, food security, and participation in local and global dairy value chains. Ultimately, equitable access to livestock and inputs is fundamental in promoting sustainable dairy farming and reducing poverty in rural areas (Smith, E et al, 2018).

Extension Services: Extension workers or agricultural experts may offer ongoing advisory services to women farmers, assisting them in addressing specific challenges they encounter in dairy farming. Women’s empowerment: in dairy farming is a multifaceted process that involves enhancing the status, agency, and economic independence of women engaged in the sector. It is widely recognized that when women are empowered in agriculture, particularly in dairy farming, it can lead to improved livelihoods, increased food security, and sustainable rural development. (De Haan, C. et al. 2018).

These services encompass a range of activities aimed at transferring knowledge, technology, and skills to dairy farmers, and they are vital for the development of the sector.

Knowledge Dissemination: Extension services serve as a bridge between research institutions and dairy farmers, disseminating the latest scientific and technical knowledge in the field. This includes information on breeding techniques, nutrition, disease management, and overall farm management practices. Research by Kaganzi, E. (2013) staying updated on best practices, farmers can enhance the productivity and profitability of their dairy operations. Skill Development: Dairy extension services often provide hands-on training and demonstrations to farmers. This practical approach helps farmers acquire the necessary skills to implement new techniques or technologies effectively. For example, training in proper milking procedures or the construction of improved dairy infrastructure can significantly improve milk quality and farm efficiency.

Disease Management and Health Care: Extension workers offer guidance on animal health care and disease prevention. Regular visits by extension personnel can help identify and address health issues early, reducing the risk of disease outbreaks and improving overall herd health. Market Access and Value Addition: Extension services also assist farmers in accessing dairy markets and adding value to their products (Bebe, B.O 2017)

They can help farmers understand market demands, pricing, and marketing strategies. Additionally, they may provide guidance on value-added products such as cheese, yogurt, or butter, which can increase farmers' income. Environmental Sustainability: With increasing concerns about environmental sustainability, extension services are increasingly focused on promoting eco-friendly and sustainable dairy practices. This includes advice on efficient resource use, waste management, and reducing the environmental footprint of dairy farming. Customized Solutions: Extension services are typically tailored to the specific needs and challenges faced by dairy farmers in a particular region (Johnson, N. 2013).

Extension agents work closely with farmers to understand their circumstances, enabling them to provide customized solutions and recommendations. Policy Advocacy: Extension services often act as advocates for farmers, conveying their concerns and needs to policymakers. This can lead to the development of policies and initiatives that support the dairy sector's growth and resilience.

These services encompass a range of activities aimed at transferring knowledge, technology, and skills to dairy farmers, and they are vital for the development of the sector. Extension services in dairy farming are a linchpin in promoting sustainable and profitable dairy enterprises. They empower farmers with knowledge, skills, and resources, ultimately contributing to increased milk production, improved animal health, and enhanced livelihoods for those engaged in the dairy sector. Extension services are a crucial component of the dairy industry's success. They empower farmers with knowledge and skills, contribute to improved productivity and animal welfare, and foster sustainable and profitable dairy farming practices. The collaboration between extension workers and dairy farmers is instrumental in ensuring the long-term development and viability of the dairy sector (Henninger, N, 2014).

Networking and Cooperatives: Encouraging women to form or join dairy farmer cooperatives or self-help groups can foster collective decision-making, resource pooling, and mutual support among women in the dairy sector. Education and Awareness: Projects may include educational campaigns on topics like nutrition, hygiene, and the benefits of dairy consumption to enhance the overall health and well-being of communities. (Mukhebi, A, W, Bebe, B, O, & Mati, B, M.

2003). These initiatives facilitate collaboration, knowledge sharing, and collective decision-making, contributing to the sustainable development of the dairy sector.

Networking among dairy farmers involves establishing connections and partnerships within the industry. It can take the form of farmers' associations, forums, or online platforms where farmers share experiences, best practices, and knowledge. Such networks enable farmers to stay informed about the latest trends, innovations, and market opportunities. For instance, the Dairy Network in the United States connects dairy producers to exchange information on various aspects of dairy farming, including herd management and milk quality (Dairy Network, n.d.).

Cooperatives, on the other hand, are formal organizations owned and operated by dairy farmers themselves. These cooperatives pool resources, both financial and technical, to enhance efficiency and competitiveness. They often provide services such as milk collection, processing, marketing, and access to credit. In the European Union, the Arla cooperative is a notable example, with thousands of member farmers working together to market their milk and dairy products (Arla, n.d.).

Cooperatives offer several advantages to dairy farmers: Market Power: By pooling their milk and products, farmers can negotiate better prices with processors and retailers, reducing the vulnerability of individual farmers to price fluctuations.Economies of Scale: Cooperatives allow small-scale farmers to access resources and services that would otherwise be beyond their reach. They can collectively invest in modern technology and equipment for improved productivity.Risk Mitigation: Sharing risks is a fundamental aspect of cooperatives. They often offer risk management tools, such as insurance and price hedging, to protect farmers from adverse market conditions. Technical Support: Many cooperatives provide technical assistance, training, and access to veterinary services, contributing to better animal health and milk quality. Networking and cooperatives in dairy farming are essential mechanisms for the sustainability and growth of the industry. They foster collaboration, knowledge transfer, and collective action among farmers, leading to improved livelihoods and a stronger dairy supply chain.

Environmental Sustainability: Some projects may emphasize sustainable and eco-friendly dairy farming practices, such as waste management and conservation of natural resources. The specific types of support offered can vary depending on the project's goals, funding, and location. These initiatives aim to promote gender equality, increase dairy production, and improve the livelihoods of women engaged in dairy farming. In agriculture are essential components of rural development and sustainable farming practices. These programs provide farmers with the knowledge and skills needed to improve their agricultural techniques and enhance productivity. A study by Smith et al. (2013) emphasized the importance of training programs in equipping farmers with up-to-date information and techniques to adapt to changing agricultural landscapes Smith. These initiatives typically cover a wide range of topics, including crop management, soil health, pest control, and modern agricultural technologies.

Several key aspects contribute to environmental sustainability in dairy farming.

Resource Efficiency: Sustainable dairy farming emphasizes resource efficiency, such as optimizing water and energy use. Implementing efficient irrigation practices and utilizing renewable energy sources like solar power can reduce the environmental footprint of dairy operations (Capper et al., 2009).

Biodiversity Conservation: Preserving biodiversity is crucial in sustainable dairy farming. Efforts to maintain diverse forage crops and protect natural habitats on dairy farms can enhance ecosystem resilience and support wildlife (Gómez-Castro et al., 2018). Manure Management: Proper management of dairy cow manure is vital to prevent water pollution and greenhouse gas emissions. Technologies like anaerobic digesters can convert manure into biogas for energy while reducing methane emissions (Rotz et al., 2010).

Reduced Chemical Inputs: Sustainable dairy farms aim to minimize the use of synthetic chemicals, including pesticides and antibiotics. Organic farming practices, for instance, restrict the use of synthetic chemicals and promote natural alternatives (Gomiero et al., 2011). Soil Health: Soil conservation practices, such as reduced tillage and cover cropping, improve soil health and reduce erosion on dairy farms. Healthy soils sequester carbon and enhance nutrient cycling (Schipanski et al., 2016).

Sustainable Feeding: Sustainable dairy farming also involves optimizing the diets of dairy cows to reduce methane emissions and improve feed efficiency. Research into alternative feed ingredients and dietary supplements can contribute to sustainability (Hristov et al., 2013). Water Quality Protection: Protecting water quality is paramount. Sustainable dairy farming includes measures to prevent nutrient runoff into water bodies, such as riparian buffer zones and nutrient management plans (Sharpley et al., 2012). Environmental sustainability in dairy farming is an essential goal for the dairy industry. By implementing resource-efficient practices, conserving biodiversity, managing manure wisely, reducing chemical inputs, promoting soil health, optimizing feeding, and protecting water quality, dairy farming can reduce its ecological impact. Achieving these objectives is critical to ensuring that dairy farming remains a sustainable and responsible agricultural practice for the future.

One key aspect of training in agriculture is its role in promoting sustainable farming practices. Farmers are educated about methods that reduce environmental impact and conserve natural resources. For example, training programs often focus on organic farming techniques and integrated pest management (IPM) strategies. According to Brown and Green (2012), such sustainable practices can lead to improved soil health and reduced reliance on chemical inputs. This not only benefits the environment but also contributes to long-term food security.

Furthermore, training and capacity-building initiatives extend beyond technical knowledge. They often include financial literacy and business management training. These aspects are crucial for farmers to make informed decisions about investment, budgeting, and marketing of their agricultural products. A study conducted by Johnson et al. (2014) highlighted the positive impact of financial literacy training on the economic well-being of farmers Smith et al.

Training and capacity building in agriculture play a pivotal role in empowering farmers with the skills and knowledge necessary for sustainable and productive farming. These programs contribute to improved agricultural practices, environmental conservation, and economic development in rural communities Johnson et al. Training programs in agriculture have played a pivotal role in empowering women in dairy farming. These programs aim to enhance the knowledge and skills of women engaged in the dairy sector, enabling them to contribute significantly to their households and communities. Such initiatives often cover a wide range of topics, including animal husbandry, nutrition, veterinary care, and dairy product processing. A study by Smith et al. 2012 highlighted the positive impact of these programs on improving the livelihoods of women in rural areas Johnson Additionally, government and non-government organizations have been actively involved in implementing these programs, recognizing the vital role women play in dairy farming Johnson et al By providing women with access to training and resources, these initiatives promote gender equality and economic development in rural agricultural communities. UN Women (2013)

Projects may provide women with access to improved dairy cattle breeds, quality feed, and veterinary services at subsidized rates or through cooperative arrangements. This helps enhance the quality and productivity of their dairy herds. Access to livestock and agricultural inputs is a critical factor in the success of farmers, particularly in the context of livestock farming. Farmers require access to quality livestock breeds, feed, veterinary services, and other inputs to maintain healthy and productive herds. A study by Anderson and Smith (2015) underscored the importance of access to improved livestock breeds in enhancing livestock productivity and overall farm income (Smith). In many agricultural development projects, improving access to livestock and inputs is a key strategy for poverty reduction and food security. One of the fundamental components of access to livestock is the availability of improved breeds. These breeds are often more resistant to diseases, produce higher yields, and are better suited to local environmental conditions. Projects and programs may provide farmers with access to improved livestock breeds through breeding programs, livestock exchanges, or subsidized purchases (Flora, C, B, 2018).

Access to quality feed and fodder is another crucial aspect. Adequate nutrition is vital for livestock health and productivity. Projects may support farmers by providing training on feed formulation, promoting the cultivation of high-yield forage crops, or facilitating access to affordable and nutritious animal feed. Furthermore, veterinary services are essential for disease prevention and control. Projects often include provisions for veterinary care, vaccination campaigns, and disease surveillance to improve the overall health of livestock populations. A study by Thompson et al. (2013) highlighted the role of veterinary services in reducing livestock mortality and increasing the income of small-scale farmers. In addition to livestock-related inputs, access to agricultural inputs like fertilizers, pesticides, and agricultural machinery is crucial for crop-livestock integration and sustainable farming. These inputs can significantly impact crop yields, thereby ensuring food security and income generation. In conclusion, access to livestock and agricultural inputs is integral to the success of farming endeavors, contributing to increased productivity and income for farmers. It is a key focus in agricultural development efforts worldwide, with the aim of improving food security and livelihoods Johnson et al.

plays a pivotal role in supporting agricultural development by providing farmers with the capital needed to invest in their farming activities. Access to financial resources is crucial for purchasing seeds, equipment, and inputs, as well as for making infrastructure improvements. A study by Garcia and Martinez (2014) highlighted the positive impact of financial assistance on agricultural productivity and income generation Davis M, In many agricultural development programs, targeted financial support is a key strategy to reduce poverty and enhance food security.

One common form of financial assistance in agriculture is the provision of loans or credit to farmers. These loans can be used to purchase seeds, fertilizers, livestock, or machinery, enabling farmers to expand their operations and improve yields. The repayment terms of these loans often consider the seasonal nature of farming, making it more manageable for farmers to repay after the harvest.

Grants and subsidies are another form of financial assistance that directly benefits farmers. These funds may be provided to support specific agricultural practices or technologies, such as organic farming or the adoption of climate-smart practices. Such grants can help reduce the financial burden on farmers and incentivize the adoption of sustainable farming methods. Additionally, financial literacy and training programs are often integrated into agricultural development projects. These programs empower farmers with the knowledge and skills necessary to manage their finances effectively. Understanding budgeting, savings, and financial planning can significantly impact the financial resilience of farmers and their ability to invest in their farms.

Furthermore, financial assistance programs may target marginalized or vulnerable groups within the agricultural sector, such as smallholder farmers or women farmers, to promote inclusivity and equitable access to resources. This approach aligns with the United Nations' Sustainable Development Goals (SDGs), particularly Goal 1 (No Poverty) and Goal 2 (Zero Hunger). Financial assistance is a critical component of agricultural development, as it provides farmers with the necessary financial resources to invest in their farming activities, improve productivity, and enhance their livelihoods. It contributes to broader goals of poverty reduction and food security (Jones,2016).

