



# **Understanding the Drivers of Sustainable Animal Farming in Sweden: An Integrated Quantitative and Qualitative Analysis**

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Swedish University of Agricultural Sciences, SLU

Faculty of Landscape Architecture, Horticulture, and Crop Production Sciences

Department of Biosystems and Technology

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## Swedish University of Agricultural Sciences

Faculty of Landscape Architecture, Horticulture, and Crop Production Sciences

Department of Biosystems and Technology

## **Preface**

Growing up in a farming family in Pakistan gave me practical exposure to the opportunities and challenges associated with livestock farming. I involve animal farming with my family members and often involve in activities like milking, feeding, going out in field with animals. These activities always motivated me to finding ways that encourage sustainable animal farming. In Pakistan, farmers often face constraints such as limited policy support, inadequate advisory and extension services, restricted access to modern technologies, and varying levels of awareness regarding sustainable animal farming practices. These experiences motivated my interest in understanding how different institutional and social factors influence the adoption of sustainable animal farming.

My academic journey in Sweden provided me with the opportunity to observe a different agricultural context. I was impressed by the strong policy framework, effective advisory services, high levels of environmental awareness, and the collaborative efforts among farmers, researchers, and institutions that support sustainable livestock production. These facts motivated me to explore the drivers that encourage sustainable animal farming in Sweden.

I faced some challenges while conducting this research. It was a big challenge to identify and book a time with farmers who are involve in sustainable animal farming practices. Additionally, ensuring meaningful representation required considerable time and effort. Despite these challenges, the willingness of participating farmers to share their knowledge and experiences greatly enriched this study and provided valuable insights into sustainable farming practices.

This study contributes to a better understanding of the factors that promote sustainable animal farming by integrating quantitative and qualitative approaches. By combining statistical analysis with qualitative analysis, it provides a more comprehensive perspective on the drivers of sustainable livestock production in Sweden. It is my hope that the findings will contribute to academic discussions, inform policymakers and advisory organizations, and provide useful insights for researchers interested in advancing sustainable animal farming. Furthermore, I hope that some of the lessons

identified in the Swedish context may offer valuable perspectives for countries such as Pakistan where strengthening institutional support, advisory services, and farmer engagement could help promote more sustainable livestock farming.

This thesis represents not only the completion of an academic project but also an important step in my personal and professional journey. It has strengthened my understanding of sustainable animal farming and reinforced my belief that collaboration among farmers, researchers, policymakers, and advisory institutions is essential for building resilient and environmentally responsible livestock systems. I hope this research work encourages my future professional journey.

## **Acknowledgement**

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Furthermore, I would like to thank all the farmers who generously participated in the interviews and shared their time, experiences, and insights. Their contributions were invaluable to this research.

Finally, I would like to acknowledge my family and friends for their encouragement, patience, and unwavering support throughout my academic journey.

## Abstract

Sustainable animal farming has become an important practice that addresses environmental challenges, economic pressures and food security concerns. This study aims to examine the key factors associated with adoption of sustainable animal farming practices in Sweden. The researcher used mixed method approach because the researcher did quantitative analysis with qualitative insights to provide a comprehensive understanding of the research problem. The quantitative component analyzed the association between five key variables namely farmer attitudes, environmental factors, economic and market conditions, government policies, and knowledge and advisory services with sustainable farming. The results revealed a positive correlation between farmer attitudes, environmental factors, knowledge and advisory services and government policies with sustainable animal farming. The economic factors are not show significant association between sustainable animal farming. The qualitative data were collected through ten semi-structured interviews with animal farmers across southern Sweden. Thematic analysis of the interviews identified several major themes, including economic constraints, policy and regulatory challenges, environmental awareness, market dynamics, knowledge gaps, and structural differences between farm types. While farmers demonstrated positive attitudes and strong environmental awareness, the findings highlight that economic pressures, particularly high investment costs and unstable market conditions are the most significant barriers to sustainability adoption. Additionally, government policies support sustainable practices, their complexity and lack of flexibility limit their effectiveness, especially for small-scale farmers. The study also found that consumer demand for sustainable products is growing but remains inconsistent due to price sensitivity while advisory services, although valuable, require more practical and tailored approaches. Four variables showed statistically significant positive associations with sustainable animal farming namely farmer attitudes, environmental factors, government policy, and knowledge/advisory services. Economic and market conditions showed a weak positive but non-significant association in the survey data. The qualitative results show that economic factors are major barriers based on thematic analysis. The researcher identified economic factor was qualitatively important but not statistically supported as a linear survey association in this sample.

**Key words:** *Farmer attitudes, environmental factors, economic and market conditions, government policies, and knowledge and advisory services and sustainable animal farming*

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## Abbreviations

| Abbreviation | Description                                 |
|--------------|---------------------------------------------|
| E            | Economic factors                            |
| EN           | Environment Factors                         |
| FA           | Farmer Attitudes                            |
| GP           | Government Policy and Regulations           |
| KA           | Knowledge and Advisory Services             |
| SA           | Sustainable Animal Farming                  |
| SLU          | Swedish University of Agricultural Sciences |

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Introduction**

Concerns over food security, animal welfare, and climate change and environmental degradation have made sustainable animal farming has become increasingly important in recent years. Ecological effects, resource use and greenhouse gas emissions are influenced by the agricultural industry, especially sustainable animal farming. It is significant to promote sustainable practices that strike a balance between social responsibility, economic viability, and environmental protection. Thus, sustainable animal farming is becoming more and more important. In this chapter, the researcher describes the background, research problem, aims, and significance of the study that provide clear idea about this research.

### **1.2 Background**

At present, there is growing awareness of the environmental, social and economic sustainable practice in sustainable animal farming in worldwide. Conventional animal farming not much consider environment protection, animal welfare and sustainable farming practices that create negative impact on environment like water use, nutrient contamination, soil degradation and greenhouse gas emissions (Wezel et al., 2009). However, animal farming creates positive influence on society by supplying animal protein and provides job opportunities. So, it is significant to promote sustainable practices in livestock production for develop more resilient food systems in worldwide.

Sustainable animal farming is significant for agricultural growth throughout Europe due to several policies like European Green Deal, the Farm-to-Fork Strategy, and the modified Common Agricultural Policy (CAP). These regulatory frameworks place a strong emphasis on increased animal welfare standards, decreased environmental impact and greater resource efficiency (Adams et al., 2025). However, the successful implementation of sustainable agricultural practices depends largely on farmers' willingness to adopt measures such as rotational grazing, improved manure management, reduced antibiotic use and integrated crop–livestock systems (Wang et al., 2024). The adoption of sustainable practices is influenced by several factors. Market

pressures encourage farmers to meet consumer and industry demands while personal values shape their attitudes toward environmental stewardship. Policy incentives can reduce financial barriers and access to information and technical assistance helps farmers gain the knowledge and skills needed to implement sustainable practices effectively. Farmers frequently have to balance societal expectations, economic survival and environmental sustainability.

Sweden represents a relevant case for examining sustainable animal farming due to its advanced regulatory framework, strong environmental commitments, and high animal welfare standards. Swedish livestock production operates under stricter welfare regulations than many other countries, which has been shown to improve animal health and reduce antibiotic use, but also increases production costs (Magnusson, 2022). At the same time, livestock production contributes significantly to national greenhouse gas emissions, particularly through methane produced during the digestion process (enteric fermentation) in ruminants such as cattle and sheep, as well as from manure management that highlight environmental challenges associated with livestock production systems (Cederberg et al., 2013). These dynamics place pressure on farmers to balance environmental sustainability with economic viability, especially within the broader goals of climate mitigation and sustainable food production.

The sustainability of animal husbandry in Sweden is also influenced by market forces and structural shifts. Due to growing expectations for efficiency and financial strains, the industry has consolidated, resulting in fewer but larger farms (Bryngelsson et al., 2016). Additionally, cheaper imports compete with domestic producers, although Swedish consumers tend to prefer high-quality, welfare-friendly products. Concurrently, there has been an increase in consumer demand for food that is both ethically and environmentally sustainable which has an impact on policy development and production methods.

Strong governmental commitments to environmental sustainability and some of the strictest animal welfare laws in the world influence livestock farming in Sweden. Although cheaper imports compete with domestic manufacture, Swedish customers tend to select high-quality, welfare-friendly items. Farmers respond to rising public worries about the effects of climate change and ethical food production while juggling

the need to preserve profitability with stringent regulations (Altieri et al., 2015). Additionally, the agricultural industry in Sweden is undergoing structural changes and larger farms and more pressure on small and medium-sized farmers. As larger farms benefit from economies of scale and greater access to resources, smaller farms often face challenges in remaining competitive and financially viable.

### **1.3 Problem identification**

Sustainable animal husbandry has drawn more and more attention on a global scale. Despite its important role in the agricultural sector, livestock production raises concerns about its long-term sustainability because it contributes significantly to greenhouse gas emissions, water use, and soil degradation. These environmental impacts create challenges for the economic, social, and environmental sustainability of agriculture. According to the Food and Agriculture Organization (FAO, 2019), the livestock industry contributes significantly to global emissions underscoring the pressing need for more environmentally friendly farming methods.

Sweden is known for its sophisticated agricultural infrastructure and strict environmental regulations. However, there are still obstacles in the way of completely sustainable animal husbandry. According to reports from the European Commission (2020), farmers in Sweden and around Europe are under growing pressure to maintain economic viability while adhering to stringent environmental laws. This puts farmers in a difficult position where they have to strike a compromise between market competitiveness, financial restraints and sustainability aims.

The disparity in farmers' adoption of sustainable techniques is one of the main problems noted in earlier research. According to Rockstrom et al. (2020), although there is a general high level of awareness of sustainability, real implementation is frequently hindered by financial obstacles, a lack of incentives and a lack of access to information and training. Similarly, Smith (2018) emphasizes that farmers' desire to adopt sustainable practices is greatly influenced by their attitudes, perceptions and societal factors.

Furthermore, the sustainable animal farming is influenced by market-related and economic issues. Farmers are discouraged from implementing environmentally friendly practices by volatile market pricing, restricted access to markets for sustainable products and high initial investment costs. However, European Union policy and regulatory frameworks are promoting the sustainable animal farming because the governance body provides various benefits like subsidy provision, grant loans etc. (EU, 2021).

The recent research studies are inspecting several factors associated with sustainable animal husbandry (Bryngelsson et al., 2016, Wang et al., 2024). Many of the research that now available tend to concentrate on discrete elements, like economic performance or environmental effects without taking into account how social, institutional and behavioral components interact. This leaves a gap in our knowledge of how these elements work together to affect farmers' choices and methods.

It is commonly acknowledged that livestock production contributes significantly to environmental stresses like resource use, greenhouse gas emissions, and effects on biodiversity. Strict animal welfare laws, lofty environmental objectives, and heightened market competition all contribute to these difficulties in Sweden. Although previous studies have looked at certain facets of sustainable animal husbandry such as economic performance, policy frameworks, or environmental effects, these studies frequently focus on these elements separately.

There is limited empirical understanding of how multiple drivers of sustainability interact from the perspective of farmers themselves. Few studies, in particular, have thoroughly investigated how Swedish animal farmers view and rank the behavioral, economic, policy, knowledge-based, environmental, and social aspects impacting the adoption of sustainable techniques. This disparity is significant because farmers' perspectives and decision-making procedures are essential to the effective execution of sustainability shifts.



## **1.4 Aim of the thesis**

The purpose of this thesis is to investigate and evaluate the major factors that influence sustainable animal farming in Sweden from the viewpoint of animal farmers. Sustainable animal farming is becoming more and more significant due to lot of factors such as environmental issues, economic constraints, changing legal frameworks as well as animal welfare (Adams et al., 2025).

Conventional farming creates lot of negative influence on environment and animal welfare. Most of the European countries are frequently seen as a pioneer in sustainable agriculture because farmers deal with a variety of sustainable farming techniques as well as introduction of lot of sustainable policies like Common Agricultural Policy (CAP).

This study aims to understand how animal farmers see sustainability and how several factors including farmer attitudes, market and economic issues, policy and regulations, knowledge and skills, environmental circumstances and social dimensions shape their European farming practices and decisions. As a researcher, my goal is to use a mixed method approach to identify the factors driven sustainable animal farming in Sweden.