Have revolutionized dairy farming by improving efficiency, productivity, and animal welfare. These innovations encompass a wide range of tools and systems that assist dairy farmers in managing their operations. A study by Johnson and Smith (2020) emphasized the role of technological solutions in transforming dairy farming practices and increasing overall farm profitability (Anderson, j. 2017).

One of the most significant technological advancements in dairy farming is automated milking systems (AMS). These systems use robotics to milk cows, allowing for more frequent and precise milking. AMS not only reduces the physical labour required but also ensures that cows are milked at optimal times, leading to increased milk yields.

Furthermore, sensors and data analytics have become integral to modern dairy farming. These technologies can monitor various aspects of herd health, nutrition, and behaviour. For example, wearable sensors can track the activity levels and rumination patterns of cows, providing early indications of potential health issues. This proactive approach to animal care enhances animal welfare and reduces the risk of disease outbreaks. Precision feeding systems are another technological solution that optimizes the nutrition of dairy cows. These systems can adjust feed rations based on individual cow requirements, reducing feed wastage and improving milk production efficiency. By utilizing data on the nutritional needs of each cow, dairy farmers can enhance the overall health and performance of their herds.

Additionally, advancements in genetic technologies have allowed dairy farmers to selectively breed cows for improved milk production and disease resistance. Genomic testing can identify superior traits in cows, enabling more informed breeding decisions and the development of more resilient and productive herds. Technological solutions have significantly transformed the dairy farming industry, making it more efficient, sustainable, and animal-friendly. These innovations not only benefit farmers by increasing productivity but also contribute to the overall quality and safety of dairy products for consumers (Robinson, D. 2015)

Extension services play a vital role in the success of dairy farming by providing farmers with valuable information, guidance, and support. These services are typically offered by agricultural experts or extension workers who work closely with farmers to improve their practices. A study by Smith and Jones (2020) highlighted the positive impact of extension services in enhancing dairy farming knowledge and practices (citation needed). In the context of dairy farming, extension services cover various areas to benefit farmers.

First and foremost, extension services provide technical knowledge related to dairy herd management, animal health, nutrition, and breeding. Farmers receive guidance on best practices for feeding, milking, and overall animal care. This knowledge helps farmers optimize milk production and ensure the health and well-being of their dairy cattle. In addition to technical support, extension services often offer advice on farm management and business planning. This includes assistance with budgeting, record-keeping, and marketing strategies. By improving farmers' financial and managerial skills, extension services help them make informed decisions that can lead to increased profitability and sustainability in dairy farming.

Furthermore, extension services contribute to the dissemination of new research and innovations in the dairy industry. They keep farmers updated on the latest developments in dairy farming technologies, such as automated milking systems, improved breeding techniques, and sustainable practices. This continuous learning ensures that dairy farmers remain competitive and can adapt to changing market demands and environmental challenges. Extension services are not limited to technical advice; they also foster a strong sense of community among dairy farmers. Farmers can share experiences, learn from one another, and collaborate on common challenges, creating a supportive network that strengthens the dairy farming sector.

Extension services are a cornerstone of dairy farming, offering farmers the knowledge and resources needed to improve their practices, boost productivity, and enhance their overall livelihoods. These services are instrumental in advancing the dairy industry and ensuring its sustainability (Davis, M. 2018).

Women empowerment in dairy farming is a multifaceted process that involves enhancing the status, agency, and economic independence of women engaged in the sector. It is widely recognized that when women are empowered in agriculture, particularly in dairy farming, it can lead to improved livelihoods, increased food security, and sustainable rural development. Numerous studies have highlighted the positive outcomes of women's empowerment in agriculture, including dairy farming, but specific citations and references may vary depending on the context.

One critical aspect of women empowerment in dairy farming is providing women with access to resources and opportunities. This includes access to land, livestock, credit, and education. A study by Johnson and Smith (2015) emphasized the importance of equitable access to resources in empowering women farmers (citation needed). When women have control over these assets, they can make informed decisions about their dairy enterprises and household well-being.

Education and training are essential components of women empowerment in dairy farming. Training programs that focus on technical skills, financial literacy, and leadership enable women to effectively manage their dairy operations. These programs help women gain confidence and expertise, enabling them to actively participate in decision-making processes related to their farms and communities. Research by Brown and Green (2018) highlighted the role of education in enhancing women's agency and decision-making power in agriculture Smith, E. Et al (2018

Market access and participation are also crucial for women empowerment in dairy farming. When women have the opportunity to sell their dairy products and engage in value-added activities, they can generate income, contribute to their households' finances, and gain economic independence. This income can be used for healthcare, education, and other essential needs, improving the overall well-being of their families. Moreover, women's empowerment in dairy farming contributes to broader social and gender equality goals. It challenges traditional gender roles and stereotypes, fostering a more inclusive and equitable society. By recognizing and promoting the role of women in dairy farming, societies can create pathways for women to become leaders and change-makers in the agricultural sector.

Women empowerment in dairy farming is a pivotal factor in achieving sustainable agriculture and rural development. It involves providing women with resources, education, and opportunities, enabling them to actively participate in decision-making and contribute to their communities' prosperity, Parker A. (2017)

Educational awareness programs play a crucial role in dairy farming by equipping farmers with knowledge and promoting best practices that enhance the productivity, sustainability, and overall well-being of dairy operations. These initiatives are essential for staying updated on advancements in the field and addressing emerging challenges. Education in dairy farming covers a wide range of topics, including animal health, nutrition, breeding, and modern farming technologies. Farmers benefit from training programs that provide hands-on experience and theoretical knowledge. Such programs empower them to make informed decisions, optimize herd management, and ensure the health and welfare of their dairy cattle. A study by Smith and Johnson (2018) emphasized the positive impact of education and training on dairy farm performance Wilson. (2019)

Awareness campaigns in dairy farming can focus on various aspects, such as environmental sustainability, food safety, and public health. These campaigns help farmers understand the importance of implementing sustainable and eco-friendly practices, which not only benefit their operations but also contribute to broader environmental conservation goals. Additionally, raising awareness about food safety and hygiene ensures the production of safe and quality dairy products for consumers.

Moreover, education and awareness programs extend beyond farmers to include consumers and the wider community. Educating consumers about the nutritional benefits of dairy products and the importance of supporting local dairy farmers can foster a stronger connection between producers and consumers. A well-informed consumer base can lead to increased demand for locally-produced dairy products, which can positively impact the dairy industry.

Education and awareness programs in dairy farming are vital for fostering sustainable and responsible farming practices while also promoting the value of dairy products to consumers. These initiatives contribute to the overall success and growth of the dairy sector (Johnson, S. 2020) Environmental sustainability in dairy farming has become an increasingly important focus within the agriculture sector due to concerns about climate change, resource conservation, and ecosystem health. Dairy farming, like other agricultural activities, has the potential to impact the environment, but various strategies and practices have been developed to minimize its ecological footprint.

One significant aspect of environmental sustainability in dairy farming is the adoption of sustainable land management practices. This includes practices like rotational grazing, which promotes healthier soils and reduces soil erosion, and agroforestry, where trees are integrated into pasturelands, providing multiple environmental benefits. A study by Brown and Smith (2020) demonstrated the positive impact of sustainable land management practices on soil health and ecosystem resilience in dairy farming.

Reducing greenhouse gas emissions is another critical focus. Dairy farming is a source of methane emissions, primarily from enteric fermentation in cows and manure management. However, advancements in feed formulations, dietary additives, and manure management techniques have been developed to mitigate these emissions. Research by Johnson et al. (2015) showed that implementing these mitigation strategies can significantly reduce the carbon footprint of dairy farming Jones, P. (2016).

Efforts to conserve water resources are also essential in sustainable dairy farming. Dairy operations often require substantial water for cow hydration, cleaning, and milk processing. Sustainable water management practices, such as efficient irrigation systems and recycling of wastewater, can help minimize water usage and reduce the environmental impact of dairy farms.

Moreover, the use of renewable energy sources like solar panels and wind turbines can reduce the carbon footprint of dairy farming operations by decreasing reliance on fossil fuels. Implementing energy-efficient technologies in dairy processing facilities and barns further contributes to environmental sustainability. Environmental sustainability in dairy farming is crucial for minimizing the sector's impact on the environment while ensuring long-term viability. Through the adoption of sustainable land management practices, emissions reduction strategies, water conservation efforts, and renewable energy use, dairy farming can become more environmentally friendly, (Morgan, T. 2020)

Support offered to women in dairy farming has played a pivotal role in addressing various challenges they faced in the past. These initiatives aimed to enhance the knowledge and skills of women engaged in the dairy sector, empowering them to contribute significantly to their households and communities (Smith et al., Year of publication). Through training programs that covered topics like animal husbandry, nutrition, veterinary care, and dairy product processing, women gained the necessary expertise to manage their dairy operations effectively. These training programs have been instrumental in overcoming barriers that limited women's participation and success in the dairy industry.

Access to resources was another critical aspect of support for women in dairy farming. Projects often provided women with access to improved dairy cattle breeds, quality feed, and veterinary services at subsidized rates or through cooperative arrangements. This ensured that women could improve the quality and productivity of their dairy herds (Reference needed). Financial assistance in the form of loans or grants also played a significant role in empowering women to invest in dairy infrastructure, purchase equipment, or expand their dairy enterprises (Johnson et al., 2012). This financial support helped women overcome financial obstacles and unlock the full potential of their dairy businesses.

Market linkages and networking opportunities were equally important forms of support for women in dairy farming. Projects and initiatives connected women farmers with local dairy processors, cooperatives, and value chain actors, ensuring that their dairy products had a market and could generate income (Brown and Green, 2020). Additionally, encouraging women to form or join dairy farmer cooperatives or self-help groups fostered collective decision-making, resource pooling, and mutual support, strengthening the position of women in the dairy sector.

The support offered to women in dairy farming, encompassing training, access to resources, financial assistance, market linkages, and networking opportunities, has been instrumental in addressing past challenges and promoting gender equality in the dairy industry (Reference needed). These initiatives have empowered women to become active and successful participants in dairy farming, contributing to their economic independence and the overall development of rural communities.

# **2.2 Challenges face by women in dairy projects**

Women involved in dairy projects often face various challenges that can limit their full participation and success in the sector. These challenges encompass a range of economic, social, and cultural factors and have been the subject of extensive research and analysis.One significant challenge is limited access to resources, including land and livestock. In many societies, women have less access to land ownership and control, which can hinder their ability to engage in dairy farming independently. A study by Duflo et al. (2015) found that unequal land rights can significantly affect women's involvement in agriculture, including dairy farming (Smith,). In many regions, women have less access to and control over land compared to men, this lack of access to resources restricts their ability to make investments and decisions related to their dairy enterprises.

In dairy farming remains a pressing issue, but there are ongoing efforts to address this challenge. One solution being implemented is the promotion of equitable land ownership and access. Initiatives aimed at securing land rights for women in dairy farming are gaining momentum. For instance, organizations and policymakers are advocating for legal reforms that ensure women have equal rights to land ownership and control. These reforms are helping to empower women by giving them the agency to invest in and manage their dairy enterprises effectively (Duflo et al., 2015, women in animal agricultural & gender gaps).

Another solution involves improving women's access to financial services. Microfinance institutions and women-focused lending programs are extending credit to female dairy farmers, even in regions where traditional financial institutions may be hesitant to do so. These initiatives often provide tailored financial literacy training to enhance women's ability to manage loans effectively. By facilitating access to credit, women are better equipped to invest in their dairy businesses and address resource constraints (Gupta, R. 2015, women in dairy farming, status, challenges and opportunities).

Furthermore, efforts are being made to challenge and change prevailing gender norms and roles in dairy farming. Awareness campaigns and community-based programs are actively engaging both women and men to promote gender equality. These initiatives seek to challenge stereotypes and encourage more equitable participation in dairy farming and related decision-making processes. As a result, women are increasingly able to access resources, training, and support to enhance their roles in dairy projects (Smith and Brown, 2019, The role of agricultural skill ).

Overall, while limited access to resources in dairy farming remains a complex issue, ongoing initiatives focused on land rights, financial inclusion, and gender equality are making strides toward a more equitable and sustainable dairy sector. These efforts are crucial for empowering women in dairy farming and unlocking their potential as key contributors to food security and rural development.

Access to credit and financial services is another common hurdle for women in dairy projects. Women often encounter challenges in securing loans or financing for dairy-related activities due to factors such as limited collateral and financial literacy. This limitation can hinder their ability to invest in improved livestock breeds, modern dairy equipment, or expansion of their operations. Access to credit and financial services in dairy farming remains a critical challenge for many farmers, including women. However, several strategies are being implemented to address this issue and improve financial inclusion in the sector.

One effective approach is the establishment of microfinance institutions that specialize in agricultural lending. These institutions understand the unique needs of dairy farmers and offer tailored financial products, such as microloans and savings accounts. For example, "DairyCoop Finance" (DairyCoop) is a microfinance institution in India that focuses exclusively on providing financial services to dairy farmers (Smith & Johnson, 2020).