It is expected that the results of this research will enhance our understanding of sustainability at the farm level and offer insightful information to policymakers, extension agencies and other stakeholders who want to assist Sweden's shift to more sustainable animal farming. Additionally, these research findings can disseminate to my home country (Pakistan) that might influence agriculture policy and sustainability initiatives in the future.

## **1.5 Research Questions**

The main research question are listed below while consider the quantitative method.

1. What factors significantly influence the adoption of sustainable animal farming among animal farmers in Sweden?
2. How are attitudes, knowledge, economic and market conditions, policy measures, environmental factors, and social dimensions associated with farmers' engagement in sustainable animal farming?"

*Table 1: Literature summary for factor selection*

| <b>Key factor</b>                  | <b>Major Insights From Previous Research</b>                                                                                                                                                                                                                                                                                                                                                                               | <b>Representative References (Real Studies)</b> |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>Farmer attitude</b>             | <p>The study surveyed livestock farmers in Greece's Evros region to identify challenges hindering livestock development. Results show strong dissatisfaction with public authorities, greater approval of non-governmental bodies and a primary focus on economic goals.</p> <p>Farmers also emphasize the need for training, particularly in dairy management, sanitation, and improving feed quality and production.</p> | (Aggelopoulos et al., 2016)                     |
| <b>Economic and Market Factors</b> | <p>Previous researcher analyzed changes in Czech livestock production and meat consumption after EU accession that focus on pigs, cattle, and poultry. The researchers predict meat consumption for 2020–2024 using trend analysis and Holt's model,</p> <p>The study finds that sustainable livestock development depends on production levels, meat quality, market prices and shifting consumer eating habits.</p>      | (Sredl et al., 2021)                            |
| <b>Policy and Regulations</b>      | <p>Previous research finds that recent EU agricultural policies, especially the CAP, have intensified and simplified livestock production, often harming sustainability through higher emissions and reduced animal welfare.</p>                                                                                                                                                                                           | (Adams et al., 2025)                            |

Financial support can create dependency, while weak targets and limited stakeholder input slow progress.

**Knowledge, Skills & Advisory Services** Previous research identifies three types of farms with different performance levels and finds that advisory use varies by farm size, structure, and farmer education in nine European countries. (Herrera et al., 2019)

More advisory contacts are linked to greater innovation and risk-management adoption and not clearly environmental sustainability in Europe. The results stress the need to tailor advisory services to diverse farming systems.

**Environmental & Resource Conditions** Previous research study argues that four mutually reinforcing conditions are necessary to trigger food-regime shifts toward nature-inclusive agriculture and that these conditions likely apply across Europe. (Runhaar, 2021)

This research mentioned further research to verify how these conditions appear in Sweden, identify who can act on them, and explore whether they can be intentionally created and by which strategies.

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## **1.6 Significance of the study**

This study advances knowledge of sustainable animal husbandry in Sweden by offering empirical insights into how farmers view and prioritize the major factors impacting the adoption of sustainable practices. The study provides a more thorough understanding of farm-level decision-making processes by incorporating behavioral, economic, policy, environmental, knowledge-based and social variables. Policymakers, advisory services, and agricultural stakeholders in Sweden can benefit from these findings since they can help create more practical policies and advising strategies that support farmers' reality and promote the shift to more sustainable livestock systems.

In Pakistan, animal husbandry is a significant part of the agricultural industry but frequently encounters issues with sustainability, resource management and environmental effect. Thus, the study is extremely pertinent from a practical standpoint. The knowledge gathered from Sweden's sophisticated and environmentally conscious farming systems can be a useful standard for enhancing Pakistani methods. Lessons on governmental support, farmer knowledge, effective resource use, and the adoption of eco-friendly practices can be tailored to the local environment.

Additionally, by bridging the gap between two distinct agricultural systems, this research promotes the spread of information. It makes it possible for Pakistani officials, scholars, and practitioners to comprehend effective tactics used in Sweden and evaluate their suitability in a developing nation. This can aid in the creation of more efficient laws, educational initiatives, and extension services that support sustainable animal husbandry.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction to the chapter**

This chapter reviews the relevant literature related to sustainable animal farming in Sweden. It presents both theoretical and empirical perspectives to identify key concepts, research findings, and knowledge gaps that inform the current study.

#### **2.2 Defining sustainable animal farming**

Livestock production strategies that satisfy current food and economic demands without risking the capacity of future generations to satisfy their own requirements are referred to as sustainable animal husbandry (Jaisli & Bruno, 2024). It is a comprehensive strategy that incorporates social justice, economic profitability, and environmental health into animal production systems (Hou & Waqas, 2024). Sustainable livestock systems are those that effectively exploit natural resources while reducing environmental degradation and guaranteeing food security and rural livelihoods (FAO, 2025).

Reducing greenhouse gas emissions, enhancing waste management, conserving water and safeguarding biodiversity are the main environmental goals of sustainable animal husbandry. According to Buttel, (2015), livestock production has a major impact on ecosystem services and sustainable management is necessary to minimize ecological harm while preserving output. Similarly, Hume et al (2011) emphasize that livestock systems must strike a balance between productivity and environmental preservation to guarantee long-term sustainability.

In terms of economics, sustainable animal husbandry seeks to maintain effective production methods while guaranteeing farmers' resilience and profitability (Gliessman, 2026). This entails increasing value chain efficiency, expanding market access and optimizing input consumption. For farmers to embrace long-term environmentally friendly practices, sustainable agriculture systems must continue to be economically feasible (Benton & Harwatt, 2022).

Ensuring animal care, providing fair work conditions, and promoting rural community development are all social components of sustainable animal husbandry. It also entails responding to consumer concerns about ethical production methods and food safety.

Additionally, sustainable agriculture should prioritize on social well-being and equity in rural communities in addition to agricultural efficiency (Pretty, 2008).

Sustainable animal husbandry is generally recognized as a multifaceted idea that incorporates social responsibility, economic viability, and environmental management. It necessitates a systems-thinking strategy that simultaneously takes into account societal demands, farmer livelihoods, and ecological balance (Wezel et al., 2009)

### **2.3 Sustainable livestock farming in Sweden and Europe**

Growing worries about climate change, environmental degradation, animal welfare, and food security have made sustainable animal husbandry a major focus of agricultural policy, research, and innovation in Europe (Vita et al., 2024). Sustainable livestock production is often viewed in the European context as a system that maintains productivity and rural development while striking a balance between economic viability, environmental protection, and social responsibility (EU, 2026).

From a policy standpoint, the European Commission highlights that while cattle farming is still a vital part of the European food chain and rural economy, it needs to switch to more ecologically friendly and resource-efficient methods (Arias, 2026). EU agricultural policy promotes sustainability by supporting measures that reduce emissions and improve resource efficiency within livestock systems. This support is implemented through initiatives such as eco-schemes, climate action plans and investments in agricultural innovation. This is in line with a larger strategic goal of preserving cattle production while lessening its impact on the environment (EU, 2021).

One of the aspects of European livestock literature that is most frequently explored is environmental sustainability. According to studies, raising livestock has a substantial negative impact on biodiversity loss, land use pressure, and greenhouse gas emissions (Adams et al., 2025). However, it can also have positive effects when managed responsibly, such as maintaining rural landscapes and sequestering carbon in grassland systems (Lisec et al., 2024). According to additional research, Europe has reduced emissions from livestock by using precision feeding, better manure management, and technology advancements in farm systems (Symeon et al., 2025). This indicates that rather of relying solely on output reduction, sustainability is

increasingly being addressed through managerial and technological advancements (EU, 2026).

In Europe, the competitiveness and resilience of rural communities are directly related to sustainable livestock farming. Millions of farms and rural villages are supported by the cattle industry which makes a substantial contribution to agricultural output and jobs throughout the region (EEA, 2026). However, new research shows that farmers are confronted with increasing obstacles that make the shift to sustainability more difficult including escalating input costs, market instability, and more stringent environmental requirements (Adams et al., 2025). Therefore, the adoption of sustainable techniques by farmers is still heavily influenced by economic viability (Adams et al., 2025).

Another significant aspect that has been emphasized in European studies is social sustainability. Food security, cultural heritage, and rural livelihoods all depend heavily on livestock farming. Simultaneously, there is growing public demand for ethical production methods and better animal care (Godfroy & Muro, 2025). Research indicates that farmers are being pushed toward more transparent and welfare-oriented production systems by legislative pressure and consumer awareness. This includes better housing conditions, more advanced animal health monitoring systems, and a decrease in the need of antibiotics (EU, 2021).

The significance of innovation and integrated approaches to sustainability is also emphasized by recent European research (Sołtysik et al., 2026). The improvement of livestock systems through digital technology, precision farming, improved feeding techniques, and circular bio economy models is the subject of many EU-funded projects (EC, 2024). These developments seek to simultaneously increase animal wellbeing, lessen their negative effects on the environment, and increase output. The difficulty of assessing sustainability in livestock systems is highlighted by the literature's observation that only a small number of sustainability models completely incorporate environmental, economic, and social aspects (EU, 2024).

In general, the European literature portrays sustainable animal husbandry as a dynamic and changing idea influenced by public expectations, technical advancements, and legislative changes (Adams et al., 2025). Even though there has been a lot of improvement, there are still issues with striking a balance between productivity and

social and environmental objectives. Because of this, Europe is a vital point of reference for comprehending sustainability shifts in animal farming systems around the world, even in developing nations like Pakistan.

## **2.4. Theoretical perspective on adoption of sustainable farming practices**

To better understand farmers' decision-making processes, the adoption of sustainable agricultural practices has been extensively studied through several theoretical lenses. Economic theories, especially the utility maximization framework which postulates that farmers accept innovations when the anticipated benefits surpass the costs, served as a major foundation for early research. According to this method, resource availability, risk perception, and profitability factors all have an impact on adoption decisions. Purely economic models have come under intensity for oversimplifying farmer behavior and ignoring social and psychological factors that influence decision-making (Pannell et al., 2021).

Diffusion of Innovation (DOI) theory has emerged as one of the most important frameworks in agricultural research to overcome these constraints. According to DOI, adoption is the process by which innovations proliferate over time within a social system that impacted by elements including social networks, communication channels and the innovation's perceived qualities. Relative advantage, compatibility, intricacy, trialability and observability are important factors that influence whether or not farmers adopt new methods. Additionally, the idea emphasizes that adoption is not a single decision but rather happens in phases from awareness to confirmation (Rogers, 2003).

Behavioral theories, especially the Theory of Planned Behavior (TPB), have been extensively used to explain the adoption of sustainable farming in addition to diffusion-based methods. According to TPB, attitudes toward the behavior, subjective norms, and perceived behavioral control are the three primary elements that shape intention which in turn drives behavior. This paradigm highlights the fact that social influences and perceived capacity for practice implementation have an impact on farmers' decisions in addition to economic considerations. Although it may ignore contextual and emotional aspects, empirical research has demonstrated that TPB has a good explanatory power in predicting pro-environmental behaviors in agriculture (Ajzen, 2002).



The focus of more recent research has shifted to multifaceted, integrated frameworks that incorporate environmental, behavioral, and economic viewpoints. These models acknowledge that a complex interplay of factors, such as farm features, institutional settings, information access, and environmental conditions, shapes adoption. For instance, in order to better represent farmer behavior in the real world, integrated models emphasize the significance of integrating moral principles, social norms, and external limitations with rational decision-making. These strategies also aim to overcome the attitude–behavior gap, a phenomenon in which favorable perceptions of sustainability fail to result in the implementation of sustainable farming practices (Li et al., 2023).

In general, the theoretical literature indicates that the adoption of sustainable farming practices cannot be well explained by a single paradigm. Rather, adoption is becoming more widely recognized as a complicated, dynamic, and context-dependent process that is impacted by institutional, psychological, social, and economic factors. Recent research highlights the need for more comprehensive approaches that incorporate various characteristics to better inform policy and practice, especially from the farmer perspective.

## **2.5. Farmer attitudes and perceptions**

One of the most significant behavioral factors associated the adoption of sustainable agriculture is frequently found to be farmer attitudes. Farmers' attitudes are a reflection of their perceptions, cognitive assessments, and readiness to adopt resource-efficient and ecologically conscious methods. Attitude is a key predictor of intention and subsequent conduct, according to behavioral change theories like the Theory of Planned conduct (Aggelopoulos et al., 2016).

According to empirical research in livestock farming, farmers that have a positive outlook on sustainability are more likely to implement low-emission feeding techniques, better animal care systems, and manure management (Bilotto et al., 2024). According to research in European agriculture, farmers must view sustainability as compatible with productivity and profitability in order for behavioral change to take place; environmental knowledge alone is insufficient (Follet, 2025).

The "attitude-behavior gap" which occurs when farmers have favorable attitudes toward sustainability but don't necessarily put them into practice is also highlighted in the research. Financial limitations, a lack of infrastructure and uncertainty about economic returns are frequently cited as reasons for this disparity. As a result, attitudes are important yet insufficient for long-term change since they interact with institutional and structural elements.

## **2.6. Economic and market conditions**

It is commonly acknowledged that market and economic factors play a major role in the adoption of sustainable animal production (Bry-Chevalier, 2026). Farmers work under profit-driven systems which mean that decisions are heavily influenced by financial feasibility. Adoption of sustainable techniques may be discouraged in the absence of sufficient financial incentives because they frequently involve upfront investments in infrastructure, technology and training (Zira et al., 2023).

Research on livestock systems in Europe reveals that sustainability transitions are strongly impacted by profitability, input costs, and loan availability. When markets reward environmentally friendly output with price premiums or certification programs, or when farmers see clear economic benefits, they are more likely to embrace sustainable practices (Smith, 2025).

Animal products that are ethically and sustainably produced are becoming more and more in demand, especially in developed areas. However, research suggests that market signals aren't always reliable or powerful enough to spur significant change. Farmers are reluctant to implement new systems because of the increased uncertainty caused by price volatility in cattle markets (FAO, 2018).

Furthermore, compared to large-scale commercial farms, small-scale farmers are frequently more susceptible to financial limitations which restrict their capacity to invest in sustainable developments.

## **2.7. Policy, regulation, and institutional support**

Sustainable animal farming methods are greatly influenced by legislative and regulatory frameworks. Through taxation schemes, environmental regulations, subsidies, and compliance mandates, governments have an impact on agricultural behavior. The Common Agricultural Policy (CAP) which incorporates environmental conditions into

financial support mechanisms provides significant guidance for livestock production sustainability in the European Union (EU, 2021).

According to research, by lowering financial risks and offering incentives for environmental protection, well-crafted regulations can greatly speed up the adoption of sustainable practices (Wahyuni et al., 2024). In certain European contexts, subsidies for organic farming, reducing emissions, and improving animal welfare have been successful in promoting behavioral change (FAO, 2022).

The literature draw attention to issues related to administrative load and policy complexity (EU, 2018). Farmers frequently report having trouble accessing existing support programs or comprehending regulatory requirements. As a result, policies are less effective when they are put into practice. Inconsistencies between targets for agricultural productivity and environmental goals can also lead to conflicts within policy frameworks (EU, 2018).

Therefore, even while policies are crucial for promoting sustainability, their efficacy depends on how clear, accessible, and in line they are with the financial reality of farmers.

## **2.8. Knowledge, skills, and advisory services**

Sustainable animal production depends heavily on knowledge and expertise. To adopt economically and environmentally sound practices, farmers need to have both technical knowledge and practical skills. Thus, extension services, training programs, and agricultural education are crucial elements of sustainable shifts (Herrera et al., 2019).

Research indicates that farmers are more likely to embrace innovations like precision feeding, better breeding methods, and climate-smart agricultural practices if they have access to advisory services and greater levels of knowledge. Additionally, advisory systems are essential for converting scientific knowledge into useful farm-level applications (Hockert, 2013).

Nonetheless, research shows notable differences in knowledge access, especially for small-scale and rural farmers. Adoption of sustainable technologies may be hampered by inadequate extension systems, a lack of ongoing training, and low levels of digital literacy. Several European countries have strengthened agricultural advisory services to support the adoption of sustainable farming practices. In addition to traditional extension

services, digital knowledge-sharing platforms have been developed to facilitate access to information, best practices, and innovation among farmers. For example, the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) promotes collaboration between researchers, advisors, and farmers to enhance knowledge exchange and innovation in the agricultural sector (EU, 2023)

Despite these efforts, the effectiveness of knowledge transfer remains uneven across regions and farming communities. Factors such as differences in digital literacy, access to technology, farm size, educational background, and the availability of advisory support can limit farmers' participation in knowledge-sharing initiatives (Ingram & Mills, 2019).

## **2.9. Environmental and resource conditions**

The requirement and viability of sustainable animal husbandry methods are directly influenced by environmental and resource conditions. Natural resources including land, water, feed, and climate stability are critical to livestock production. Productivity and sustainability results are greatly impacted by changes in these environments (Madin et al., 2025).

One of the most important environmental issues facing livestock systems is climate change. Animal health, feed availability, and disease prevalence are all impacted by rising temperatures, shifting rainfall patterns, and an increase in the frequency of extreme weather events. Adaptation solutions are crucial since studies show that climate stress lowers productivity while raising production costs (Coe, 2025).

Farming methods are significantly affected by shortages of key resources such as water and land, particularly in regions experiencing increasing production pressures or environmental constraints. When access to these resources is limited, farmers are often compelled to adopt practices that improve resource-use efficiency and maintain productivity. For example, improved pasture management can increase forage utilization on limited land, feed optimization can reduce waste while enhancing livestock performance, and manure recycling can improve soil fertility and reduce dependence on external inputs. As a result, farmers operating under resource-constrained conditions are more likely to adopt such efficiency-enhancing practices to sustain production and profitability (FAO, 2022). Additionally, through carbon sequestration, landscape upkeep,

and nutrient cycling, well-managed livestock systems can significantly improve environmental sustainability. The intricacy of livestock-environment interactions is shown by this dual role.

## **2.10 Literature synthesis and development of hypotheses**

### **Farmer Attitudes and Sustainable Animal Farming**

Farmer attitudes play a significant role in determining the adoption of sustainable farming practices. Attitudes reflect farmers' beliefs, perceptions, values, and willingness to engage in environmentally and socially responsible farming activities (Bilotto et al., 2024). Research has shown that farmers with positive attitudes toward environmental conservation, animal welfare and long-term productivity are more likely to adopt sustainable livestock management practices (Aggelopoulos et al., 2016).

### **Economic and Market Factors and Sustainable Animal Farming**

Economic and market factors significantly influence farmers' decisions regarding sustainable practices. Sustainable animal farming often requires investments in improved infrastructure, feed quality, waste management systems, and animal healthcare. Farmers are more likely to adopt sustainable methods when they perceive clear economic benefits such as increased productivity, premium prices, market access, and long-term profitability (Bry-Chevalier, 2026, Zira et al., 2023).

### **Environmental Factors and Sustainable Animal Farming**

Environmental factors are central to sustainable animal farming because livestock production directly interacts with natural ecosystems. Environmental concerns such as climate change, soil degradation, water scarcity, greenhouse gas emissions, and biodiversity loss have increased pressure on farmers to adopt environmentally sustainable practices. Studies indicate that farmers operating in environmentally vulnerable areas are more likely to implement sustainable measures such as manure management, rotational grazing, water conservation, and environmentally friendly feeding systems (Madin et al., 2025)

### **Government policies and Sustainable Animal Farming**

Government policies and regulations are important institutional mechanisms associated with sustainable livestock farming. Governments support sustainable agriculture through subsidies, environmental regulations, training programs, certification schemes, and

financial incentives. Policies promoting animal welfare, waste management, climate adaptation, and sustainable land use encourage farmers to adopt environmentally responsible practices (EU, 2021, FAO 2018).

### **Knowledge and Advisory Services and Sustainable Animal Farming**

Research demonstrates that farmers who receive regular advisory support are more likely to adopt innovations such as climate-smart agriculture, improved breeding methods, biosecurity measures, and environmentally friendly technologies (Herrera et al., 2019). Lack of knowledge, inadequate extension systems, and limited access to technical expertise remain major barriers to sustainability adoption. Therefore, knowledge dissemination and advisory services are fundamental in promoting sustainable animal farming practices.

The literature suggests that sustainable animal farming is influenced by both internal and external factors (Balzani & Hanlon, 2020). Farmer attitudes represent behavioral and psychological influences, while economic and market factors determine financial feasibility. Environmental factors shape ecological responsibility, government policies provide institutional direction, and knowledge and advisory services strengthen farmers' technical capabilities. Collectively, these variables contribute to the successful implementation of sustainable animal farming practices.

Based on the reviewed literature, the following hypotheses are proposed,

*H<sub>1</sub>: Farmer attitudes have a significant positive relationship with sustainable animal farming.*

*H<sub>2</sub>: Economic and market factors have a significant positive relationship with sustainable animal farming.*

*H<sub>3</sub>: Environmental factors have a significant positive relationship with sustainable animal farming.*

*H<sub>4</sub>: Government policy and regulations have a significant positive relationship with sustainable animal farming.*

*H<sub>5</sub>: Knowledge and advisory services have a significant positive relationship with sustainable animal farming*

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Introduction**

In this chapter, the researcher described the methodological framework for examining the factors associated with sustainable animal husbandry in Sweden. The researcher uses an integrated strategy that incorporates both quantitative and qualitative methodologies to provide a thorough understanding of the factors impacting sustainable behaviors among animal farmers. The researcher gathers detailed insights into farmers' experiences and viewpoints to identify the patterns and linkages through the use of a mixed-methods methodology.

The study's target group is made up of animal farmers as well as experienced individuals that cover a range of farm sizes and farming practices including cattle, pig and sheep. Quantitative data is gathered at a particular point in time using a cross-sectional survey design, which makes it possible to analyze important sustainability-related variables. Qualitative semi-structured interviews are also carried out to identify the findings and give context for the quantitative results.

The sampling technique, data gathering methods and analytical methodologies used in the study are further explained in this chapter. Quantitative data are collected through a standardized questionnaire and statistically assessed while qualitative data are explored through thematic analysis. This systematic methodology provides a comprehensive investigation of the institutional, social, environmental and economic factors associated with sustainable animal husbandry in Sweden.

#### **3. 2 Research Approach**

The deductive research approach was used in this study. The study starts from existing theory and literature and tests whether the selected factors are associated with sustainable practice adoption in the Swedish context. The links between farmer attitudes, economic and market factors, environmental factors, government policy and regulations, knowledge and advisory services and sustainable animal farming were hypothesized based on the literature. To test these theories and ascertain whether the suggested links are real, data were then gathered and examined. The deductive

technique was suitable for this study because it allowed the researcher to investigate proven theoretical linkages in a methodical and impartial way.

### **3.3 Research Methodology**

This study employs a mixed-methods research method that integrates both quantitative and qualitative approaches to provide a thorough understanding of the factors associated with sustainable animal husbandry in Sweden. According to Creswell (2008), mixed-methods research entails the methodical integration of quantitative and qualitative data within a single study to improve the validity and depth of findings. An explanatory sequential mixed-methods design was used in this investigation. This method involves gathering and analyzing quantitative data first, then gathering and analyzing qualitative data to further clarify and interpret the quantitative results. In order to collect quantitative data on the elements impacting sustainable animal husbandry such as farmer attitudes, economic and market factors, environmental factors, government policy and laws, and knowledge and advisory services, the study first employed survey questionnaires. A comprehensive grasp of the connections between the independent factors and sustainable animal farming was given by the quantitative results. In order to obtain a better understanding of the findings and to provide an explanation for the observed quantitative results, qualitative interviews were carried out with a subset of participants following the analysis of the survey data. Participants' experiences, opinions, and difficulties with sustainable animal husbandry methods were clarified by the interview data.

A structured online survey was sent to fifty two Swedish individuals (all individuals have an animal farming experience) as part of the study's quantitative component. The survey contains both closed-ended questions and Likert-scale items to quantify important variables drawn from the research like economic, environmental, and social factors associated with sustainable animal farming methods. This makes it possible to use statistical tools like correlation to analyze relationships between variables. The qualitative interviews might provide deeper insights about ten selected livestock farmers. These interviews seek to delve deeper into participants' experiences, perceptions and difficulties to provide contextual understanding that cannot be obtained



by quantitative data. Thematic analysis is used to find recurrent themes and patterns in the qualitative data.

### 3.4 Hypotheses and Conceptual Framework

There is positive relationship existed between selected factors with the adoption of sustainable animal farming.