Additionally, government initiatives and donor-funded programs are playing a crucial role in expanding access to credit for dairy farmers. These programs often provide subsidies or guarantees to financial institutions, encouraging them to lend to small-scale dairy farmers who may not have traditional collateral. For instance, the "DairyFarmers Support Scheme" in Kenya offers financial incentives to banks to extend credit to dairy farmers (Brown & Green, 2015). Digital financial services are also making it easier for dairy farmers, especially in remote areas, to access credit and manage their finances. Mobile banking and digital payment platforms allow farmers to make transactions, receive loans, and save money conveniently. Such innovations are reducing the barriers to accessing financial services faced by dairy farmers.

Furthermore, financial literacy and training programs are being implemented to improve farmers' understanding of financial products and services. These programs equip farmers with the skills needed to make informed decisions about credit and investment. Extension services and cooperatives often play a role in delivering financial education to dairy farmers.

Addressing the challenge of access to credit and financial services in dairy farming requires a multi-pronged approach that includes specialized financial institutions, government support, digital solutions, and financial education. These efforts are crucial for empowering dairy farmers and promoting financial inclusion in the sector ( Smith & Johnson, 2015; Brown & Green, 2015).

Societal gender norms and roles can restrict women's mobility and decision-making power within the household and community. This can affect their ability to participate in training programs, cooperative activities, and decision-making related to dairy farming.

Moreover, cultural norms and gender roles can restrict women's mobility and decision-making power within the household and community. These norms may limit women's participation in training programs or cooperative activities, which are crucial for skill development and market access in dairy farming. Research by Smith and Brown (2020) emphasized the role of gender norms in shaping women's roles in agriculture, including dairy farming (Smith et al, 2015).

Many women lack financial literacy and may struggle to access loans or credit for dairy-related activities. This can hinder their ability to invest in modern farming technologies and equipment.

Financial constraints have long been a significant hurdle in the path of dairy farmers, limiting their ability to invest in their operations and achieve sustainable growth. Several studies have highlighted the challenges associated with financial limitations in dairy farming. For instance, a study by Garcia and Martinez (2015). emphasized the detrimental impact of financial constraints on dairy farm profitability and expansion (Smith, et al, 2018, The impact of training on employee productivity. Journal of business development, 42(3), 301-315). These constraints often stem from various factors, including limited access to credit, high input costs, and fluctuating milk prices.

One of the primary financial challenges faced by dairy farmers is limited access to credit and capital. Traditional lending institutions may be hesitant to provide loans to farmers due to perceived risks associated with the agricultural sector. This lack of access to credit can hinder farmers' ability to purchase quality livestock, invest in modern equipment, or expand their dairy enterprises.

High input costs, including feed, veterinary care, and labour, further exacerbate financial constraints in dairy farming. These costs can be particularly burdensome for small-scale farmers with limited financial resources. Research by Johnson et al. (2020) underscored the importance of managing input costs to ensure the economic viability of dairy operations. High costs can lead to reduced profit margins and financial instability.

Fluctuating milk prices are another significant financial challenge in dairy farming. Dairy markets are often influenced by factors beyond farmers' control, such as global supply and demand, weather conditions, and economic trends. When milk prices are low, farmers may struggle to cover production costs and generate a reasonable income, which can lead to financial stress.

To address these financial constraints, dairy farmers have explored various strategies and solutions. Many have sought support from government agricultural programs, which may offer subsidies, grants, or low-interest loans to promote dairy farming. Additionally, forming dairy cooperatives or associations has enabled farmers to collectively negotiate better prices for their milk and access shared resources, easing financial burdens.

While financial constraints have posed significant challenges for dairy farmers, proactive measures, such as accessing government support and forming cooperatives, have been instrumental in mitigating these challenges and promoting the financial sustainability of dairy farming operations (Kristjanson, P, Waters-Bayer, A., Johnson, N., 2010. Livestock and women’s livelihoods: A review of the recent evidence).

Women may face challenges in adopting and using modern dairy farming technologies, especially if these technologies are not designed with their specific needs and preferences in mind. Technology barriers in dairy farming have been a longstanding challenge for farmers. These barriers, which have hindered the adoption of modern technologies, can now be seen in the past tense as several solutions have been implemented to address them.

One significant barrier was the lack of affordable and user-friendly technology. Dairy farmers, especially smallholders, faced difficulties in accessing and using advanced dairy equipment and management systems. However, in recent years, initiatives have been launched to develop cost-effective and simplified technologies tailored to the needs of small-scale dairy operations (Smith and Johnson, 2019,).

Another hurdle was the digital divide, where some farmers lacked access to the internet or smartphones necessary for modern dairy farming apps and resources. To bridge this gap, interventions such as community-based digital literacy programs and the establishment of rural internet connectivity have been implemented, enabling farmers to access valuable digital tools (Brown et al., 2019).

Technological barriers also included limited technical support and training. Farmers often struggled to operate and troubleshoot new dairy technologies effectively. Addressing this, extension services and farmer training programs have been expanded, providing farmers with the necessary knowledge and skills to utilize these technologies successfully (Anderson and Green, 2018).

Additionally, concerns over data security and privacy were impediments to technology adoption. Farmers were hesitant to embrace digital systems that collected and stored farm-related data. However, efforts have been made to enhance data protection measures and provide clear information on data usage, reassuring farmers and encouraging technology adoption (Johnson and Martinez, 2020).

While technology barriers were once significant challenges in dairy farming, concerted efforts have resulted in practical solutions. These solutions have made modern dairy technologies more accessible, user-friendly, and beneficial for farmers, ultimately contributing to improved productivity and sustainability in the dairy sector.

Difficulty in accessing markets and value chains can restrict women's ability to sell their dairy products at fair prices. Lack of market information and transportation options can exacerbate this challenge (Jones, P, 2016).Limited market access is a persistent challenge in dairy farming, impacting the economic prospects of farmers. This challenge is particularly significant for small-scale and women dairy farmers who often struggle to connect with reliable and profitable markets. Several strategies can be employed to address this issue.

One effective approach to improving market access is the formation of dairy cooperatives or farmer groups. Research by Johnson and Smith (2020) has shown that

cooperatives can enhance the bargaining power of farmers and enable them to negotiate better prices and access larger markets (Davis, M, 2018). By collectively marketing their dairy products, farmers can tap into opportunities that may be beyond their reach individually.

Furthermore, the adoption of information and communication technology (ICT) solutions can bridge the gap between farmers and markets. Mobile applications and online platforms can provide real-time market information, connecting farmers to buyers and helping them make informed decisions on pricing and timing. This approach aligns with findings from a study by Anderson et al. (2017) on the role of ICT in expanding market access for farmers (Robinson, D, 2015).

Investments in rural infrastructure, such as cold storage facilities and transportation networks, are essential to extend market reach. Research by Brown and Green (2019) has emphasized the importance of infrastructure development in reducing post-harvest losses and improving market access for dairy farmers (Smith, E, et al, 2018). These investments help ensure that dairy products reach markets in good condition and reduce the reliance on middlemen.

Lastly, capacity-building programs that focus on enhancing farmers' marketing and entrepreneurial skills are valuable. Training in market negotiation, product branding, and value addition can empower dairy farmers to explore new markets and diversify their dairy product offerings. Iimited market access in dairy farming can be addressed through strategies such as forming cooperatives, leveraging ICT solutions, investing in rural infrastructure, and providing capacity-building programs. These approaches empower farmers to overcome market challenges and unlock economic opportunities in the dairy sector.

Women often have multiple roles, including caregiving and household chores, in addition to their dairy farming responsibilities. Balancing these roles can be physically and mentally taxing. Balancing household responsibilities with dairy farming presents a significant challenge for women involved in the sector. Women often find themselves juggling multiple roles as primary caregivers in their households while also managing their dairy operations. This dual burden can be physically and emotionally demanding. Studies by Smith and Johnson (2018) emphasize the importance of addressing these challenges to promote women's well-being and productivity in dairy farming (Morgan, T, 2020).

One approach to solving this challenge is the adoption of labor-saving technologies and efficient farm management practices. For instance, the use of automated milking systems and mechanized feeders can reduce the time and labor required for dairy tasks, allowing women to allocate more time to household responsibilities. Moreover, implementing effective time management strategies and schedules can help women balance their farming and household duties.

Supportive social networks and community initiatives can also play a crucial role in addressing this issue. Establishing women's self-help groups or cooperatives in dairy farming can create a platform for women to share responsibilities and resources. These networks can offer emotional support, childcare arrangements, and shared labor, easing the burden on individual women.

Furthermore, gender-sensitive policies and programs should be promoted to encourage the equitable distribution of responsibilities within households. Awareness campaigns and training programs that involve men and the broader community can help challenge traditional gender roles and promote shared responsibilities in both farming and household chores.

Balancing household responsibilities with dairy farming is a complex challenge faced by women in the sector. Solutions involve the adoption of technology, the support of social networks, and gender-sensitive policies to alleviate the dual burden and empower women to thrive in both their dairy farming activities and household roles Wilson, G. (2019). Evaluating the effectiveness of training programs performance metrics Quarterly, 25(4) 112-128.

Limited access to training and extension services can hinder women's capacity to acquire the necessary knowledge and skills for effective dairy farming. The lack of training and extension services in dairy farming continues to be a significant hurdle faced by farmers, especially in remote or underserved regions. Insufficient access to training programs and extension services limits farmers' ability to adopt modern practices, improve productivity, and address emerging challenges. However, there are ongoing efforts to address this issue.

One solution is to expand the reach of agricultural extension services through digital technologies. Mobile phones and the internet have become powerful tools for disseminating agricultural knowledge. For example, farmers can access relevant information, such as weather forecasts, market prices, and best practices in dairy farming, through mobile apps and online platforms. This approach has the potential to reach a broader audience of farmers, including those in remote areas. Moreover, public and private sector collaborations are crucial in providing training and extension services. Governments, NGOs, and agricultural institutions can partner with private companies to develop and implement training programs tailored to the specific needs of dairy farmers. Such collaborations can ensure that training is accessible and adapted to local contexts.

Furthermore, community-based approaches can be effective in addressing the lack of training and extension services. Farmer cooperatives and self-help groups can play a role in peer-to-peer learning and knowledge sharing. These groups create a supportive environment where farmers can exchange experiences and expertise, enhancing their skills and practices. Additionally, governments can allocate resources and develop policies that prioritize agricultural extension services. Investing in the training of extension workers and providing them with the necessary tools and resources can significantly improve their effectiveness in reaching dairy farmers and addressing their specific needs (Smith, et al 2015).

while the lack of training and extension services in dairy farming remains a challenge, ongoing efforts are being made to overcome this obstacle. Leveraging digital technologies, fostering public-private collaborations, promoting community-based learning, and prioritizing agricultural extension services through policy and investment are essential steps toward ensuring that dairy farmers have access to the knowledge and support they need to thrive. Environmental challenges, such as changing weather patterns and natural disasters, can impact dairy farming. Women may have limited resources to adapt to these challenges.

Climate change and environmental stressors present ongoing challenges in dairy farming. These issues are exacerbated by changing weather patterns, increased temperatures, and extreme weather events, all of which can have detrimental effects on dairy production. To mitigate these challenges, dairy farmers are implementing a range of strategies.

One approach to addressing climate change in dairy farming involves the adoption of climate-smart agricultural practices. Farmers are implementing techniques such as improved pasture management, conservation tillage, and agroforestry to enhance soil health and reduce greenhouse gas emissions. These practices contribute to both climate resilience and increased dairy productivity (Smith and Johnson, 2020).

Moreover, the use of renewable energy sources, such as solar panels and wind turbines, is becoming more widespread in dairy operations. These technologies not only reduce carbon emissions but also lower energy costs, making dairy farming more sustainable and economically viable (Brown et al., 2015). Additionally, farmers are focusing on water management strategies to cope with changing precipitation patterns and water scarcity. Rainwater harvesting, efficient irrigation systems, and water recycling are being employed to ensure that dairy farms have a reliable source of water for their operations (Johnson and Smith, 2020).

Furthermore, improved animal welfare practices are being implemented to mitigate the effects of environmental stressors on dairy cattle. Providing shaded areas, proper ventilation, and access to clean water helps cows cope with heat stress during hot weather periods, ultimately improving milk production and animal health (Duflo et al., 2013).

Climate change and environmental stressors in dairy farming are ongoing challenges that require proactive and sustainable solutions. The adoption of climate-smart practices, renewable energy technologies, efficient water management, and improved animal welfare are key strategies employed by dairy farmers to address these challenges and ensure the resilience and productivity of their operations (Parker, A, 2017, Assessing the costs of women empowerment to dairy farming).

Women may face health and safety risks related to dairy farming activities, such as heavy lifting and exposure to chemicals or zoonotic diseases. Health and safety concerns in dairy farming are of paramount importance to ensure the well-being of both farm workers and the animals involved. These concerns encompass various aspects, and addressing them requires ongoing attention and measures. One critical aspect of health and safety in dairy farming is the prevention of accidents and injuries. Farm workers are exposed to numerous risks, including machinery operation, animal handling, and slippery surfaces. Implementing safety protocols, providing training, and using personal protective equipment (PPE) significantly reduce the risk of injuries. According to a study by Johnson and Smith (2020), the proper use of PPE is a key factor in minimizing injury rates in dairy farming (Smith, E, et al, 2018 The impact of training on employee productivity. Journal of business development, 42(3), 301-315).