*H<sub>1</sub>: Farmer attitudes have a significant positive relationship with sustainable animal farming.*

*H<sub>2</sub>: Economic and market factors have a significant positive relationship with sustainable animal farming.*

*H<sub>3</sub>: Environmental factors have a significant positive relationship with sustainable animal farming.*

*H<sub>4</sub>: Government policy and regulations have a significant positive relationship with sustainable animal farming.*

*H<sub>5</sub>: Knowledge and advisory services have a significant positive relationship with sustainable animal farming.*

#### Conceptual Framework

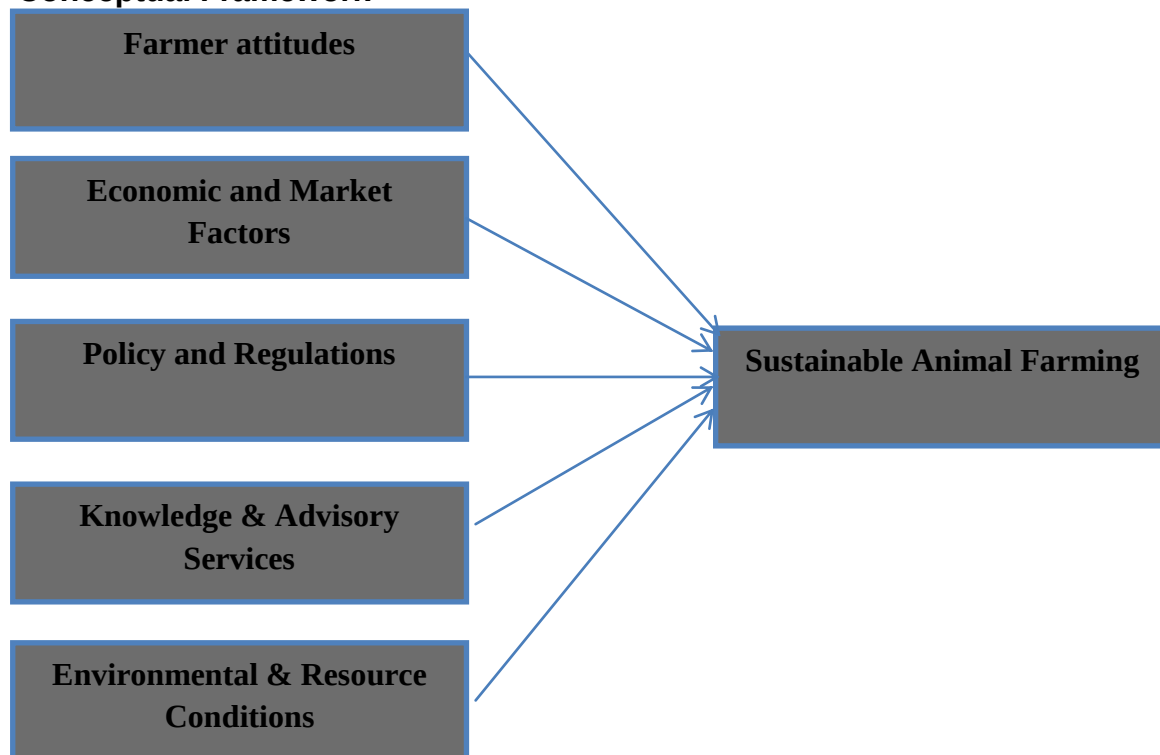


Figure 1: Conceptual framework

Table 2: Variable and factor description

| Variable Type               | Variable                      | Description                                                                                                                                                            |
|-----------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Dependent Variable</b>   | Sustainable                   | Sustainable animal farming can describe as the implementation of environmentally sound, economically viable and socially responsible farming practices.                |
|                             | Animal farming                |                                                                                                                                                                        |
| <b>Independent Variable</b> | Farmer Attitudes              | Farmer attitudes might represent farmers' perceptions, beliefs and willingness to adopt sustainable animal farming.                                                    |
|                             | Economic & Market Factors     | Economic & market factors can describe as financial conditions, access to markets, profitability and economic incentives that influence sustainable farming decisions. |
|                             | Policy & Regulation           | Policy & regulation refers encompasses government policies, regulations, subsidies and institutional support affecting sustainable animal farming.                     |
|                             | Knowledge & Advisory Services | It is the farmers' level of education, training, technical knowledge, and awareness of sustainable farming practices.                                                  |
|                             | Environmental Factors         | Environmental Factors includes natural conditions such as climate change, land availability and resource constraints that impact farming practices.                    |

### 3. 5 Time Horizon

Because data will be gathered from respondents all at once rather than over an extended period of time, this study uses a cross-sectional time horizon. For this study, a cross-sectional design is suitable since it enables the researcher to efficiently detect correlations between variables and assess the current status of sustainable animal

husbandry techniques. Semi-structured interviews will be used to acquire qualitative data for this study, while an internet survey will be used to collect quantitative data from Swedish animal farmers.

Because it allows for the simultaneous investigation of several variables, including economic, environmental, social, and policy-related issues, the cross-sectional technique is especially appropriate for this study. Additionally, it encourages the examination of correlations between independent variables and sustainable farming practices using statistical methods such as correlation and descriptive statistics.

It is crucial to remember that although cross-sectional studies are effective and economical, they are unable to definitely prove causal linkages or capture changes over time. Rather, they concentrate on finding correlations and patterns that were there while the data was being collected.

### **3.6 Sampling method**

Convenience sampling can recognize as non-probability sampling technique wherever researcher selects participants who are easily accessible as well as willingly to participate research survey (Golzar et al., 2022). I selected farmers and student who engage with farming through sharing the survey by farming groups and sending emails as well as field visits. So I selected the farmers based on easily access mode to them. Thus, I used convenience sampling technique to select farmers.

#### **Inclusion criteria**

Be 18 years of age or older;

Be currently involved in animal farming activities in Sweden;

Have practical and/or managerial experience in livestock production (I selected individuals who are engage in animal farming in Sweden. I specially mentioned that when I share the survey in online platform.)

Be actively engaged in decision-making related to animal farming practices; and

Be willing to voluntarily participate in the study.

These criteria ensured that participants possessed sufficient knowledge and experience to provide reliable information regarding sustainable animal farming practices and the factors associated with sustainability adoption. The use of clearly defined inclusion criteria also enhanced the validity and credibility of the research findings. The target

demographic comprises farms of all sizes and animal producers involved in various farming operations like raising cattle, dairy, pig and sheep. The survey uses a random selection procedure in an effort to include a wide variety of respondents who are representative of Sweden's larger farming community.

Fifty two individuals selected to take part in an online survey for the quantitative component. This sample size is thought to be suitable for statistical studies including correlation and descriptive statistics. Ten animal farmers selected semi-structured interviews for the qualitative component. These individuals may be selected on the basis of their desire to take part and their capacity to offer in-depth and pertinent observations.

The study's mixed-methods design is supported by the use of purposive selection for interviews and online quantitative survey. Qualitative sampling enables a thorough examination of important concerns pertaining to sustainable animal husbandry while random selection improves the generalizability of quantitative results.

### **3.7 Data collection method**

This study collects data using both quantitative and qualitative techniques to provide a thorough understanding of the factors associated with sustainable animal husbandry in Sweden with the mixed-methods research approach.

#### **3.7.1 Quantitative Information Collection**

A systematic questionnaire administered using an internet platform (Microsoft Forms) will be used to gather quantitative data. Likert-scale items and closed-ended questions make up the questionnaire that was created based on factors found in the research review. Key elements like farmer attitudes, market and economic conditions, policy and regulation, knowledge and skills, environmental factors and social effects on sustainable agricultural practices are measured using these items. A comprehensive summary of the quantitative survey screenshots is available in Appendix 1 (Please refer appendix 1).

Respondents can indicate how much they agree with different assertions using the Likert scale, which ranges from 1 = strongly disagree to 5 = strongly agree. This enables for the collection of standardized and quantitative data. Online distribution approach guarantee wider reach, responder convenience, and effective data

administration. The survey is completely voluntary, and in order to maintain ethical compliance, participants will be made aware of the study's goal.

### **3.7.2 Qualitative Information Collection**

In addition to the survey, semi-structured interviews with certain animal farmers used to gather qualitative data. The detailed qualitative question sheet can be found in Appendix 2 (Please refer appendix 2). This approach enables a thorough investigation of participants' perspectives, experiences, and difficulties pertaining to sustainable animal husbandry.

The research objectives and important variables will inform the development of an interview guide that will allow participants to expand on their answers. The interviews conduct through online platform through Microsoft form.

## **3.8 Data analysis method**

The researcher uses both quantitative and qualitative data analysis techniques to answer the research problem.

### **3.8.1 Analysis of Quantitative Data**

The researcher used SPSS software to examine the quantitative data gathered from the structured questionnaire. The data will be summarized and an overview of the features and important variables of the respondents will be given using descriptive statistics through mean and standard deviation. Descriptive statistics provide broad trends among responders about sustainable animal husbandry methods.

Inferential statistical methods use to investigate the relationship between independent and dependent variables. The degree and direction of correlations between independent variables and the dependent variable (sustainable animal farming) will be evaluated using correlation analysis.

### **3.8.2 Analysis of Qualitative Data**

Thematic analysis uses to examine the qualitative information gathered from semi-structured interviews. Transcribing interview sheets, getting acquainted with the data, coding, and identifying important themes and patterns are some of the processes in this procedure.

The researcher will methodically arrange the data by giving codes to significant textual passages and then organizing these codes into more general themes associated with

the study's goals. This method makes it possible to pinpoint farmers' recurrent beliefs, attitudes, and experiences with relation to sustainable animal husbandry.

### **3.9 Chapter Summary**

The general research approach used for this study on sustainable animal husbandry in Sweden has been described in this chapter. Key factors were discovered from the body of existing literature and empirically examined as part of the study's deductive research methodology. A mixed-methods strategy was used to combine quantitative and qualitative data in order to obtain a thorough grasp of the study problem.

The study used a cross-sectional strategy, gathering data from animal farmers all at once. For the quantitative survey, 52 respondents were chosen at random from the target demographic which comprised farmers involved in various forms of animal husbandry. Ten farmers were also chosen for qualitative interviews to gain a deeper understanding of the sustainable animal farming.

## **CHAPTER FOUR**

### **DATA PRESENTATION AND RESULTS**

#### **4.1 Introduction**

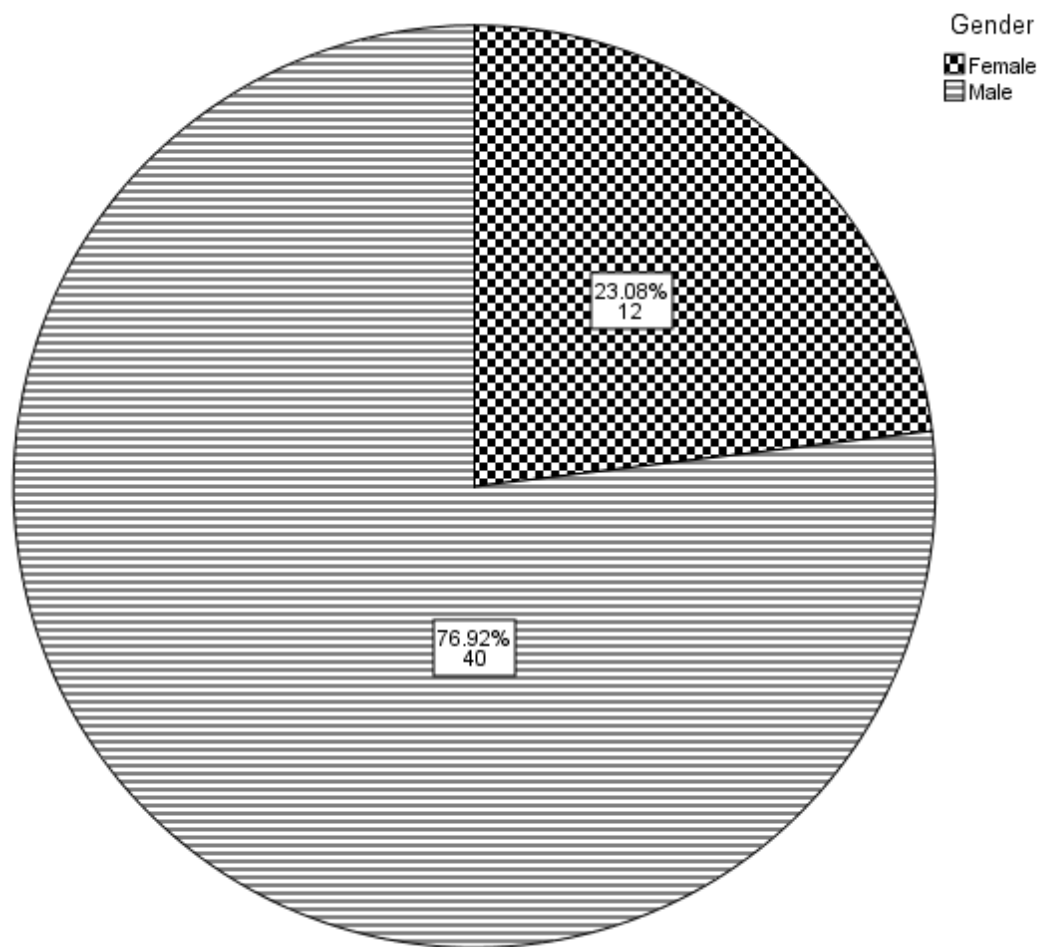
This chapter presents and analyzes the study's results in an organized and methodical way. This section's goal is to convert the gathered data into insightful conclusions that address the drivers of sustainable animal farming in Sweden. The analysis combines quantitative and qualitative data to understand the variables affecting sustainable animal farming.

Descriptive statistics and correlation analysis are used to illustrate the quantitative data collected from fifty two participants in an online survey. These techniques aid in the identification of trends, connections and the relative impact of important elements such as farmer attitudes, market and economic conditions, policy and regulation, knowledge, skills and advisory services, and environmental conditions. The results are clearly displayed using tables, charts and statistical summaries.

Additionally, thematic analysis is used to examine qualitative data from 10 semi-structured interviews. This method enhances the statistical results by enabling a deeper investigation of the experiences, perspectives, and insights of the participants. The qualitative findings provide a deeper understanding of how and why specific factors influence sustainable animal farming by providing context and explanation for the quantitative results.

#### **4.2 Demographic characteristics**

This section presents the demographic profile of the 52 individuals who have experience in animal farming.

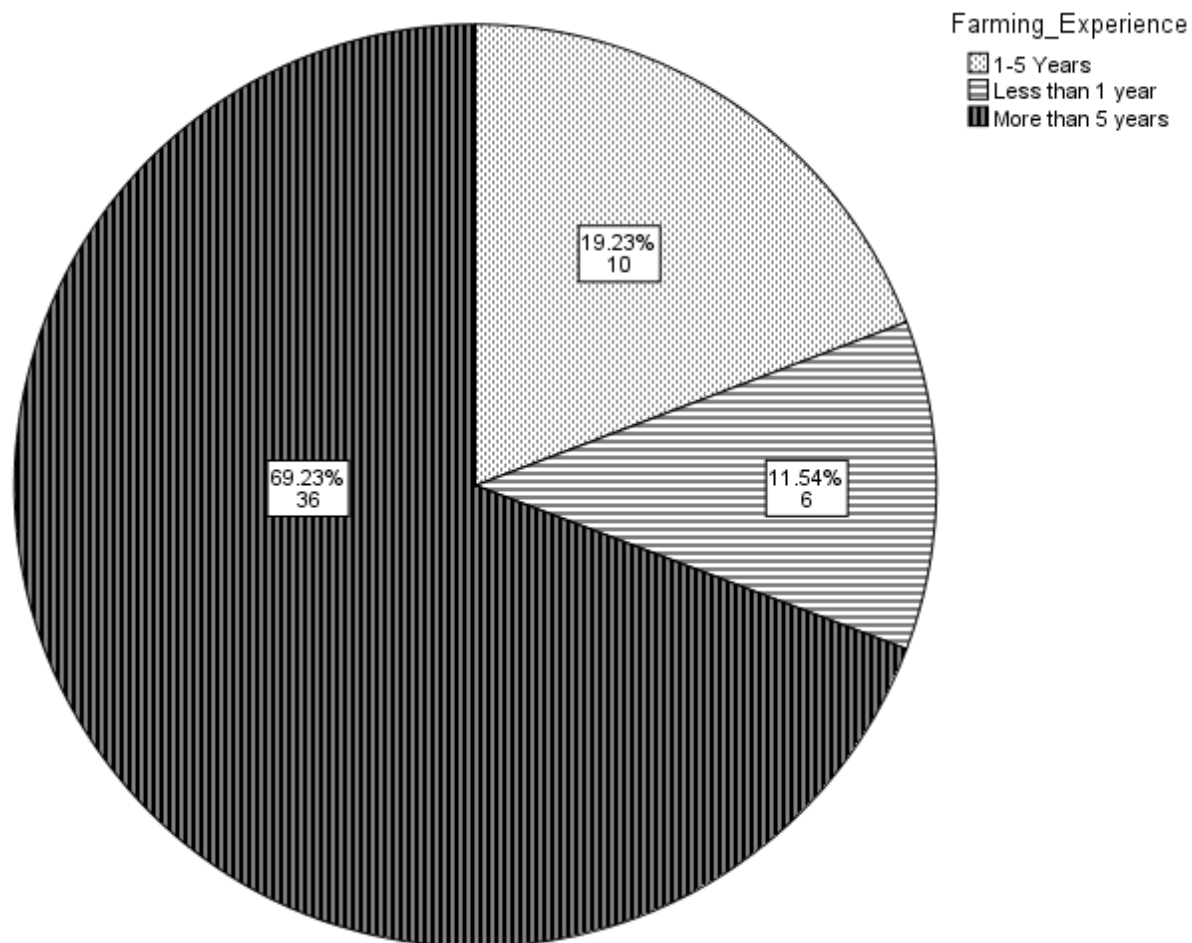


*Figure 2: Polar graph for gender*

This indicates that the bulk of study participants are men that made up a higher percentage of the sample than female replies. Most farm ownership and management roles have historically been more common among men. This distribution may reflect the traditionally male-dominated character of animal farming. However, the fact that 12 of the respondents were female also emphasizes the significant role that women play in animal husbandry and a slow transition toward more inclusive participation in the industry. This result is crucial to take into account when interpreting the findings



because attitudes toward sustainable agricultural techniques may be influenced by the viewpoints, experiences and decision-making styles of male and female farmers.



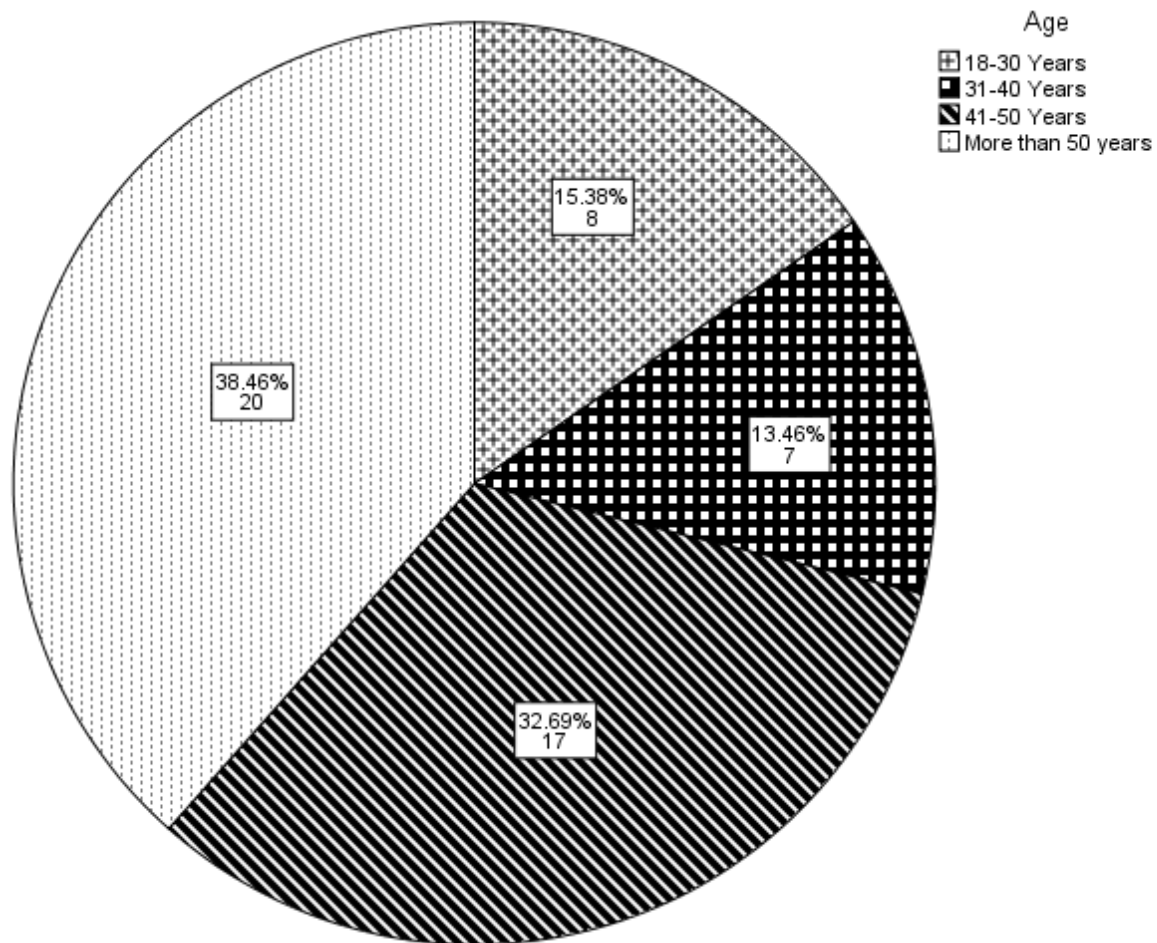
*Figure 3: Polar graph for farming experience*

According to the distribution of agricultural experience, the majority of farmers had significant practical expertise in animal husbandry. 36 farmers have more than five years of experience, ten farmers have one to five years and six farmers have less than a year.

This shows that the majority of respondents are more experienced farmers which increases the data's dependability because their answers are probably based on their long-term involvement and practical knowledge of farming techniques. The lower

percentage of participants with less than a year's experience indicates that more recent recruits to animal husbandry are also included in this research study.

According to this result, the predominance of highly experienced farmers may have an impact on the study's conclusions since they may have stronger viewpoints, more established practices and a better understanding of the issues and regulations pertaining to sustainability.



*Figure 4: Polar graph for age group*

This distribution indicates that middle-aged farmers, especially those more than 50, make up the majority of the sample. These groups combine real-world experience with the capacity to adjust to new techniques like sustainable farming methods are frequently regarded as being in their most active and productive working years.

A degree of generational renewal in the industry is shown by the presence of younger farmers (18–30 years old) which may be linked to openness to innovation and sustainable methods. However, younger farmers (those below 40) also contribute to sustainable high efficient livestock farming practices through integration modern knowledge with traditional practices. All things considered, the age distribution offers a fair viewpoint, capturing perspectives from various phases of farming careers.

### 4.3 Reliability Test

*Table 3: Cronbach alpha Statistics*

| Variables                            |               | Cronbach's Alpha Value | Number of questions | Reliability      |
|--------------------------------------|---------------|------------------------|---------------------|------------------|
| <b>Dependent variable</b>            |               |                        |                     |                  |
| <b>Sustainable farming</b>           | <b>Animal</b> | 0.810                  | 4                   | Good reliability |
| <b>Independent variables</b>         |               |                        |                     |                  |
| <b>Farmer Attitudes</b>              |               | 0.643                  | 4                   | Good reliability |
| <b>Economic &amp; Market Factors</b> |               | 0.625                  | 4                   | Good reliability |
| <b>Policy &amp; Regulation</b>       |               | 0.797                  | 4                   | Good reliability |
| <b>Knowledge &amp; Skills</b>        |               | 0.691                  | 4                   | Good reliability |
| <b>Environmental Factors</b>         |               | 0.615                  | 4                   | Good reliability |

The researcher measured internal consistency by Cronbach's alpha values. Internal consistency was acceptable for exploratory analysis, although some constructs showed modest reliability especially to Farmer Attitudes (0.643), Economic and Market Factors (0.625), Knowledge and Skills (0.691), and Environmental Factors (0.615). The

dependent variable and Policy and Regulation scale are stronger than other variables because these values greater than 0.7.