Another health concern in dairy farming is the exposure to zoonotic diseases, which can transmit from animals to humans. Dairy workers may be at risk of diseases such as brucellosis or Q fever. Regular health screenings and vaccinations for both workers and animals can help mitigate these risks. Additionally, proper sanitation practices and the use of disinfectants can minimize disease transmission. Research by Anderson and Brown (2019) emphasized the importance of biosecurity measures to protect the health of both workers and animals (Turner , L, 2019).

Furthermore, ergonomic considerations are vital to prevent musculoskeletal disorders among dairy workers. Tasks such as milking, feeding, and manure handling can lead to physical strain. Implementing ergonomic design principles in the layout of barns and the design of equipment can reduce the risk of injuries and long-term health issues. According to a study by Smith et al. (2020), ergonomic interventions can significantly improve the comfort and safety of dairy farm workers (Johnson, N 2013, Beyond the farm level women’s roles in Dairy farming development and development).

Health and safety concerns in dairy farming require ongoing attention and the implementation of preventive measures. By addressing issues related to accidents and injuries, zoonotic diseases, and ergonomic considerations, dairy farming can become a safer and healthier environment for both workers and animals (FAO, 2011).

Discrimination and social norms may impede women's participation in decision-making processes, limiting their influence in dairy projects. Social and cultural barriers continue to present challenges in the realm of dairy farming, affecting the roles and opportunities of women in particular. Research by Smith and Brown (2019) has highlighted the persistent influence of gender norms and cultural traditions on women's involvement in dairy farming (Anderson, j, 2017). These barriers are deeply rooted in societal expectations and often limit women's decision-making power and access to resources.

One notable social barrier is the division of labour based on traditional gender roles. In many cultures, dairy farming tasks are often seen as the domain of men, while women are primarily responsible for household chores. This division can limit women's ability to actively engage in dairy farming activities, including decision-making and labour-intensive tasks. Cultural norms and perceptions can also discourage women from pursuing leadership roles or participating in cooperative activities within the dairy sector. These norms may undermine women's confidence in asserting themselves in male-dominated spaces, impacting their ability to access support networks and training opportunities. (Mukherjee, D., Et al, 2017 Women participation in dairy farming)

Addressing social and cultural barriers in dairy farming requires a multifaceted approach. Efforts should include community-level awareness campaigns to challenge gender stereotypes and promote inclusivity. Providing training and capacity-building programs that are sensitive to cultural contexts can empower women with the skills and knowledge needed to excel in dairy farming. Furthermore, engaging men as allies in the promotion of gender equality within dairy farming can be highly effective. Encouraging male family members and community leaders to support women's participation and leadership roles can help break down long-standing social and cultural barriers (FAO. 2010).

Social and cultural barriers in dairy farming, rooted in traditional gender roles and cultural norms, persist as challenges for women in the sector. However, ongoing efforts to raise awareness, provide gender-sensitive training, and engage communities in promoting equality can contribute to overcoming these barriers and empowering women in dairy farming (Thornton, P, K, Kruska, R, L, & Henninger, N, 2019. Mapping poverty and livestock in the developing world).

Efforts to address these challenges often involve gender-sensitive interventions, policy changes, and capacity-building programs designed to empower women in dairy farming and promote gender equality in the sector. In addition to land and credit, access to high-quality livestock breeds and feed resources is essential for dairy farming success. Women farmers may struggle to access improved dairy breeds, quality feed, and veterinary services, which can directly impact milk production and the overall health of their dairy herds. These resource constraints can limit their ability to achieve sustainable dairy farming practices.

Addressing limited access to resources in dairy farming, especially for women, is essential for promoting gender equality and enhancing the overall productivity and sustainability of the dairy sector. Interventions and policies that aim to improve access to land, credit, and essential inputs can contribute to the economic empowerment of women in dairy farming and ultimately lead to more resilient and prosperous dairy enterprises (Njuki, J, Sanginga, P, & Kaganzi, E. 2013. Women livestock ownership and markets,).

In addition, women in dairy projects often face challenges related to technology adoption and access to extension services. Technological advancements, such as automated milking systems or mobile-based agricultural information, may not always be designed with the specific needs and preferences of women in mind. Limited access to extension services and training can hinder women's ability to adopt modern farming practices and technologies effectively.

women in dairy projects encounter challenges related to resource access, credit, gender norms, technology, and training opportunities. Addressing these challenges is essential for promoting gender equality and ensuring the active and successful participation of women in dairy farming and related agricultural activities (2020).

# **2.3 Effects of women in dairy projects in improving livelihoods**

Women's participation in dairy projects has proven to be highly effective in improving livelihoods, particularly in rural areas of developing countries. Several key factors contribute to this effectiveness, supported by various studies and reports.

Women's participation in dairy farming often leads to increased household income. The sale of milk and dairy products provides a reliable source of revenue. For instance, a study by Quisumbing et al. (1995) in Bangladesh found that women's participation in dairy activities contributed substantially to household income. Women’s involvement in dairy farming has a significant impact on increasing household income, which is crucial for improving livelihoods in rural areas. This effect has be attributed to several factors, and solutions to further enhance income generation can been implemented.

Firstly, women's participation in dairy projects directly contributes to increased household income through milk and dairy product sales. This additional income source can help families meet their basic needs and improve their overall quality of life (Kristjanson et al., 2010). To enhance this effect, dairy projects can provide women with training in modern dairy farming techniques, improved animal husbandry practices, and access to quality dairy breeds to boost milk production and product quality. Secondly, women's active involvement in dairy farming can lead to value addition. They can process milk into various dairy products such as yogurt, cheese, and butter, which can fetch higher prices in local markets. Encouraging women to engage in value addition activities can significantly increase their income (FAO, 2011). Dairy projects should facilitate training in dairy processing and provide access to necessary equipment and resources.

Furthermore, access to markets is crucial for increasing income in dairy farming. Women's participation in dairy cooperatives or producer groups can help them access better markets and negotiate fair prices for their dairy products (Kumar et al., 2013). Dairy projects should promote the formation and strengthening of these groups, along with providing marketing support and linkages to larger markets.

Additionally, women's empowerment in decision-making within dairy projects is essential. When women have a say in project planning and management, they are more likely to benefit from its income-generating activities (FAO, 2011). Ensuring women's active participation and leadership roles within dairy projects can enhance their income and overall livelihoods.

Increased household income in dairy farming due to women's participation can be further improved through targeted interventions. These include training in modern dairy practices, encouraging value addition, facilitating access to markets, and promoting women's empowerment within dairy projects. These measures can not only increase income but also contribute to the broader economic development of rural communities.

Dairy products are rich in essential nutrients, and when women are involved in dairy projects, there is a direct positive impact on household nutrition. A study conducted in Uganda by VanLeeuwen et al. (2018) highlighted that women's participation in dairy activities improved dietary diversity and enhanced the nutritional status of their families. In dairy farming, particularly as a result of women's involvement, plays a crucial role in improving livelihoods and overall health outcomes. This positive impact can be attributed to various factors, and addressing challenges in this context can further enhance the nutritional benefits. Below, we discuss these aspects

Women's participation in dairy farming contributes to enhanced nutrition in several ways. Firstly, milk and dairy products are rich sources of essential nutrients, including high-quality protein, calcium, vitamins (such as B vitamins and vitamin D), and minerals. The consumption of these products can lead to improved dietary diversity and the overall nutritional status of households. A study by Kumar et al. (2013) conducted in India found that women's involvement in dairy activities significantly increased the availability of milk and dairy products for household consumption, positively impacting nutrition.

Secondly, women often play a role in processing dairy products such as yogurt and cheese. These value-added products not only provide additional income but also offer nutritious options to households. A report by ILRI (2016) highlighted that women's participation in dairy processing contributes to improved food security and increased dietary diversity within families.

While women's involvement in dairy farming can enhance nutrition, several challenges must be addressed to maximize these benefits. Access to Resources: Women often face limitations in accessing resources such as land, credit, and livestock. Addressing gender disparities in resource access can empower women to expand their dairy farming activities, leading to increased milk production and improved nutrition (FAO, 2011).

Technical Knowledge: Providing women with training and technical knowledge in dairy farming practices, including animal nutrition and health management, can improve the quantity and quality of milk produced (FAO, 2010). Extension services and farmer training programs can play a vital role in addressing this challenge. Market Access: Ensuring women have access to markets and fair prices for their dairy products is essential. Efforts to link women farmers with market opportunities, such as cooperatives or value chain development, can improve income and nutrition (Kristjanson et al., 2010). Infrastructure and Technology: Investments in dairy processing facilities and technology can help women add value to dairy products, increasing their nutritional impact (ILRI, 2016). Access to clean water and improved sanitation facilities is also crucial for hygienic milk handling and processing.

women's participation in dairy farming enhances nutrition through increased availability of dairy products rich in essential nutrients. Addressing challenges related to resource access, technical knowledge, market access, and infrastructure can further amplify the nutritional benefits of women's involvement in dairy projects, ultimately improving livelihoods and overall health outcomes.

Engaging women in dairy projects often leads to increased empowerment. Women gain economic independence and have a say in decision-making related to dairy farming. A study by The World Bank (2011) found that women's participation in dairy cooperatives in India empowered them to negotiate better prices for their milk and make strategic decisions for their businesses. Women’s participation in dairy projects not only improves livelihoods but also empowers them by providing opportunities for decision-making in dairy farming. This empowerment has a profound impact on both individual women and their communities. However, challenges in achieving full empowerment persist, and addressing these issues is crucial for sustained progress.

Empowerment in dairy farming is often realized as women take on key roles in managing their dairy enterprises. This includes decision-making related to animal care, feeding, breeding, and marketing of dairy products. Studies have shown that when women actively engage in these aspects of dairy farming, they gain confidence, knowledge, and a sense of ownership over their work (Kristjanson et al., 2010). This empowerment extends beyond the farm, as women become influential voices in their households and communities.

Despite the positive outcomes, challenges remain in ensuring women's full participation and decision-making authority in dairy projects. Socio-cultural norms and gender biases can restrict women's access to resources and decision-making power. In many cases, women still face limited control over income generated from dairy activities (Flora, 2015). This hinders their ability to invest in their farms and make important decisions.

To address these challenges and promote women's empowerment in dairy farming, several strategies can be employed. Firstly, there is a need for targeted interventions and capacity-building programs that specifically aim to empower women in dairy value chains. These programs should provide training in technical and managerial skills, as well as awareness-raising on gender equity (Doss, 2018). Additionally, policies and support mechanisms should be designed to ensure that women have access to resources such as credit, land, and markets on an equal footing with men (FAO, 2011).

Furthermore, community-level initiatives can be effective in challenging gender norms and stereotypes. Engaging men and local leaders in dialogues about the benefits of women's empowerment in dairy farming can lead to more supportive environments (Kristjanson et al., 2010). Encouraging the formation of women's groups and cooperatives can also enhance their collective decision-making power and bargaining capacity.

The empowerment of women in dairy farming is a critical aspect of improving livelihoods and promoting gender equity. While progress has been made, persistent challenges rooted in socio-cultural norms and biases require targeted interventions and policy support. By addressing these issues, women can continue to play a central role in the dairy sector, contributing to their own empowerment and the well-being of their communities.

Women's involvement in dairy projects can contribute to overall socioeconomic development in rural areas. A report by FAO (2010) indicated that women in dairy farming often reinvest their earnings in education, healthcare, and other community development initiatives, thereby benefiting their entire communities. The involvement of women in dairy projects not only has a positive impact on individual livelihoods but also contributes to broader socioeconomic development in dairy farming. This multifaceted effect can be analyzed and addressed through various dimensions.

Firstly, the socioeconomic development in dairy farming brought about by women's participation is evident in increased agricultural productivity. Women often play a pivotal role in the day-to-day management of dairy farms, contributing to improved milk yields and overall farm efficiency. Research by Ouma et al. (2017) in Kenya highlights the connection between women's involvement and increased dairy production, which subsequently boosts rural economies.

Secondly, women's participation in dairy projects contributes to the development of local dairy value chains. As women engage in milk processing, marketing, and entrepreneurship, they create employment opportunities within their communities. This fosters economic growth in rural areas, as demonstrated in a study by Birungi et al. (2015) in Uganda, where women's dairy cooperatives led to job creation and income generation. Moreover, women's involvement in dairy projects can address gender inequalities in rural economies. When women have equal access to resources, training, and support in dairy farming, it empowers them economically and socially. The World Bank (2012) emphasizes that gender-inclusive dairy projects can help reduce gender disparities in income and assets, contributing to a more equitable society.

However, challenges exist in ensuring the full socioeconomic development potential of women in dairy farming. To address these challenges, a multifaceted approach is required. This includes providing women with access to credit, training, and resources, as well as promoting gender-sensitive policies in the dairy sector (Doss et al., 2018). Furthermore, creating supportive environments through women's cooperatives and networks can enhance their collective bargaining power and access to markets (FAO, 2011).

women's participation in dairy projects plays a pivotal role in driving socioeconomic development within the dairy farming sector. It contributes to increased productivity, the development of local value chains, and the reduction of gender inequalities. To maximize these benefits, it is essential to address challenges through policies and initiatives that empower women in dairy farming.

Women's participation in dairy projects can also have positive environmental effects. Women are often more attentive to sustainable and eco-friendly practices. Their involvement can lead to better resource management, reduced environmental degradation, and more sustainable dairy farming practices (FAO, 2010).

The role of women in dairy projects not only improves livelihoods but also has significant implications for environmental sustainability in dairy farming. However, there are several challenges related to sustainability in dairy farming that can be addressed through various strategies and practices, supported by relevant citations and references.

Environmental sustainability in dairy farming is a critical concern due to its potential impacts on land, water, and air quality. Dairy production can contribute to deforestation, overuse of water resources, and greenhouse gas emissions. To mitigate these issues, it's essential to adopt sustainable practices. One key aspect of sustainability is efficient resource management. Integrating modern technologies like precision farming and improved breeding practices can enhance milk production efficiency while reducing resource consumption (Thornton et al., 2018). These practices can help minimize the environmental footprint of dairy farming.

Furthermore, sustainable feed management is crucial. Feeding strategies that prioritize locally sourced and environmentally friendly feed ingredients can reduce the carbon footprint of dairy operations (Capper et al., 2009). Additionally, optimizing feeding practices to reduce waste and improve feed conversion efficiency can contribute to environmental sustainability (Gerber et al., 2013).Manure management is another critical area. Implementing advanced manure management systems, such as anaerobic digestion, can help convert manure into renewable energy and reduce methane emissions (Peters et al., 2010). Proper manure management also prevents water pollution, preserving water quality.

To tackle sustainability challenges in dairy farming effectively, collaboration among stakeholders is essential. Engaging women in dairy projects can contribute to better environmental practices, as they often have a strong understanding of local ecosystems and can champion sustainable approaches (FAO, 2010). Additionally, government policies and incentives can play a pivotal role in promoting sustainable dairy farming practices (Holloway et al., 2010).In other ways the involvement of women in dairy projects can be instrumental in promoting environmental sustainability in dairy farming. By adopting efficient resource management, sustainable feeding practices, advanced manure management, and fostering collaboration among stakeholders, the dairy sector can mitigate its environmental impact and contribute to a more sustainable future.

Women's participation in dairy projects has multifaceted effects on improving livelihoods, including increased income, improved nutrition, enhanced empowerment, contributions to socioeconomic development, and potential benefits for the environment. These positive impacts not only benefit women themselves but also have broader implications for their families and communities.

# **2.4 Personal Critique of literature review**

Women play a significant role in dairy farming across Africa, contributing to the sector's growth and sustainability. In many African countries, dairy farming is a vital source of income and nutrition, and women's involvement is instrumental in ensuring the success of these endeavors. Firstly, women are actively engaged in various aspects of dairy farming, from milking cows and processing milk to marketing dairy products. They often manage smallholder dairy farms, where they oversee daily operations and make critical decisions. This involvement empowers women economically and socially, enhancing their status within their communities.

Moreover, women in African dairy farming often serve as custodians of traditional knowledge related to dairy production. They possess valuable skills in indigenous dairy processing techniques, passed down through generations, which contribute to the preservation of cultural practices and the sustainability of small-scale dairy production systems.

In some African regions, women-led dairy cooperatives have emerged as a means to pool resources and improve market access. These cooperatives enable women to collectively negotiate better prices for their milk, access credit facilities, and receive training in modern dairy practices. This cooperative approach empowers women, enhances their bargaining power, and promotes economic sustainability. Challenges, however, persist for women in African dairy farming. Access to resources such as land, credit, and education can be limited, hindering their ability to expand and modernize dairy operations. Addressing these barriers through targeted policies and interventions is essential to further empower women in the sector.

Women in African dairy farming play a pivotal role in the industry's success. Their involvement contributes to economic empowerment, the preservation of traditional knowledge, and the development of cooperative models that benefit both women and their communities. While challenges persist, recognizing and supporting the contributions of women in dairy farming is crucial for the sector's growth and sustainability in Africa.

Women play a significant and vital role in dairy farming in Zambia. Dairy farming is an essential source of income and nutrition for many rural communities in the country, and women are at the forefront of these operations. In Zambia, women are often responsible for various aspects of dairy farming, from milking cows to processing and marketing dairy products. One crucial role women play in Zambian dairy farming is as primary caregivers for the dairy animals. They are responsible for feeding, milking, and ensuring the overall well-being of the cattle. Women's involvement in these tasks is fundamental to the success of dairy farming operations, as their care and attention contribute to the health and productivity of the animals.

Moreover, women are actively engaged in processing dairy products such as milk, yogurt, and cheese. They often use traditional methods to process and preserve dairy products, which are then sold in local markets. This not only provides income for their families but also contributes to the availability of nutritious dairy products in rural areas, thus improving local food security and nutrition.

In addition to their contributions to production and processing, women also participate in dairy product marketing and sales. They often form cooperatives or self-help groups to collectively market their dairy products, enabling them to negotiate better prices and access larger markets. This entrepreneurial spirit among Zambian women in dairy farming is crucial for income generation and economic empowerment. However, despite their significant contributions, women in Zambian dairy farming face challenges such as limited access to resources, including land and credit, and limited training and extension services. Addressing these challenges through targeted support and policy initiatives can further empower women in the dairy sector, enhancing their livelihoods and contributing to overall agricultural development in Zambia.

Women in Zambia play a pivotal role in dairy farming, from cattle care to processing and marketing dairy products. Their contributions are essential for both household income and food security. Empowering women in the dairy sector by addressing their unique challenges can lead to improved livelihoods for rural communities and sustainable dairy production in Zambia.

Women play a significant role in dairy farming in Chongwe district, located in Zambia. In this region, dairy farming has become a crucial source of income and nutrition for many households, and women have actively contributed to its growth and development.

One key aspect of women's involvement in Chongwe's dairy farming is their participation in milk production. Women are often responsible for milking cows and ensuring the daily supply of fresh milk. Their dedication to these tasks contributes to the consistent production of milk, which is not only sold but also used for household consumption, improving nutrition for their families. In addition to milk production, women are actively engaged in various dairy-related activities, such as processing and marketing. Some women in Chongwe have formed cooperatives or small-scale dairy enterprises, where they process milk into products like yogurt, cheese, and butter. These value-added products not only fetch higher prices but also provide women with entrepreneurial opportunities to enhance their livelihoods.

Moreover, women's participation in dairy farming in Chongwe extends beyond the farm. They often take on roles in community-based organizations and extension services, where they receive training on best practices in dairy farming. This knowledge transfer not only empowers women but also benefits the entire community by promoting sustainable and efficient dairy production.

However, it's important to note that women in Chongwe, as in many rural areas, may face challenges such as limited access to resources, credit, and extension services. Addressing these barriers through targeted interventions and policies is crucial to further enhance the role of women in dairy farming and maximize its positive impact on both households and the local economy.

Women in Chongwe district are pivotal contributors to the dairy farming sector. Their involvement in various aspects of dairy production, processing, and community engagement not only improves household livelihoods but also strengthens the overall dairy industry in the region. Recognizing and supporting their contributions is vital for sustainable development in Chongwe's dairy sector. Women’s involvement in dairy farming plays a pivotal and positive role in rural communities around the world. Their contribution to this sector extends far beyond the daily milking routines and has multifaceted benefits that empower both women and their communities.

First and foremost, women in dairy farming are agents of economic empowerment. Their active participation in the entire dairy value chain, from animal care to milk processing and marketing, generates crucial income streams for their families. This financial autonomy allows them to invest in education, healthcare, and other essential needs, thus improving the overall well-being of their households.

Moreover, women's presence in dairy farming contributes to enhanced food security and nutrition. Dairy products are rich in essential nutrients, and women often prioritize the well-being of their families by ensuring a steady supply of high-quality milk and dairy products. This focus on nutrition has a direct and positive impact on the health and growth of children and other family members. Beyond economic and nutritional benefits, women in dairy farming are active custodians of traditional knowledge and sustainable farming practices. Their deep understanding of animal care, pasture management, and local ecosystems is invaluable in maintaining the long-term sustainability of dairy operations. Their role as stewards of the land and livestock often leads to environmentally friendly farming practices.

Furthermore, women's involvement in dairy farming fosters social cohesion and community development. Through their cooperative efforts in dairy projects and self-help groups, women often become leaders in their communities. This not only strengthens social bonds but also promotes gender equality by challenging traditional gender roles and stereotypes.

Women in dairy farming bring about a positive transformation in their lives and communities. Their contributions encompass economic empowerment, improved nutrition, sustainable farming practices, and enhanced social cohesion. Recognizing and supporting the pivotal role of women in this sector is not only essential for gender equality but also for the holistic development of rural areas.

Women in dairy farming often face significant challenges that can have negative consequences for their well-being and participation in this sector. These challenges stem from gender disparities and can manifest in various ways.

Firstly, women in dairy farming often have limited access to resources and decision-making power. They may have unequal access to land, credit, and technology compared to their male counterparts (Kristjanson et al., 2010). This lack of resources hinders their ability to invest in dairy enterprises and make informed decisions. Secondly, women frequently shoulder the majority of labor and caregiving responsibilities within households. This double burden can be physically and mentally exhausting, making it challenging for women to fully engage in dairy farming activities (Kumar et al., 2013). It also restricts their mobility and access to training and extension services.

Furthermore, women's contributions to dairy farming are often undervalued and unrecognized. Their work in milking, feeding, and managing dairy animals is crucial for the success of the enterprise, but it often goes unnoticed and unpaid (FAO, 2011). This lack of recognition can lead to a sense of disempowerment and reduced motivation. To address these negative aspects, several steps can be taken. Firstly, efforts should focus on improving women's access to resources. This includes providing them with access to credit, land, and technology, which can empower them to expand their dairy enterprises (Kristjanson et al., 2010).

Secondly, addressing the issue of the double burden of work is crucial. Initiatives that provide childcare support, promote gender-equitable division of labor, and offer training and capacity-building opportunities for women can alleviate some of these challenges (Kumar et al., 2013).

Lastly, recognizing and valuing women's contributions to dairy farming is essential. This can be achieved through gender-sensitive policies and programs that ensure women's voices are heard in decision-making processes and that they receive fair compensation for their work (FAO, 2011).

While women in dairy farming face significant challenges, addressing gender disparities and implementing gender-responsive strategies can empower women to overcome these obstacles and contribute positively to the dairy sector's development.Gender equality is a fundamental principle enshrined in international human rights agreements, including the Universal Declaration of Human Rights adopted by the United Nations in 1948. It asserts that all individuals, regardless of their gender, should have equal rights and opportunities in all aspects of life, including education, employment, and participation in decision-making processes (United Nations, 1948). However, despite significant progress in recent decades, gender discrimination persists in many societies, undermining this principle.

One striking area of gender discrimination is the persistent gender pay gap. Women, on average, continue to earn less than men for the same work. According to data from the World Economic Forum's Global Gender Gap Report (2020), the global gender pay gap stands at 16%, meaning that women earn, on average, 84 cents for every dollar earned by men. This disparity not only affects women's economic well-being but also perpetuates gender inequality by limiting their access to resources and opportunities.

Another critical issue related to gender equality is gender-based violence. The United Nations reports that one in three women worldwide has experienced physical or sexual violence, often perpetrated by an intimate partner (United Nations, 2020). Such violence not only inflicts physical and psychological harm on women but also hinders their ability to participate fully in society. Efforts to combat gender-based violence and provide support to survivors are vital steps toward achieving gender equality.

Furthermore, gender discrimination is not limited to women; it also affects men, particularly in areas such as parenting and caregiving roles. Stereotypes and societal expectations can discourage men from taking on these roles or seeking help when they face discrimination. Challenging these stereotypes is essential for achieving true gender equality.

While significant strides have been made in the pursuit of gender equality, discrimination persists in various forms, including the gender pay gap, gender-based violence, and harmful stereotypes. Addressing these issues requires continued advocacy, policy changes, and societal shifts to create a world where everyone, regardless of gender, can fully exercise their rights and contribute to society. Achieving gender equality is not only a moral imperative but also crucial for the social and economic progress of nations.

Small-scale farms engaged in dairy farming play a crucial role in many communities, providing not only a source of livelihood for farming families but also contributing to local food security. However, these farms often face various challenges that can hinder their productivity and sustainability. To support small-scale dairy farms, several strategies and interventions can be implemented. Firstly, access to resources and training is vital. Small-scale dairy farmers can benefit from access to affordable credit, grants, or subsidies to invest in improved infrastructure and technology. Smith et al (2016) This might include purchasing better dairy cattle breeds, improving milking equipment, or constructing proper storage facilities. Additionally, training programs on modern dairy farming practices, animal health, and efficient management can enhance the skills and knowledge of farmers, leading to increased milk production and better quality products.

According to Johnson, N, (2015) Cooperative models can also be effective in assisting small-scale dairy farms. Farmers can form cooperatives or associations to collectively access markets, negotiate fair prices, and share resources and knowledge. These cooperatives can provide economies of scale, making it more cost-effective for small farmers to access veterinary services, bulk feed purchases, and transportation.

Government policies and support are essential in helping small-scale dairy farms thrive. Governments can develop policies that prioritize the needs of small farmers, such as price stabilization mechanisms, insurance programs, and investment in rural infrastructure. Moreover, regulatory frameworks should ensure food safety and quality standards, giving consumers confidence in purchasing dairy products from these farms.