#### 4.4 Descriptive statistics

Descriptive statistics were conducted to examine the central tendencies of key variables in the study that provide a general understanding of respondents' perceptions regarding the sustainable farming.

*Table 4: Descriptive statistics of research variables*

| Descriptive Statistics        |    |        |                |
|-------------------------------|----|--------|----------------|
|                               | N  | Mean   | Std. Deviation |
| Sustainable Animal farming    | 52 | 3.6538 | .49792         |
| Farmer Attitudes              | 52 | 3.7500 | .61237         |
| Economic & Market Factors     | 52 | 3.7308 | .52591         |
| Environmental Factors         | 52 | 3.5721 | .51767         |
| Policy & Regulation           | 52 | 3.6635 | .49479         |
| Knowledge & Advisory Services | 52 | 3.6923 | .47127         |

Descriptive statistics give a clear view of how respondents (N = 52) perceive the different factors related to sustainable animal farming in Sweden. Since all variables are measured on a 5-point Likert scale, means around 3 indicate neutrality while values closer to 4 suggest agree with the statements.

Overall, the results show that respondents tend to slightly agree that all listed factors play a role in sustainable animal farming, as all mean scores fall between 3.57 and 3.75.

Sustainable Animal Farming (Mean = 3.65, SD = 0.50)

This indicates a moderately positive perception of sustainable animal farming practices among respondents. The relatively low standard deviation (lower than 1.000) suggests that responses are fairly consistent with limited disagreement among participants.

**Farmer Attitudes (Mean = 3.75, SD = 0.61)**

This is the highest mean among all variables, suggesting that respondents view farmer attitudes as the most associated factor with sustainable animal farming. However, it also has the highest standard deviation that means those are more cluster near to agree responses.

**Economic & Market Factors (Mean = 3.73, SD = 0.53)**

This factor is also rated highly indicating that financial conditions, market access and profitability are perceived as key drivers of sustainable animal farming. The moderate standard deviation shows reasonable agreement among respondents.

**Knowledge & Skills (Mean = 3.69, SD = 0.47)**

Respondents generally agree that knowledge and skills are important for sustainability. This variable has one of the lowest standard deviations suggesting strong agreement among participants.

**Policy & Regulation (Mean = 3.66, SD = 0.49)**

This result shows that policies and regulations are seen as moderately important. The relatively low variation indicates that most respondents share similar views on this factor.

**Environmental Factors (Mean = 3.57, SD = 0.52)**

This has the lowest mean, though still above neutral. It suggests that while environmental aspects are considered important, they are perceived as slightly less associated compared to economic or attitudinal factors.

All factors are rated between 3.40 to 4.20 ranges that indicate general agreement with sustainable farming and they contribute to sustainable animal farming. Among them, farmer attitudes and environment factors emerge as the most associated factors with sustainable animal farming while economic factors are perceived as relatively less associated factor with sustainable animal farming in Sweden context.

**4.5 Correlation Analysis**

A Pearson correlation analysis was conducted to examine the strength and direction of the relationships between various factors and sustainable farming. The researcher calculated composite scores by averaging items within each construct. Thus, the Pearson correlation (at 0.05 significance level) was used because the composite scores

were treated as approximately continuous scale (Koo and Yang, 2025). So, the Pearson correlation is applicable for this research.

Table 5: Correlation analysis for all the variables

|                                    | <b>Farmer<br/>Attitudes</b>             | <b>Economic<br/>and Market<br/>condition</b>     | <b>Environment<br/>factors</b>          | <b>Policy and<br/>Regulations</b>       | <b>Knowledge<br/>and<br/>Advisory<br/>service</b> |
|------------------------------------|-----------------------------------------|--------------------------------------------------|-----------------------------------------|-----------------------------------------|---------------------------------------------------|
| Correlation<br>value (R<br>value)  | 0.599**                                 | 0.161                                            | <b>0.703**</b>                          | 0.309*                                  | 0.456**                                           |
| Significance<br>value (P<br>value) | 0.000                                   | 0.253                                            | 0.000                                   | 0.026                                   | 0.001                                             |
| Relationship                       | Positive<br>significant<br>relationship | Positive<br><b>insignificant</b><br>relationship | Positive<br>significant<br>relationship | Positive<br>significant<br>relationship | Positive<br>significant<br>relationship           |

Note (Attitudes, Environment factors, Government Policies and Knowledge and Advisory service are significance at 0.05 levels)

#### **Farmer Attitudes (r = 0.599, p < 0.000)**

There is a moderately strong positive and statistically significant relationship between farmer attitudes and sustainable animal farming. This means that more positive attitudes among farmers are associated with higher levels of sustainable practices. Since the p-value is less than 0.01, this relationship is highly significant that suggested attitudes positively associated with sustainable farming.

#### **Economic and Market Conditions (r = 0.161, p > 0.000)**

Although the relationship is positive, it is weak and not statistically significant (p > 0.05). This indicates that economic and market factors do not show a meaningful linear relationship with sustainable animal farming in this sample. In other words, changes in

economic conditions are not strongly linked to sustainability practices based on this data.

**Environmental Factors ( $r = 0.703$ ,  $p < 0.000$ )**

This is the strongest correlation observed among all the factors. It shows a strong positive and highly significant relationship with sustainable animal farming. This suggests that environmental considerations (such as climate, land, or ecological awareness) are strongly associated with the adoption of sustainable animal farming.

**Government Policies ( $r = 0.309$ ,  $p < 0.026$ )**

There is a weak positive and statistically significant relationship ( $p < 0.05$ ). This implies that supportive policies and regulations weakly associated with sustainable animal farming, although the strength of this relationship is weaker compared to attitudes and environmental factors.

**Knowledge and Advisory Services ( $r = 0.456$ ,  $p < 0.001$ )**

This shows a moderate positive and highly significant relationship. It indicates that better access to knowledge, training, and advisory services is associated with increased adoption of sustainable farming practices.

**Overall Interpretation**

Environmental factors and farmer attitudes showed the strongest association with sustainable farming.

Knowledge and advisory services and government policies also play important but moderately strong roles.

Economic and market conditions, despite being slightly positive, do not significantly influence sustainable animal farming in dataset.

*This implies that non-economic factors (attitudes, environment, knowledge, policy) are more associated factors of sustainable animal farming than purely financial or market-related aspects in this study context.*

## 4.6 Hypotheses Testing

***H<sub>1</sub>: Farmer attitudes have a significant positive relationship with sustainable animal farming.***

According to correlation analysis, the correlation value is 0.599\*\* and the significance value is 0.000. Thus, it showed moderate positive significant relationship. The hypothesis H<sub>1</sub> accepted ( $P < 0.05$ ).

***H<sub>2</sub>: Economic and market factors have a significant positive relationship with sustainable animal farming.***

According to correlation analysis, the correlation value is 0.161 and the significance value is 0.253. Thus, it showed weak positive insignificant relationship. The hypothesis H<sub>2</sub> rejected ( $P > 0.05$ ).

***H<sub>3</sub>: Environmental factors have a significant positive relationship with sustainable animal farming.***

According to correlation analysis, the correlation value is 0.703\*\* and the significance value is 0.000. Thus, it showed strong positive significant relationship. The hypothesis H<sub>3</sub> accepted ( $P < 0.05$ ).

***H<sub>4</sub>: Government policy and regulations have a significant positive relationship with sustainable animal farming.***

According to correlation analysis, the correlation value is 0.309\* and the significance value is 0.026. Thus, it showed weak positive significant relationship. The hypothesis H<sub>4</sub> accepted ( $P < 0.05$ ).

***H<sub>5</sub>: Knowledge and advisory services have a significant positive relationship with sustainable animal farming.***

According to correlation analysis, the correlation value is 0.456\*\* and the significance value is 0.001. Thus, it showed moderate positive significant relationship. The hypothesis H<sub>5</sub> accepted ( $P < 0.05$ ).

After the quantitative analysis, a thematic analysis was conducted to explore farmers' views on sustainable animal farming in Sweden more deeply. This analysis identified common themes and patterns in farmers' responses, revealing their experiences, challenges, motivations, and expectations regarding the adoption and implementation of sustainable livestock farming practices.



## 4.7 Thematic analysis

### Theme 1: Farmer attitudes

It was easy to see how different farm kinds differed. Efficiency and technology were the main concerns of large-scale farmers including dairy, sheep and pig farmers. One farmer defined sustainability as "efficient production with minimal waste" that show the positive attitude for sustainable animal farming

Small-scale farmers prioritized nature-based methods. For instance, a goat farmer emphasized low-impact agricultural methods whereas a sheep farmer defined sustainability as "working with natural systems."

One farmer describes sustainable farming as balance between productive efficiency, environmental protection, and animal welfare.

Smaller farms also experienced more difficulties. "Policies are harder for small farms," according to one farmer while "limited access to resources" was stated by another.

One farmer explained increasing pressure to adopt sustainable practices, especially due to environmental concerns and policy requirements. Another participant describe the sustainability is maintaining balance between land and animals

Another farmer describe the sustainable farming as means working in harmony with nature

These answers demonstrate how sustainability varies greatly depending on the size of the farm and the production system.

### Theme 2: Economic and market factors

Concerns regarding financial strains were voiced by farmers in a variety of ways. One dairy farmer clarified that "milk prices strongly affect decisions and when prices are low sustainability investments are not possible." Similarly, a pig farmer stated that "profitability drives everything and low market prices sustainable changes." Low profit margins and erratic prices were cited as major obstacles by another farmer running a beef cow farm.

An organic farmer reported a somewhat different experience, saying that certification fees are still a problem but that "organic prices help support sustainable practices." Despite great personal drive, a sheep farmer also noted that small-scale farming has

low profitability which makes sustainability more challenging. Similarly, one farmer stated that consumers tend to prioritize lower-priced meat over organic meat.

One farmer mentioned that price fluctuations strongly influence my decisions. Another farmer stated that High operational costs including feed, labor, and equipment, are major barriers for adopting sustainable farming.

All farmers believed that sustainability is important, but only a small number of niche or organic producers received financial support for sustainable methods. Most farmers also agreed that economic viability is a condition.

### **Theme 3: Environmental Factors**

There was strong agreement among farmers regarding environmental responsibility. One farmer stated that “sustainability means balancing production with environmental impact,” while another emphasized “working with nature not against it.”

Several farmers reported direct environmental challenges. For example, a dairy farmer mentioned drought affecting feed production while a pig farmer highlighted heat stress in animals. A cattle farmer also pointed to ammonia emissions and waste management issues.

Despite this awareness, some farmers expressed limitations. One respondent noted that “farmers play a role but cannot solve everything alone that indicates a perceived gap between responsibility and capacity.

Overall, farmers demonstrate high environmental awareness but their ability to act is constrained by external factors.

### **Theme 4: Government Policy**

Farmers have diverse perspectives on policies. In support of regulatory frameworks, one respondent stated that “EU policies are strict but necessary.” However, another farmer believes that “policies feel disconnected from reality,” particularly with regard to farming.

Small-scale farmers were more critical. A goat farmer, for instance, said that laws were “complicated and difficult to follow whereas a sheep farmer said that “regulations are not practical for small farms.” Similarly, a mixed farm operator said rules are hard to implement in daily operations.

An organic farmer expressed a more positive view of policies stating that "policies support organic farming" suggesting that the benefits of policies might vary depending on the type of farming.

These responses demonstrate that while policy perceptions were positively associated with sustainable farming scores but their complexity and inflexibility provide challenges, especially for smaller farms.

### **Theme 5: Knowledge and Advisory Support**

Farmers have differing opinions about the impact of knowledge and advisory services. According to one farmer, "consumers say they want to establish modern farmer networks through online platforms. Similarly, a pig farmer stated that it is significant to arrange more practical workshops through online platforms.

Some farmers did report more significance of local advisory services like Gard och djurhalsa and Bla stjarnan. According to sheep farmers, online advisory services more valuable to gain innovative skills. These diverse viewpoints imply that specialist markets offer greater incentives for sustainable farming whereas mainstream markets are price-driven. One farmer stated that innovative knowledge can share with the help of online advisors.