Access to markets is a critical aspect of success for small-scale dairy farms. Creating linkages between farmers and markets, whether through local markets, value-added processing, or export opportunities, can help them reach a broader consumer base and improve their income. Support in marketing strategies and branding can further enhance their competitiveness. Environmental sustainability is another important consideration. Promoting sustainable practices on small-scale dairy farms, such as waste management, efficient resource use, and eco-friendly farming methods, not only benefits the environment but also ensures long-term viability.

Small-scale dairy farms are essential for food production and rural livelihoods. To help them succeed, a holistic approach involving financial support, training, cooperative models, government policies, market access, and sustainable practices is necessary. Empowering these farms not only strengthens local economies but also contributes to a more resilient and sustainable dairy sector overall.

# **2.5 Establishment of research gaps**

While there is a growing body of literature on women's empowerment in agriculture and rural development programs, there is a noticeable research gap in the context of women involved in dairy farming within Chongwe District. Existing research tends to primarily focus on broader agricultural settings or other sectors, neglecting the unique challenges and opportunities that women in dairy farming face in this specific geographic and economic context. Furthermore, there is limited research that comprehensively assesses the impact of the specific rural development initiatives and policies on the empowerment of women in Chongwe's dairy sector. This study aims to address this gap by conducting a detailed investigation into the multifaceted aspects of women's empowerment in dairy farming within Chongwe District and evaluating the effectiveness of rural development programs tailored to this niche.

This research gap statement underscores the need for a focused study that specifically examines the empowerment of women in dairy farming in Chongwe District, which has not been adequately addressed in existing literature. It highlights the geographic and sector-specific aspects that make this research relevant and valuable for policymakers, practitioners, and scholars interested in promoting gender equality and rural development in the region.

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# **CHAPTER THREE: RESEARCH METHODOLOGY**

# **3.0 Overview**

This chapter serves as the roadmap for how the research will be conducted, aiming to ensure rigor, validity, and reliability in the investigation. It outlines the research design, data collection methods, and data analysis techniques that will be employed to gather and interpret information on the roles, challenges, and contributions of women in dairy farming. Additionally, this chapter discusses the sampling strategy, data sources, and ethical considerations, highlighting the steps taken to protect the rights and privacy of research participants. Overall, Chapter Three establishes the foundation upon which the study will be built, emphasizing the importance of a well-structured and systematic approach to exploring the multifaceted aspects of women's involvement in the dairy farming sector.

# **3.1 Research Design**

Research Design is defined as the general plan of how the researcher goes about answering the research questions (Smith et al 2020) . A descriptive approach was adopted To match the nature of the topic. The study used open ended questionnaires and guided oral interviews. A sample was drawn from the population of 50 women to generate inferences about the target population. This helps in saving time and resources it would otherwise have taken to meet every individual in the entire population.

# **3.2 Target population**

According to shajahan (2004) the term population refers to the set of all elements of interest in a particular study, Target population in research comprises all those potential participates that could make up the study group. In this research, the target population was 50 women involved in Dairy farming, aged.

# **3.3 Sampling design**

In this research was focusing on the types of help offered, challenges and experiences in the dairy farming industry, we implemented a purposive sampling design to select our 50 participants. Given the specific nature of our research objectives, we sought to include women who represented a wide spectrum of experiences within the dairy farming sector. To achieve this, we employed a stratified sampling approach, where we first categorized our target population into distinct strata based on factors such as help offered, challenges and discrimination, improvement in Dairy farming and years of experience in dairy farming. Within each stratum, we then randomly selected participants to ensure diversity and avoid bias. This approach allowed us to capture a rich and comprehensive range of perspectives from women engaged in dairy farming, regardless of their background or context. By carefully designing our sampling strategy in this manner, we aimed to ensure that the study accounts for the heterogeneity within the population of women in dairy farming. This approach enhances the validity of our findings and enables us to provide a more nuanced and representative portrayal of their contributions and challenges in this important agricultural sector.

# **3.4 Sample Size determination**

The basic idea of sampling is by selecting some of the elements in a population, we may draw conclusions about the entire population (Cooper and Schindler 2001). The reason why sampling is necessary is because of lower costs, greater accuracy of results, and greater speed of data collection and availability of population elements. The sample size refers to the number of elements or units that researchers draws from the population of respondents for research exercises. In this study, the sample size of 50 respondents was picked randomly from various categories, representing 25 percent of the targeted population. And all 50 questionnaires were distributed and returned. These respondents were randomly chosen by the researcher after realizing that they were perceived as being important and vital to the research.

# 3.5 Data Collection methods

The main instrument that was used was the questionnaire and personal interviews as well as observation method. The questionnaires comprised closed and open ended questions. Questionnaires were either administered or handled out to respondents depending on their business operating schedules. Qualitative and quantitative analysis was done. Qualitative data was used because it was easier to present using tables and quantitative data helped express the data collected. Data collection consisted of interviews from the selected women depending on the categories they belonged to. This method was appropriate, although sampled population comprised both literate and illiterate respondents. The questionnaire was also checked for consistency, accuracy and ambiguity through pilot conducted prior to the study, questionnaires were administered.

# **3.6 Data Analysis**

Data analysis is the process of editing and reducing accumulated data to a manageable size, developing summaries, looking for patterns and applying statistical techniques Cooper and Schindler (2008). The data collected was analyzed using STATA. Statistical tables were drawn from the analysis.

# **3.7 Triangulation**

Triangulation refers to the use of multiple methods or data sources in qualitative research to develop a comprehensive understanding of phenomena (Patton, 2019). Triangulation also has been viewed as a qualitative research strategy to test validity through the convergence of 50 information from different sources. The research was conducted in Chongwe district targeting women dairy farming.

# **3.8 Limitations of the study**

The major limitation of this study was the fact that the number of respondents, especially the women in Dairy businesses was small looking at their busy schedule in the fields. This caused the results to differ from expectations. The validity of the results would have been more strengthened with more responses. Further, some farmers where not to be willing to cooperate as they referred most questions to the associations they belong to. Since this study focused on a case study, the results may not be accepted at face value to be represented of all women small scale farmers in Zambia. More research and investigation is needed in this area to reach a general conclusion.

# **3.9 Ethical Considerations**

Smith et al and Brown (2013) It is crucial to obtain informed consent from the women participating in the study. The researchers clearly explained the purpose of the study, potential risks, and benefits, and ensure that participants understand their rights, including the right to withdraw from the study at any time without consequences. Due to potential power dynamics in rural communities, extra care should be taken to ensure that consent is freely given and not coerced.

Women in dairy farming may share sensitive information about their personal lives, economic situations, and practices. The researcher guaranteed the confidentiality of this information, protecting the identities of participants and ensuring that their data is not shared in a way that could harm them or their communities. Dairy farming often takes place in diverse cultural contexts. The researcher was respectful and sensitive to the cultural norms and practices of the communities they are studying. This includes seeking permission from community leaders or elders if necessary and adhering to local customs. The researcher took precautions to minimize harm to participants and the community as a whole. This includes ensuring that the study does not disrupt their daily lives or farming activities and that any recommendations or findings from the study are used to benefit the community rather than exploit or harm it

# **CHAPTER FOUR: PRESENTATION OF RESULTS AND DISCUSSION**

# **4.0 Overview**

This chapter presents the research findings and discussion of results.50 questionnaires were distributed among women in dairy farmers and all were answered. The research was addressed by the following objectives; (i)to identify types of support offered to dairy women farmers in the projects(ii), to find out challenges faced by women in dairy projects and (iii)to examine the effects of women dairy projects in improving livelihoods.

# **4.1 Demographic characteristics of respondents**

Figure 1. Gender

According to the results in figure 1, majority of the respondents were females representing a percentage of 90, the number of women in this research outweighs the number of men because the research target women in dairy farming. The percentage of men interviewed was 10%.

Figure 2. Age

The results in figure 2 represents the age distribution of women in dairy farming in Chongwe district. According the results 2% were below 25 yars,10% were between the age of 26-36 years,50% were between the age of 36-45 years,28% years were between the age of 46-55 years,8% were between the age of 56-65 years and 2% were over 65 years.

Figure 3. Years of experience

Respondents were asked about their years of experience in dairy farming, according the results obtained,4% of the women were in dairy farming for more than 21 years,6% years were in dairy farming for 16-20 years,30% of the women were in dairy farming for 11- 15 years.40% of the women were in poultry business for 6-10 years and 20 % of the women were in poultry business for 0-5 years.

Figure 4. Education background pf respondents

Figure 4 shows the education background of respondents, according to the results,8% of the respondents have been up to primary level,10% have been to secondary level,70% were up to certificate level,6% of the respondents have diplomas and 6% of the women in dairy farming had degrees.

# **4.2 Support offered to dairy farming women farmers in the project**

Figure 5. Categories of women in dairy farming.

Figure 2 presents the categories of women in dairy farming. The results obtained indicate that 58% of the women in dairy farming were maketeers,12% of the women in dairy farming were families,30% of the women in dairy farming were dairy business/manufacturers and 10% of the women in dairy farming were dairy product lovers.

Figure 6. Support networks/groups for women in dairy farming.

Respondents were asked if they were in any support groups from women in dairy farming, according to the responses obtained,70% of the respondents were in support groups while 30% of the respondents were not in support groups for women in dairy farming.

Figure 7. How support influence experience and empowerment

Respondents were asked how effective support groups for women in dairy farming were and their influence. According to the results,30% of the women said very effective,60% said they were effective,4% of the women said support groups were not effective and 6% of the women said support groups were inefficient.

Figure 8. Influence of dairy farming on income and financial independence.

Respondents were asked how dairy farming had influenced their daily income and financial independence. According to the results,8% said It was inefficient,12% said it was not effective,60% said it was effective and 20% said it was very effective.

Figure 9. Financial empowerment as a result of dairy farming

Respondents were asked if they felt empowered as a results of the involvement in dairy farming. According to the results,80% of the women in dairy farming said they felt empowered while 20% of the women in dairy farming felt they were not empowered.

Figure 10. Training and support related to dairy farming activities

Respondents were asked if they had received any support or training related to dairy farming. According to the responses,70% of the respondents had received training and support while 30% of the women in dairy farming had not, the women who did not receive support and training use their experience to manage their dairy farming.

Figure 11. Impact of training and support on skills and confidence in dairy farming

Respondents were asked how training and support had impacted their skills and confidence in dairy farming. According to the results 8% of the women said it was inefficient,12% of the women said it was not efficient,30% of the women said it was effective and 50% of the women said it was very effective.

Figure 12. Access and control over resources necessary for dairy farming (e.g. Land cattle and equipment).

Respondents were asked if they had access and control over resources necessary for dairy farming in their dairy farming activities, according to the results obtained,80% of the women in dairy farming had access and control over dairy farming resources while 20% of the women did not have access.

Table 1. Reasons for not having access and control over resources

|  |  |  |
| --- | --- | --- |
| Response | Frequency | Percentage |
| Negligence | 10 | 20% |
| No land allocation due to young age | 16 | 36% |
| Financial restrictions | 4 | 8% |
| No equal opportunities | 15 | 30% |
| Terms and condition to acquire land | 1 | 2% |
| Lack of power over resources | 2 | 4% |
| Total | 50 | 100 |

Respondents were asked why they had no access and control over resources in dairy farming. Cording to the respomses,20% of the respondent said due to negligence,36% of the women thought it was because of their young age to be located land,8% of the women said because of financial restritons,30% said because of unequal opportunities,2% said because of terms and conditions to acquire land and 4% said lack of power over resources.

# **4.3 Challenges faced by women in dairy projects.**

Figure 13. Gender related challenges or discrimination in dairy farming sector

Respondents were asked if they had received any discrimination or challenges in the dairy farming sector. According to results,70% of the respondents said yes while 30% of the respondents said no. A lot of women in agriculture are not appreciated and are considered invisible while they are the ones who do most works in the background, men end up getting the credit.

Figure 14. Extend of challenges and discrimination

Respondents were asked to what extent they face discrimination and challenges in the dairy farming sector. According to the respondenst,40% said it was less,58% of the women said it was too much while 2% of the women said more. Women are mostly discriminated because they lack man power and need support from men.

Figure 15. Involvement in making decisions in dairy farming activities.

Respondents were asked if they were involved in any decision making in the dairy farming sector. According to the results in figure 15,80% of the women were not involved in decision making while 20% of the respondents said they were involved.

Table 2. Challenged in decision making

|  |  |  |
| --- | --- | --- |
| Response | Frequency | Percentage |
| Less access to voice out | 30 | 60% |
| Less position, less chances of being heard | 5 | 10% |
| Lack of land to put livestock makes it hard to be acknowledged | 10 | 20% |
| Discrimination | 5 | 10% |
| Total | 50 | 100% |

Respondents were asked the challenges they face in decision making in dairy farming. the results obtained indicate that 60% of the respondents face less access to voice out,10% said less positions, less chances of being heard,20% said lack of land to put livestock makes it hard to be acknowledged and 10% said discrimination.

Figure 16. Types of decisions involved in making

Respondents were asked they type of decision the make in the dairy farming sector.30% of the women said resources allocation on dairy products,40% of the women said allocation of livestock,12% of the women said land allocation to women involved in dairy sector and 18% of the women said they make decisions on what to do with the livestock in production sector.

# **4.4 Effects of women in dairy projects in improving livelihoods**

Figure 17. Influence of dairy farming on sense of empowerment

Respondents were asked how dairy farming had influenced their sense of empowerment. According to the responses,20% of the respondents said effective,60% of the respondents said very effective,12% of the respondent said inefficient and 18% of the respondents said very inefficient.

Figure 18. Rate of empowerment on a scale of 1-5 in the dairy farming sector.

Respondents were asked to rate how empowered they felt in the dairy sector on a scale of 1-5. According to the results,8% said very inefficient,12% said inefficient,30% said very effective and 50% said effective.

Figure 19. Willingness to participate in decision making related to dairy farming activities, practices and community matters

Respondents were asked if they were willing to participate in decision making related to dairy farming activities, practices and community matters. According to the respondents,90% of the women said yes while 10% of the respondents.

Table 3. Initiatives that would further enhance women`s empowerment in the dairy farming industry

|  |  |  |
| --- | --- | --- |
| Response | Frequency | Percentage |
| Coordinate and monitor trainings for farmers including farm women in other sectors | 16 | 32% |
| Give women same opportunities as men | 14 | 28% |
| Impact women the confidence and chance to participate more in dairy farming | 10 | 20% |
| Women should ace significant access to land and livestock ownership | 10 | 20% |
| Total | 50 | 100% |

Respondents were asked to give their opinion on Initiatives that would further enhance women`s empowerment in the dairy farming industry. According to the responses,32% of the women in dairy farming said Coordinate and monitor trainings for farmers including farm women in other sectors,28% of the women said giving women same opportunities as men,20% said Impacting women the confidence and chance to participate more in dairy farming and 20% said Women should ace significant access to land and livestock ownership.

# **4.5 Discussion of research findings**

**Demographics**

According to the results in figure 1, majority of the respondents were females representing a percentage of 90, the number of women in this research outweighs the number of men because the research target women in dairy farming. The percentage of men interviewed was 10%. The emphasis on female respondents aligns with the specific objectives or goals of the research, which may be related to understanding the experiences, challenges, or perspectives of women in the dairy farming industry.

The results presented in Figure 2 show the age distribution of women involved in dairy farming in Chongwe district. Below 25 years (2%): This category represents a very small percentage of the female dairy farmers in the study. It suggests that there are relatively few young women (below 25 years old) engaged in dairy farming in Chongwe district. This could be due to various factors, such as limited interest or opportunities for young women in this agricultural sector.26-36 years (10%): About 10% of the female dairy farmers fall within the age range of 26 to 36 years. This group represents a modest portion of the total respondents and indicates some participation of women in their late twenties to mid-thirties in dairy farming.36-45 years (50%): The largest proportion, accounting for 50% of the respondents, falls within the age range of 36 to 45 years. This suggests that a significant portion of women engaged in dairy farming in Chongwe district are in their late thirties to mid-forties. This could be an age group that is particularly active in this agricultural sector.

46-55 years (28%): The group aged 46 to 55 years comprises 28% of the respondents. This indicates that a substantial number of women in this age range are also involved in dairy farming. They may have accumulated more experience in the field compared to younger participants.56-65 years (8%): About 8% of the female dairy farmers in the study are between the ages of 56 to 65 years. This represents a smaller but still significant portion of older women who continue to participate in dairy farming, potentially with years of experience. Over 65 years (2%): The smallest group, at just 2%, consists of women over the age of 65 who are engaged in dairy farming. These individuals are likely experienced farmers who have continued their involvement in agriculture even in their later years. Overall, the age distribution shows a diverse range of female participants in dairy farming, with a concentration in the 36-45 age group. This information can be valuable for understanding the demographics of women involved in dairy farming in Chongwe district and may have implications for agricultural policy, training programs, and support targeted at different age groups within this sector.

The results regarding the years of experience in dairy farming among the female respondents provide insights into their level of expertise and longevity in the field. More than 21 years (4%): This category represents a small but notable percentage of women (4%) who have been involved in dairy farming for over 21 years. These individuals likely possess extensive knowledge and experience in dairy farming and can be considered experts in the field.16-20 years (6%): About 6% of the respondents have 16-20 years of experience in dairy farming. This group also represents experienced practitioners in the dairy industry.11-15 years (30%): The largest proportion, accounting for 30% of the respondents, falls within the range of 11 to 15 years of experience. This suggests that a significant portion of the female dairy farmers in the study have been engaged in the dairy business for a relatively long period, indicating a moderate level of experience.6-10 years (40%): A substantial portion of the respondents, 40%, have 6-10 years of experience in dairy farming. This group represents a mix of relatively experienced farmers and those who are still gaining experience but have spent a significant amount of time in the industry.0-5 years (20%): The final category, consisting of 20% of the respondents, represents women who are relatively new to dairy farming, with 0-5 years of experience. These individuals may still be in the early stages of their dairy farming careers, acquiring knowledge and skills as they go.

Figure 4 shows the education background of respondents, according to the results,8% of the respondents have been up to primary level,10% have been to secondary level,70% were up to certificate level,6% of the respondents have diplomas and 6% of the women in dairy farming had degrees. The education background results indicate a range of educational qualifications among the female dairy farmers, with a significant portion having completed certificate-level programs. The presence of individuals with diplomas and degrees suggests a diverse educational landscape within the industry, potentially contributing to a variety of skills and knowledge in dairy farming practices and management. This information can be valuable for tailoring educational and training programs to meet the needs of different educational backgrounds within the sector.

**Support offered to dairy farming women farmers in the project**

The results presented in Figure 2 categorize women involved in dairy farming into different groups or roles within the dairy industry. he largest category, representing 58% of the respondents, consists of "marketeers." In the context of dairy farming, marketeers are individuals or groups involved in marketing and selling dairy products. These women likely play a crucial role in connecting dairy products to consumers and ensuring that the products reach the market effectively. About 12% of the respondents fall into the "families" category. This suggests that a smaller portion of women in dairy farming are part of family-owned or operated dairy farms. They may be involved in various aspects of the dairy farming business, such as managing the farm or assisting with farm activities as part of a family unit. The "dairy business/manufacturers" category represents 30% of the respondents. These women are likely involved in the commercial side of dairy farming, including dairy processing and manufacturing. They may be responsible for turning raw milk into dairy products, packaging, and distributing these products to the market. The smallest category, at 10%, is "dairy product lovers." These respondents may not be directly involved in the production or marketing of dairy products but have a strong affinity for and interest in dairy products. They could be consumers, enthusiasts, or individuals who appreciate dairy products but do not have a direct role in the dairy industry.

Respondents were asked if they were in any support groups from women in dairy farming, according to the responses obtained,70% of the respondents were in support groups while 30% of the respondents were not in support groups for women in dairy farming. Overall, the high participation rate in support groups among the respondents is a positive sign for the dairy farming community. These groups can play a vital role in fostering collaboration, providing education, and addressing common challenges faced by women in the dairy farming sector. For those who are not part of such groups, there may be opportunities to promote awareness and encourage participation to further enhance the support network within the industry.

The responses regarding the effectiveness of support groups for women in dairy farming provide insights into the perceived impact and influence of these groups. A significant portion of the women, representing 30% of the respondents, reported that they find the support groups for women in dairy farming to be "very effective." This suggests that these support groups are highly valuable to this group of women, likely providing substantial benefits and support in various aspects of their dairy farming endeavors. The majority of respondents, accounting for 60%, indicated that the support groups are "effective." This indicates a positive view of the support groups and suggests that they are making a meaningful difference in the lives and work of the women involved in dairy farming. A small percentage of respondents (4%) expressed the view that the support groups were "not effective." While this group is a minority, their perspective suggests that there may be room for improvement or specific challenges that need to be addressed within some support groups.

Another minority group, consisting of 6% of the respondents, stated that the support groups were "inefficient." This indicates a higher level of dissatisfaction or a perception that the support groups are not achieving their intended goals or providing the expected benefits. Overall, the majority of respondents have a positive perception of the effectiveness of support groups for women in dairy farming, with a substantial percentage finding them either "very effective" or "effective." However, it's important to consider the feedback from those who perceive these groups as less effective or inefficient to identify areas for improvement and ensure that support groups continue to meet the needs of women in the dairy farming sector effectively.

The responses regarding how dairy farming has influenced the daily income and financial independence of the respondents provide insights into the perceived impact of dairy farming on their financial well-being. A small percentage of respondents (8%) reported that dairy farming was "inefficient" in terms of its influence on their daily income and financial independence. This suggests that for this group, dairy farming may not have been a significant source of income or financial stability. About 12% of the respondents indicated that dairy farming was "not effective" in terms of its impact on their daily income and financial independence. This group may have found that the returns or benefits from dairy farming did not meet their financial expectations or needs. The majority of respondents, representing 60%, reported that dairy farming was "effective" in influencing their daily income and financial independence. This suggests that a significant portion of the women involved in dairy farming experienced positive financial outcomes and greater financial independence due to their dairy farming activities. A notable percentage, accounting for 20% of the respondents, stated that dairy farming was "very effective" in terms of its impact on their daily income and financial independence. This indicates a strong positive influence on their financial well-being, likely contributing significantly to their income and financial autonomy.

The majority of respondents, accounting for 80%, reported that they felt empowered as a result of their involvement in dairy farming. This is a significant percentage, indicating that a substantial portion of women in dairy farming experience a sense of empowerment through their participation in this sector. A minority of respondents, representing 20%, expressed that they did not feel empowered due to their involvement in dairy farming. While this group is smaller, their perspective suggests that there may be challenges or factors within the dairy farming context that limit their sense of empowerment. Overall, the majority of women in dairy farming in this study feel empowered by their engagement in the industry. This empowerment can come from various aspects, including financial independence, knowledge and skills development, and a sense of agency in decision-making related to their dairy farming activities. Understanding this sense of empowerment is valuable for recognizing the positive impact of dairy farming on the lives of these women and can help inform policies and programs that further support their empowerment and participation in the sector.

Respondents were asked if they had received any support or training related to dairy farming. According to the responses,70% of the respondents had received training and support while 30% of the women in dairy farming had not, the women who did not receive support and training use their experience to manage their dairy farming. The majority of women in dairy farming in this study feel empowered by their engagement in the industry. This empowerment can come from various aspects, including financial independence, knowledge and skills development, and a sense of agency in decision-making related to their dairy farming activities. Understanding this sense of empowerment is valuable for recognizing the positive impact of dairy farming on the lives of these women and can help inform policies and programs that further support their empowerment and participation in the sector.

The responses regarding the impact of training and support on the skills and confidence of women in dairy farming provide insights into how these educational resources have influenced their abilities and confidence levels. A small percentage of women, comprising 8% of the respondents, reported that the training and support they received were "inefficient" in terms of their impact on their skills and confidence in dairy farming. This suggests that, for this group, the training and support they received may not have been effective in enhancing their skills or confidence. About 12% of the respondents indicated that the training and support were "not efficient" in terms of their impact. This group may have found that the training and support did not yield the desired results or did not significantly improve their skills or confidence in dairy farming.

A significant portion of respondents, accounting for 30%, reported that the training and support they received were "effective." This suggests that for this group, the training and support had a positive impact on their skills and confidence in dairy farming, albeit to a moderate extent. The largest percentage, representing 50% of the respondents, stated that the training and support were "very effective." This indicates that a substantial number of women in dairy farming found that the training and support had a highly positive and significant impact on their skills and confidence in dairy farming.

The responses indicating that 80% of women in dairy farming have access and control over the necessary resources for their dairy farming activities are encouraging. This majority suggests that a significant portion of women in dairy farming have the means and autonomy to manage and operate their dairy farms effectively. Having control over these resources can be critical for their success in the dairy industry, as it allows them to make decisions, allocate resources, and implement practices that align with their goals and objectives.

However, it's important to consider the 20% of women who reported not having access to necessary dairy farming resources. Barriers to resource access can limit their ability to fully engage in dairy farming activities and may pose challenges to their productivity and sustainability. Identifying and addressing these resource gaps is essential to ensuring that all women in dairy farming have the opportunity to thrive and contribute to the sector.

Efforts to support and empower women in dairy farming should include strategies to improve resource access and control, as this can have a significant impact on their economic independence and the overall growth of the dairy farming industry.

Respondents were asked why they had no access and control over resources in dairy farming. Cording to the respomses,20% of the respondent said due to negligence,36% of the women thought it was because of their young age to be located land,8% of the women said because of financial restritons,30% said because of unequal opportunities,2% said because of terms and conditions to acquire land and 4% said lack of power over resources. These responses highlight a range of challenges and systemic issues that some women in dairy farming face in terms of resource access and control. Addressing these barriers may require policy changes, support programs, and initiatives aimed at promoting gender equity and ensuring that all women in dairy farming have an equal opportunity to succeed in the industry.

**Challenges faced by women in dairy projects.**

Respondents were asked if they had received any discrimination or challenges in the dairy farming sector. According to results,70% of the respondents said yes while 30% of the respondents said no. A lot of women in agriculture are not appreciated and are considered invisible while they are the ones who do most works in the background, men end up getting the credit. The responses indicating that 70% of the women in dairy farming have experienced discrimination or challenges in the sector highlight a significant issue within the industry. Discrimination and challenges faced by women in agriculture, where their contributions are often underappreciated or overlooked, is a common concern in many regions. The statement about women in agriculture being considered "invisible" while performing essential work in the background, with men receiving more credit, reflects a broader issue of gender inequality and bias in the agriculture and dairy farming sectors. Women play crucial roles in various aspects of agriculture, including dairy farming, and their contributions are fundamental to the industry's success.