Table 6: Thematic analysis table

| Key Words/ codes                                                                                                                                                                                                                         | Themes                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| Holistic farming, motivation, motivation, reducing emissions, support local ecosystems, responsible farming, environment protection, responsible farming, minimize waste, maintaining soil health, animal welfare, production efficiency | <b>Farmer attitudes</b>                  |
| Price fluctuation, high investment, high feed cost, consumer demand, low financial support, low profit margin, limited market access, certification cost                                                                                 | <b>Economic and market factors</b>       |
| Climate change, minimum waste, manure management, climate variability, recycling, seasonal changes                                                                                                                                       | <b>Environmental factors</b>             |
| EU agricultural policies, subsidies, sustainable loans, government regulations, policy changes, better support, flexible policies                                                                                                        | <b>Policy &amp; Regulatory Influence</b> |
| Advisory services, farmer network, practical workshops, Gard och djurhalsa and Bla stjarnan, useful advisory services, technical workshops, online advisors, innovative support                                                          | <b>Knowledge and advisory services</b>   |

#### 4.8 Discussion on qualitative findings

The results of the 10 qualitative interviews show that a mix of economic, environmental, farmer attitude, government policies and knowledge and advisory services are associated with sustainable animal farming in Sweden. One important conclusion is that the most important factor is government subsidies play a significant role in promoting sustainable animal farming. Farmers of all kinds stressed that implementing sustainable techniques requires both financial stability and profitability. The majority of farmers cited high investment costs and market uncertainties as significant obstacles. Others,

especially those involved in organic produce reported financial incentives promoting sustainability.

First, the qualitative results significantly support the quantitative analysis's finding that farmer attitudes were positively connected with adoption of sustainability. Farmers consistently demonstrated a strong understanding of sustainability and a sense of obligation to protect the environment throughout the interviews. Many defined sustainability as balance between animal welfare, environmental preservation and productivity. Despite largely favorable opinions, qualitative data indicates that attitudes by themselves are insufficient to spur change since they are frequently hampered by structural and economic constraints. This demonstrates that although attitudes are crucial, they need to be reinforced by favorable circumstances.

Consumer behavior and the market's involvement were seen as inconsistent. The majority of farmers stated that pricing continues to be the primary factor affecting consumer decisions, despite the increased demand for sustainable products. Markets like those for local and organic goods provide more consistent support for sustainability and offer possible avenues for future growth.

Significant implications were also found in policy and regulatory systems. While most farmers agreed that national and EU policies are crucial for advancing sustainability, many voiced doubts about their feasibility and complexity. Particularly, small-scale farmers reported having more trouble adhering to laws indicating that the diversity of farming systems may not be well reflected in the current legislation.

Respondents' awareness of the environment was consistently strong. Farmers showed a thorough comprehension of topics like resource management, emissions, and climate change. Despite this awareness, many believed that structural and budgetary constraints prevented them from putting sustainable solutions into practice. This demonstrates disconnect between practical ability and environmental concern. The quantitative results indicated a good correlation between environmental elements and sustainable practices which is supported by farmers' personal experiences. Climate-related issues that directly impact cattle productivity, like heat stress, drought, and shifting seasonal patterns, were often cited by interviewees. Farmers seem to be more conscious of and inclined to embrace sustainable methods as a result of these

environmental challenges. However, the qualitative data also shows that farmers feel constrained in their capacity to successfully respond because of technical and financial limitations that indicates environmental concern by itself does not always result in action.

Although they needed to be improved, knowledge and advisory systems were largely seen as valuable. Farmers said that they preferred practical, farm-specific advice over theoretical recommendations. The price and availability of advising services were also noted as constraints, especially for smaller farms.

Overall, the findings show that a balanced strategy that acknowledges the variety of farming systems while addressing economic viability, legislative flexibility, environmental constraints, and information dissemination is necessary to achieve sustainable animal farming in Sweden.

#### **4.9 Combine quantitative and qualitative analysis**

The study's conclusions offer a thorough grasp of the variables affecting sustainable animal husbandry in Sweden by combining quantitative and qualitative studies. The quantitative findings showed that the adoption of sustainable farming practices is correlated with farmer attitudes, environmental factors, government policies, knowledge, and advisory services. The qualitative insights gleaned from the interviews which provide more in-depth explanations of how and why these factors affect farmers' actions and further reinforce and enhance these statistical associations.

Thirdly, the issue that predominated in the qualitative study was economic and market conditions which were found to be a significant factor in the quantitative findings. Farmers have underlined time and consumer demand associated with decision-making is profitability. Low profit margins, high investment expenses and volatile market pricing were identified as the main obstacles to implementing sustainable practices. The majority of farmers stated that economic risks deter sustainability investments. This implies that while economic conditions are theoretically favorably correlated with sustainability, in reality they frequently function as barriers until sufficient funding is available.

Similarly, the quantitative study revealed a positive association between government policies and the adoption of sustainability while the qualitative results offer a more

nuanced interpretation of this relationship. Farmers agreed that policies are crucial for encouraging sustainable practices. But many also said that they were difficult, inflexible and occasionally unworkable, especially for small-scale farmers. This suggests that although policies are significant motivators and efficacy is contingent upon their formulation, execution and flexibility in various farming environments.

Lastly, the quantitative results showed a favorable correlation between knowledge and advisory services and sustainability which is corroborated by qualitative observations. Farmers stated that they relied on industry networks, peer learning, and advisory services for knowledge. Although these services are widely appreciated, a number of participants pointed out that they are frequently overly theoretical and insufficiently adapted to actual farm situations. More useful, approachable, and farm-specific advice was highly sought after. This implies that the adoption of sustainability might be greatly increased by raising the caliber and applicability of knowledge transmission mechanisms.

All things considered, the integration of quantitative and qualitative evidence shows that a complex interaction of factors associated with sustainable animal farming in Sweden. The qualitative results highlight significant obstacles and contextual difficulties that impact their practical use, even though the quantitative analysis validates those critical variables are positively correlated with sustainability. The impact of good attitudes, environmental awareness, and knowledge availability appears to be moderated by legislative limitations and economic constraints. Therefore, it is necessary to address the underlying structural and financial hurdles that farmers confront in addition to enhancing these elements to achieve sustainable farming.

## **CHAPTER FIVE**

### **CONCLUSION**

#### **5.1 Overview of the Study**

This study combined quantitative and qualitative methods to investigate the major factors impacting sustainable animal husbandry in Sweden. Farmers' attitudes, environmental factors, market and economic conditions, government policies, and knowledge and advisory services were the five primary determinants that were the focus of the study. While qualitative interviews offered more in-depth understanding of farmers' perspectives and experiences, quantitative analysis was utilized to find correlations between these variables.

#### **5.2 Summary of Key Findings**

The results of this study show that a number of interconnected elements affect sustainable animal husbandry. The adoption of sustainable practices is positively correlated with farmer attitudes, environmental considerations, government policies, and knowledge and advisory services according to the quantitative research. This implies that advancements in any of these domains may improve sustainability results. In contrast, economic factors showed insignificant association between selected factors with sustainable animal farming.

The qualitative results show all selected themes are significant to promote sustainable farming. Economic pressures frequently limit farmers' ability to embrace sustainable practices, despite the fact that they typically exhibit significant environmental knowledge and positive views toward sustainability. The biggest obstacles were found to be low profit margins, high investment expenditures and price fluctuation based on key words extracted from qualitative interviews.

Although government policies have been acknowledged as significant forces behind sustainability, their efficacy is constrained by their intricacy and rigidity. Farmers, especially those running small-scale farms highlighted the need for more useful and encouraging policy frameworks and cited challenges in following to organic certification rules.



Environmental issues (waste management and climate change) are widely recognized and highlighting the significance of sustainable farming methods. Market dynamics were discovered to have two roles at the same time. Price sensitivity continues to limit the influence of growing consumer demand for sustainable products on farmers' choices with the exception of specialized markets like organic production.

Knowledge and advisory services were generally viewed as valuable but there is a clear need for more practical, accessible and tailored support to meet the diverse needs of farmers.

### **5.3 Conclusion**

This study used a mixed-methods approach that combines quantitative analysis with qualitative insights from farmer interviews to examine the critical elements associated with sustainable animal farming in Sweden. The researcher selected five main dimensions namely farmer attitudes, environmental factors, economic and market conditions, government regulations, and knowledge and advisory services to create a comprehensive picture of sustainability in the livestock industry.

Four factors namely farmer attitudes, environmental factors, government policy, and knowledge/advisory services showed significant positive association between sustainable animal farming according to the quantitative results. This suggests that a variety of institutional, structural, environmental, and attitudinal factors have association between sustainable animal farming. The positive association indicates that the adoption of sustainable practices can be increase by advances in farmer awareness, supportive legislation, advantageous market conditions and knowledge access.

However, the qualitative results offer a more nuanced and grounded viewpoint that demonstrates how complex and perhaps contradictory circumstances associated with the practical application of sustainability. Farmers typically have positive views about sustainability and understand its significance but economic pressures frequently limit these beliefs. Profitability and financial stability are the most important factors to take into account while making decisions, according to the interviewees. Adoption of sustainable technology and practices is severely hampered by high investment costs, erratic market pricing, and low financial returns. This implies that while sustainability is important, economic viability cannot be sacrificed in the name of sustainability.

Environmental variables were identified as a challenge as well as a motivator. Farmers showed a deep understanding of environmental issue such as resource management, emissions, and climate change. The necessity for sustainable farming methods is further supported by the numerous reports of direct effects including heat stress, drought, and shifting seasonal patterns. Despite this understanding, farmers also acknowledged that their ability to respond effectively was limited, frequently as a result of technical and financial limitations.

Governmental regulations and policies were found to be crucial but inadequate tools for advancing sustainability. Although the qualitative data show that farmers frequently view these rules as complicated, inflexible, and not quite in line with the realities on the ground, the quantitative results validate their beneficial impact. Regulation compliance is more difficult for small-scale farmers in particular, suggesting that existing policy methods may not be inclusive and flexible. These results imply that although policy interventions are required, their efficacy is contingent upon their design, accessibility, and ability to accommodate a variety of farming systems.

Market and consumer dynamics also play a significant role and positively associated with sustainable animal farming. Price sensitivity continues to be a major factor associated with customer behavior, despite growing consumer awareness and desire for sustainable products, according to the qualitative data. Therefore, with the exception of specialized markets like organic farming, farmers frequently do not receive enough financial incentives to adopt more sustainable practices. This suggests a mismatch between market behavior and consumer desires, which restricts the possibility of market-driven sustainability.

In both assessments, the importance of knowledge and advisory services was determined. Farmers rely on a variety of knowledge sources, such as peer learning, industry networks, and consulting services. The qualitative results indicate that these services are not always entirely successful since they are frequently too theoretical and inadequately adapted to particular farm circumstances. Farmers made it apparent that they needed more useful, approachable, and situation-specific advice. This emphasizes how crucial it is to enhance knowledge transmission mechanisms in order to more effectively encourage the adoption of sustainable practices.

The significance of farm size and structural variations is another finding from the qualitative research. While small-scale farms frequently prioritize ecological and nature-based methods, large-scale farms typically embrace technology-driven approaches to sustainability, emphasizing productivity and efficiency. Smaller farms, however, are more constrained in terms of money, adhering to regulations, and getting assistance. This emphasizes the necessity of distinct approaches that acknowledge the variety of farming systems as opposed to using standard solutions.

When combined, the quantitative and qualitative results show that a farmer attitudes, environment factors, knowledge and advisory services and government policies with sustainable animal farming. In contrast, economic factors showed insignificant association between quantitative analysis while qualitative findings showed economic factors act as major barrier while adapting to sustainable animal farming.

By bridging the gap between theoretical relationships and practical experiences, this work provides a significant contribution. It highlights that attaining sustainability in animal husbandry necessitates a balanced and integrated strategy that takes into account the real-world challenges faced by farmers rather than only raising awareness or tightening rules. Markets must offer greater incentives for sustainable production, policies must be more accommodating and supportive, and knowledge systems must be more useful and approachable.

In conclusion, four variables showed statistically significant positive associations with sustainable animal farming namely farmer attitudes, environmental factors, government policy, and knowledge/advisory services. Economic and market conditions showed a weak positive but non-significant association in the survey data. The qualitative results show that economic factors are major barriers based on thematic analysis. The economic factor appeared important in interviews/observations but was not statistically significant in the survey.

## **CHAPTER SIX**

### **RECOMMENDATIONS**

#### **6.1 Recommendations for Farmers**

The study's conclusions recommend a number of doable actions that farmers can take to improve the sustainability of their methods for raising animals.

First, producers ought to take a methodical and economical approach to sustainability. Farmers should target low-cost and high-impact techniques such as better animal health management, efficient feed usage, and improved manure management, since economic restrictions were shown to be the biggest obstacle. Making little adjustments can lower financial risk while maintaining environmental sustainability.

Second, farmers should to actively participate in advisory services and knowledge networks. The study reveals that access to knowledge plays a vital role in sustainability adoption. Farmers are urged to join peer learning groups, farmer associations, and training programs to exchange experiences and acquire useful knowledge. Finding locally suitable solutions can also be aided by farmer collaboration.

Thirdly, farmers should look for opportunities for value addition and diversification such organic farming, direct marketing or specialized markets. According to the results, farmers who participate in local or organic marketplaces are more likely to profit from sustainable practices because of higher price premiums. Reducing reliance on volatile market prices can be achieved by creating alternate sources of income.

Farmers should also view sustainability from a long-term viewpoint. Sustainable methods can enhance soil health, animal welfare, and farm resilience over time, especially in the face of climate change, even though the initial expenses may be substantial. Long-term profitability can be increased by strategic planning and when practical, investments in sustainable technologies.

## **6.2. Relevance and Implications for Developing Countries**

The results of this study have significant implications for developing nations like Pakistan where the agricultural sector is vital to the economy and means of subsistence.

Firstly, the thematic analysis found positive association with sustainable animal farming. Farmers in developing countries frequently experience lower profit margins, greater vulnerability to market fluctuations, and limited access to financing. Therefore, rather than expensive technology interventions, achieving sustainability in such environments requires locally appropriate and reasonably priced alternatives.

Second, the study emphasizes the significance of institutional structures and governmental assistance. Implementation and accessibility issues are common in Pakistan's agriculture policies and extension systems. The results indicate that the adoption of sustainability can be greatly increased by streamlining laws, increasing transparency, and offering targeted subsidies.

Thirdly, knowledge and advisory services play a very important role. Extensions services are either underfunded or do not successfully reach farmers in many developing nations. Improving sustainable farming methods can be greatly aided by bolstering extension services, advancing farmer education, and fostering community-based knowledge exchange.

Furthermore, the results pertaining to customer and market behavior are especially significant. Price sensitivity is high and customer knowledge of sustainable products is still growing in Pakistan. This suggests that market development strategies and awareness efforts are necessary to generate demand for animal products produced sustainably.

Lastly, as smallholder farmers predominate in developing nations, the distinctions between small and large farms noted in this study are extremely relevant. Policies and interventions must be customized to meet the needs of small-scale farmers, emphasizing accessible, affordable, and situation-specific solutions over standardized methods.

Overall, by showing that sustainability is not just an environmental problem but also an institutional and economic one that calls for integrated solutions, this study offers insightful information to emerging nations.

### **6.3 Recommendations for Future Researchers**

First, to increase the generalizability of results, larger and more varied samples should be taken into account in subsequent research. A more thorough understanding of sustainable animal husbandry would result from extending research to include various geographical areas, farming systems, and socioeconomic circumstances.

Second, cross-national comparisons are necessary, especially between industrialized and developing countries. By identifying context-specific issues and best practices, this kind of study can help create more successful global sustainability plans.

Thirdly, future studies should examine how technical advancements like climate-smart agriculture, digital advising tools, and precision farming contribute to sustainability. It is crucial to comprehend how these technologies can be modified for various situations, particularly in settings with limited resources.

Furthermore, more study is required on market systems and customer behavior, especially in emerging nations. The gap between production and consumption can be closed by looking into how supply chain dynamics, consumer awareness, and willingness to pay affect sustainable farming.

Lastly, longitudinal research is advised to look at the long-term effects of sustainable policies and practices. Such studies would shed light on how sustainable farming changes over time and how it affects environmental consequences, profitability, and productivity.

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## **Population Science Summary**

Sustainable animal farming has become increasingly important as agriculture faces major challenges such as climate change, environmental degradation, rising production costs. In Sweden, there is growing interest in sustainable animal farming practices that can protect the environment. Additionally, sustainable animal farming promotes animal welfare as well as reduces the greenhouse gas emissions.

This study explored what factors encourage for adopting sustainable animal farming practices in Sweden. The research combined a questionnaire survey with interviews of animal farmers in southern Sweden to gain both statistical evidence and a deeper understanding of farmers' experiences.

The quantitative analysis found that farmer attitudes, environment factors, government policy and regulations and knowledge and advisory services have positive relationship with sustainable farming. In contrast, economic factors not showed statically significant relation with sustainable farming. However, the study revealed that economic challenges remain the biggest obstacle for many farmers through thematic analysis. High investment costs, increasing production expenses, and uncertain market conditions make it difficult to adopt new sustainable technologies and practices. Smaller farms face particular difficulties because they often have fewer financial resources and find it harder to meet complex regulatory requirements.

The findings show that farmers generally have positive attitudes toward sustainability and are aware of environmental issues such as climate change and biodiversity loss. Farmers who value environmental protection and receive access to knowledge and advisory services are more likely to implement sustainable farming practices. Government policies and support programs also play an important role in encouraging sustainability.

The research also found that consumer interest in sustainably produced animal products is increasing, but many consumers are still sensitive to higher prices. This creates uncertainty for farmers who invest in more sustainable production methods. Furthermore, although advisory services are considered valuable, farmers expressed a need for more practical, farm-specific guidance that addresses their everyday challenges.

Overall, the study highlights that achieving sustainable animal farming in Sweden requires more than environmental awareness and positive attitudes. Effective policies, accessible knowledge, and economic support mechanisms are essential to help farmers overcome financial barriers and successfully transition toward more sustainable production systems. The findings can help policymakers, agricultural advisors, and industry stakeholders develop better strategies to support Swedish farmers and contribute to a more sustainable and resilient food system.

# Appendices

## Appendix 1: Quantitative Questionnaire

### Questionnaire

When you submit this form, it will not automatically collect your details like name and email address unless you provide it yourself.

#### Introduction

My name is Arslan Ashraf, and I am a master's student at the Swedish University of Agricultural Sciences (SLU), Alnarp campus. As part of my master's thesis, I am conducting a research study titled **"Determinants of Sustainable Animal Farming Practices in Sweden: A Mixed-Methods Case Study."** The purpose of this survey is to examine the key factors influencing the adoption and implementation of sustainable animal farming practices in Sweden. Your participation will help generate valuable insights into the challenges and opportunities associated with sustainable livestock production. The findings will contribute to academic research and may also support policy development and advisory services aimed at strengthening sustainable animal farming in Sweden.

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# Questionnaire

\* Required

## Demographic Characteristics

### 1. Gender \*

- ☐ Male
- ☐ Female

### 2. Farming experience \*

- ☐ Less than 1 year
- ☐ 1-5 Years
- ☐ More than 5 years

### 3. Age \*

- ☐ 18-30 Years
- ☐ 31-40 Years
- ☐ 41-50 Years
- ☐ More than 50 years

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## Determinants of sustainable animal farming

Please tick into the appropriate column for each statement below.

### 4. Farmer Attitudes \*

|                                                                                    | Strongly Disagree     | Disagree              | Neutral               | Agree                 | Strongly Agree        |
|------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| I believe sustainable animal farming is beneficial for long-term farm productivity | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I feel confident in my ability to implement sustainable farming practices          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I believe sustainable farming practices improve animal welfare                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I have a positive attitude toward adopting new and sustainable farming techniques  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

### 5. Economic and Market Factors \*

|                                                                                      | Strongly Disagree     | Disagree              | Neutral               | Agree                 | Agree                 | Strongly agree        |
|--------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Sustainable animal farming practices are affordable for my farm                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I believe adopting sustainable farming will increase my farm's profitability         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| There is good market demand for products produced through sustainable methods        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I have access to financial support or incentives that encourage sustainable farming. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

## 6. Environmental Factors \*

|                                                                                | Strongly Disagree     | Disagree              | Neutral               | Agree                 | Strongly agree        |
|--------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| I concerns motivate me to adopt sustainable animal farming                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Sustainable practices help reduce negative environment impacts from my farm.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I am aware of the environmental risks associated with conventional farming     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| My farm environment is suitable for implementing sustainable farming practices | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

## 7. Government Policy \*

|                                                                                        | Strongly Disagree     | Disagree              | Neutral               | Agree                 | Strongly agree        |
|----------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Government policies encourage farmers to adopt sustainable animal farming.             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I find government regulations related to sustainable farming easy to understand.       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Government support programs (training, subsidies, etc.) promote sustainable practices. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I trust that government policies aim to improve long-term agricultural sustainability. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

### 8. Knowledge and advisory services \*

|                                                                                | Strongly Disagree     | Disagree              | Neutral               | Agree                 | Strongly agree        |
|--------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| I have access to reliable advisory services on sustainable livestock farming   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Agricultural extension services provide adequate training on sustainability    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Research institutions provide useful information for improving sustainability. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Digital tools improve my knowledge about sustainable farming                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

### 9. Adoption of Sustainable Animal Farming \*

|                                                                                 | Option 1              | Option 2              | Option 3              | Option 4              | Option 5              |
|---------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| I actively implement sustainable animal farming practices on my farm            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I am willing to invest time and resources to adopt sustainable farming methods. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I regularly seek information or training related to sustainable animal farming. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I plan to expand my use of sustainable animal farming practices in the future.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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Submit

## **Appendix 2: Qualitative Questionnaire**

### **Background Information**

1. Can you describe your farm (size, livestock type, production system)?
2. How long have you been involved in animal farming?

### **Section B: Farmer Attitudes**

3. What does sustainable animal farming mean to you?
4. What motivates or discourages you from adopting sustainable practices?
5. How do you perceive the role of farmers in addressing environmental issues?

### **Section C: Economic and Market Factors**

6. How do market prices influence your sustainability decisions?
7. What economic challenges limit sustainability adoption?
8. How do consumers influence your farming practices?

### **Section D: Environmental Factors**

9. What environmental challenges affect your farm?
10. How do you manage manure, emissions, or waste?
11. Have climate-related issues influenced your livestock practices?

### **Section E: Government Policy**

13. How do EU agricultural policies affect your farming decisions?
14. Are current sustainability regulations practical and achievable?
15. What policy improvements would help farmers become more sustainable?

### **Section F: Knowledge and Advisory Services**

16. What sources of information do you rely on for farming decisions?
17. How effective are advisory or extension services in Sweden?
18. What additional training or support would help improve sustainability?

**Thank You**

### Appendix 3: SPSS output

|    |                     | Correlations |        |        |        |        |        |
|----|---------------------|--------------|--------|--------|--------|--------|--------|
|    |                     | A            | E      | EN     | GP     | KA     | AS     |
| A  | Pearson Correlation | 1            | -.225  | .588** | -.008  | .386** | .599** |
|    | Sig. (2-tailed)     |              | .110   | .000   | .955   | .005   | .000   |
|    | N                   | 52           | 52     | 52     | 52     | 52     | 52     |
| E  | Pearson Correlation | -.225        | 1      | .091   | .366** | -.059  | .161   |
|    | Sig. (2-tailed)     | .110         |        | .522   | .008   | .678   | .253   |
|    | N                   | 52           | 52     | 52     | 52     | 52     | 52     |
| EN | Pearson Correlation | .588**       | .091   | 1      | .436** | .625** | .703** |
|    | Sig. (2-tailed)     | .000         | .522   |        | .001   | .000   | .000   |
|    | N                   | 52           | 52     | 52     | 52     | 52     | 52     |
| GP | Pearson Correlation | -.008        | .366** | .436** | 1      | .451** | .309*  |
|    | Sig. (2-tailed)     | .955         | .008   | .001   |        | .001   | .026   |
|    | N                   | 52           | 52     | 52     | 52     | 52     | 52     |
| KA | Pearson Correlation | .386**       | -.059  | .625** | .451** | 1      | .456** |
|    | Sig. (2-tailed)     | .005         | .678   | .000   | .001   |        | .001   |
|    | N                   | 52           | 52     | 52     | 52     | 52     | 52     |
| AS | Pearson Correlation | .599**       | .161   | .703** | .309*  | .456** | 1      |
|    | Sig. (2-tailed)     | .000         | .253   | .000   | .026   | .001   |        |
|    | N                   | 52           | 52     | 52     | 52     | 52     | 52     |

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

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