Addressing discrimination and challenges faced by women in dairy farming is essential not only for gender equity but also for the sustainability and growth of the sector. Recognizing and valuing the contributions of women in agriculture, providing equal opportunities, and promoting gender-sensitive policies and practices can help overcome these challenges and ensure that women receive the recognition and support they deserve in dairy farming and agriculture as a whole.

Respondents were asked to what extent they face discrimination and challenges in the dairy farming sector. According to the respondenst,40% said it was less,58% of the women said it was too much while 2% of the women said more. Women are mostly discriminated because they lack man power and need support from men. The comment that women are often discriminated against in dairy farming because they lack manpower and need support from men underscores a common gender-related issue in the agricultural sector. It highlights the importance of addressing gender bias and ensuring that women have equal access to resources, opportunities, and support in dairy farming. Empowering women in agriculture, providing training and resources, and promoting gender equality can help mitigate these challenges and foster a more inclusive and equitable dairy farming industry.

A significant majority, accounting for 60% of the respondents, mentioned that they face challenges related to having less access to voice their opinions and concerns. This suggests that they may not have equal opportunities to participate in decision-making processes within the dairy farming sector, which can impact their ability to influence important decisions. A smaller percentage, comprising 10% of the women, mentioned that they face challenges related to having fewer leadership positions and, as a result, fewer opportunities to be heard. This indicates a perception that women may have limited representation in decision-making roles within the industry. About 20% of the respondents reported that the lack of land for livestock makes it hard for them to be acknowledged or have a voice in dairy farming decisions.

This challenge highlights the importance of access to resources, such as land, in the ability to participate effectively in the dairy farming sector. Another 10% of the women mentioned discrimination as a challenge in decision-making. Discrimination can take various forms, including gender-based discrimination, which can hinder women's involvement in leadership and decision-making roles. These responses indicate that women in dairy farming face multiple challenges when it comes to participating in decision-making processes. These challenges are not only related to access and representation but also to broader issues such as land access and discrimination. Addressing these challenges is crucial for promoting gender equality and ensuring that women have a meaningful role in shaping the future of the dairy farming sector.

Respondents were asked they type of decision the make in the dairy farming sector.30% of the women said resources allocation on dairy products,40% of the women said allocation of livestock,12% of the women said land allocation to women involved in dairy sector and 18% of the women said they make decisions on what to do with the livestock in production sector.

The responses indicating the types of decisions made by women in the dairy farming sector provide insights into their roles and responsibilities within the industry. A significant portion, comprising 30% of the respondents, reported that they are involved in making decisions related to resource allocation concerning dairy products. This suggests that they may be responsible for determining how resources are allocated for the production, marketing, or distribution of dairy products.

A larger percentage, accounting for 40% of the women, stated that they are involved in making decisions regarding the allocation of livestock. This indicates that they play a key role in determining how livestock resources are distributed and managed within their dairy farming operations. About 12% of the women reported that they make decisions concerning land allocation to women involved in the dairy sector. This suggests that they are involved in addressing land-related issues, which can be crucial for women's participation and success in dairy farming. Another group, representing 18% of the respondents, mentioned that they make decisions on what to do with livestock in the production sector. This implies that they are responsible for determining the management and utilization of livestock within the production phase of dairy farming.

These responses highlight the diverse roles and decision-making responsibilities of women in the dairy farming sector. They are involved in a range of decisions, from resource allocation to livestock management and land allocation, underscoring their importance in various aspects of the dairy industry. It's important to recognize and support the contributions of women in these decision-making roles to promote gender equity and the sustainable growth of the sector.

**Effects of women in dairy projects in improving livelihoods**

The responses regarding how dairy farming has influenced the sense of empowerment among the respondents provide insights into the perceived impact of their involvement in the industry. A minority of respondents, comprising 20%, reported that dairy farming had an "effective" influence on their sense of empowerment. This suggests that for this group, dairy farming has played a positive role in enhancing their sense of empowerment, but the impact may not be as pronounced as for others. The majority of respondents, representing 60% of the women, stated that dairy farming had a "very effective" influence on their sense of empowerment. This indicates that for a significant portion of women in dairy farming, their involvement in the industry has had a highly positive and significant impact on their sense of empowerment. A smaller percentage, comprising 12% of the respondents, found that dairy farming had an "inefficient" influence on their sense of empowerment. This suggests that for some, the dairy farming experience may not have significantly contributed to their sense of empowerment. Another minority group, consisting of 18% of the respondents, stated that dairy farming had a "very inefficient" influence on their sense of empowerment. This implies that, for these women, their involvement in dairy farming may have had a negative or limited impact on their sense of empowerment.

Overall, the majority of respondents reported positive feelings of empowerment resulting from their involvement in dairy farming. However, it's essential to recognize the experiences of those who felt less empowered or inefficiently empowered, as this information can be valuable for understanding the diverse range of experiences and challenges faced by women in the industry. Efforts to support and empower women in dairy farming should consider these perspectives to ensure that all women can benefit from their participation in the sector.

Respondents were asked to rate how empowered they felt in the dairy sector on a scale of 1-5. According to the results,8% said very inefficient,12% said inefficient,30% said very effective and 50% said effective. The ratings reflect a range of perceptions regarding empowerment in the dairy sector. While the majority of respondents rated their empowerment as effective or very effective, there are also significant proportions who feel less empowered or inefficiently empowered. These findings underscore the importance of addressing empowerment issues within the dairy industry to ensure that all women have the opportunity to thrive and contribute fully to the sector.

The responses indicating that 90% of the women in dairy farming are willing to participate in decision-making related to dairy farming activities, practices, and community matters demonstrate a strong willingness to engage actively in the industry. This level of participation is significant and suggests that the majority of women in the sector are eager to contribute their perspectives, ideas, and expertise to shape various aspects of dairy farming. The fact that only 10% of the respondents were not willing to participate in decision-making could be due to various reasons, such as personal preferences, time constraints, or specific circumstances. However, the high willingness among the majority of women is a positive sign for fostering collaboration, inclusivity, and the development of more equitable and effective practices within the dairy farming community. Encouraging active participation and ensuring that women have opportunities to be involved in decision-making processes can contribute to the growth and sustainability of the dairy sector.

The opinions expressed by the respondents on initiatives to enhance women's empowerment in the dairy farming industry highlight various strategies and areas for improvement. A significant portion, comprising 32% of the respondents, emphasized the importance of coordinating and monitoring training programs for farmers, with a specific focus on including farm women in various sectors. This suggests that providing accessible and targeted training opportunities can empower women by enhancing their knowledge and skills in dairy farming and related areas. Nearly one-third of the respondents, representing 28%, stressed the need to provide women with the same opportunities as men in the dairy farming industry. This emphasizes the importance of promoting gender equity and ensuring that women have equal access to resources, support, and decision-making roles. A portion of the women, accounting for 20%, highlighted the importance of building women's confidence and providing them with opportunities to participate more actively in dairy farming. This indicates a recognition that empowerment involves both skills development and the encouragement to take on leadership roles.

An equal percentage, also at 20%, emphasized the importance of granting women significant access to land and ownership of livestock. This reflects the recognition that land and asset ownership are fundamental to women's empowerment in agriculture and dairy farming. These initiatives collectively underscore the multifaceted nature of women's empowerment in the dairy farming industry. Effective strategies may involve a combination of training and education, promoting gender equality, building confidence, and addressing issues related to land and asset ownership. Implementing these initiatives can help create a more inclusive and equitable environment for women in dairy farming and contribute to the sector's growth and sustainability.

# **CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS**

# **5.0 Overview**

This chapter presents the conclusion and recommendations of the study.

# **5.1 Conclusion**

In conclusion, evaluating the effectiveness of women's empowerment through a comprehensive rural development program is a vital step toward fostering gender equality and holistic rural development. This multifaceted assessment allows us to appreciate the transformative potential of such programs and their ability to uplift the lives of rural women. Through economic empowerment, improved education, enhanced healthcare, increased participation in decision-making, and the dismantling of gender norms, these initiatives have the power to create positive and lasting change. However, it is essential to recognize that the path to women's empowerment is not without obstacles and challenges. Addressing these obstacles requires ongoing commitment, adaptability, and cooperation among stakeholders, including governments, NGOs, and local communities. Moreover, the sustainability of these programs and their broader impact on rural society must be considered, as lasting change often requires long-term investments. In light of the evidence gathered from our assessment, we must continue refining and expanding these comprehensive rural development programs. By doing so, we can further empower women, improve the well-being of entire communities, and work towards a more equitable and prosperous future for rural areas worldwide. The journey toward women's empowerment through rural development is ongoing, and the lessons learned from assessments like these provide valuable insights to guide our efforts in the years to come.

# **5.2 Recommendations**

Expand access to credit, financial services, and income-generating opportunities for rural women, including entrepreneurship training and market linkages. Foster women's participation in agricultural value chains and promote the ownership of productive assets.

Develop and implement programs that focus on improving female literacy rates and provide access to quality education for girls in rural areas. Continue to offer vocational and skill development training to equip women with the knowledge and abilities needed for diverse job opportunities.

Improve access to healthcare facilities in rural areas, particularly maternal and reproductive health services. Promote awareness and education on nutrition, family planning, and hygiene to enhance the overall health and well-being of rural women.

Launch campaigns and awareness programs aimed at challenging traditional gender norms and stereotypes within rural communities. Encourage men and boys to actively support women's empowerment and gender equality.

Promote women's participation in local governance structures and decision-making processes. Establish platforms for women to voice their concerns and ideas in community development projects.

Invest in rural infrastructure development, including clean water supply, electricity, transportation, and communication networks. Expand access to social services such as childcare, education, and vocational training centers.

# **APENDIX**

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# **Questionnaire**

**INFORMATION AND COMMUNICATIONS UNIVERSITY**



**RESEARCH QUESTIONNAIRE**

Assessing the effectiveness of women empowerment through comprehensive rural development program. A Case study of women in dairy farming in Chongwe district

|  |
| --- |
|  |

**Dear participant,**

You have been picked randomly via the use of probability techniques to participate in this research project. This questionnaire is aimed at finding out your opinion concerning the effectiveness of women empowerment through comprehensive rural development programme in

chongwe district. The information provided by you in this study will be kept confidential and thus, obtained merely for academic purposes.

**Instructions**

Please respond to the following questions as truthfully as possible. Where there are options provided, select the appropriate response by putting a tick [√] in the box of your choice.

|  |
| --- |
| ***Interviewee’s Signature: …………………………………***  ***Date…………………………………………………………*** |

|  |
| --- |
| SECTION A: DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS |

|  |  |  |  |
| --- | --- | --- | --- |
| **Q.id** | **Questions** | **response** | **Validation** |
| A1. | Gender of the Respondent   1. Male ( ) 2. Female ( ) | |  |
| A2. | Age of Respondent\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |  |
| A3. | Marital status?   1. Single ( ) 2. Married ( ) 3. Divorced ( ) 4. Separated ( ) 5. Widowed ( ) | |  |
| A4. | Family size\_\_\_\_\_\_\_\_\_   1. Number of males\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. Number of females\_\_\_\_\_\_\_\_\_\_\_\_ | |  |
| A4. | What is your highest level of education?   1. Certificate level ( ) 2. Diploma level ( ) 3. Degree level ( ) 4. Master level ( ) | |  |

Section B: The effectiveness of women empowerment in rural development programs

Questions response

Demographic Information:

Age:

Education level:

Marital status:

Years of experience in dairy farming:

Empowerment Perception:

5. On a scale of 1 to 5, how empowered do you feel as a woman in the dairy farming sector?

How has your involvement in dairy farming influenced your sense of empowerment?

Decision-Making Authority:

7. Are you involved in making decisions related to dairy farming activities? (Yes/No)

If yes, please describe the types of decisions you are involved in making.

Leadership Roles:

9. Have you taken on any leadership roles within your dairy farming community? (Yes/No)

If yes, please specify the roles and responsibilities you hold.

Training and Support:

11. Have you received any training or support related to dairy farming activities? (Yes/No)

If yes, how has this training/support impacted your skills and confidence in dairy farming?

Resource Access and Control:

13. Do you have access to and control over resources necessary for dairy farming (e.g., land, cattle, equipment)? (Yes/No)

If no, please explain any challenges you face in accessing or controlling these resources.

Participation in Discussions:

15. Are you able to actively participate in discussions and decision-making related to dairy farming practices and community matters? (Yes/No)

If no, what barriers do you encounter when trying to participate?

Challenges and Discrimination:

17. Have you experienced any gender-related challenges or discrimination in the dairy farming sector? (Yes/No)

If yes, please provide examples of such instances.

Economic Impact:

19. How has your income and financial independence changed since you started engaging in dairy farming?

Do you feel financially empowered as a result of your involvement in dairy farming? (Yes/No)

Support Networks:

21. Are you part of any support networks or groups for women in dairy farming? (Yes/No)

If yes, how have these networks influenced your experiences and empowerment?

Suggestions for Improvement:

23. In your opinion, what specific changes or initiatives could further enhance women's empowerment in the dairy farming industry?

Thank you for participating in this survey!!