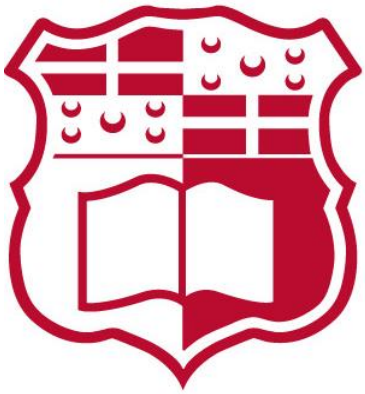

L-Università ta' Malta

Geopolitical and Country-Specific Risks: Risk Management Strategies Among Maltese Grape Farmers.

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A dissertation submitted in partial fulfilment of the requirements for the award of the Master of Science in Insurance and Risk Management at the Faculty of Economics, Management and Accountancy at the University of Malta

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Abstract

This thesis explores the geopolitical and country-specific risks Maltese grape farmers face and the risk management strategies adopted to reduce these risks. Given the Maltese islands' unique geographical and demographical constraints, Maltese grape farmers face several unique risks. Malta's grape farming industry is noticeably vulnerable to global and local risks, which is why analysing these risks is crucial in understanding the sustainability of local grape farming practices. Moreover, this study analyses and discusses key themes such as resource constraints, climate change risks, risk management tools, risk perceptions and how Maltese grape farmers adapt to enhance resilience.

The thesis commences by providing a background on geopolitical and country-specific risks and how risks are managed within the grape farming industry. It then reviews the relevant literature, exploring geopolitical and country-specific risks through a theoretical framework and examining how global and local farmers manage and adopt risk management strategies. Following this, the thesis outlines the methodology and details the interview process. The interview findings are analysed and discussed in the context of the literature review, focusing on discovering new geopolitical and country-specific risks and risk management strategies that were not found in the existing literature.

This study adopts a qualitative approach, including in-depth interviews with Maltese grape farmers. These interviews yielded valuable insights into the farmers' experiences regarding the risks they face during operations and their strategies to manage various risks. The analysis revealed several critical findings. Geopolitical risks, such as international trade disruptions and political instability, directly affect the availability and cost of essential agricultural inputs like fertilisers and pesticides. These global factors, coupled with country-specific challenges such as limited land availability, rising land prices, and water scarcity, create a highly challenging environment for Maltese grape farmers.

The study concludes that while Maltese grape farmers demonstrate impeccable resilience and adaptability to emergent risks, policymakers and regulatory bodies urgently need more support systems.

Keywords

Risk Management, Maltese Grape Farming, Geopolitical Risks, Country-specific Risks, Adaptability & Resilience

Dedication

To my late grandfather, who sadly passed away in February of this year.

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I am grateful to several people who have assisted and guided me throughout this thesis.

I am profoundly grateful to my supervisor, Dr. Jonathon Spiteri, for his invaluable guidance, insightful feedback and continuous support throughout the entire duration of this thesis. Dr. Spiteri's encouragement and guidance were instrumental in helping me navigate the challenges of achieving this milestone.

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Chapter 1: Introduction

1.1 Background

Farming has always been characterised as a high-risk industry littered with uncertainty that farmers endlessly try to navigate around to maximise their returns. Risks within the industry emanate from several sources namely climate change, human behaviour, price and yield fluctuations, expropriations by governments for development and financial and economic risks. The key factors driving these risks are climate change and persistent long-term imbalances between supply and demand. Extreme weather caused by climate change is likely to harm local yields, as currently being observed. In addition, structural elements such as increased demand driven by population and income growth, diminishing arable land, water scarcity and contamination of water tables, are expected to result in imbalances between demand and supply. (Battaglini, et al., 2009). The risks mentioned above are risks faced by grape farmers globally; however, within the Maltese context, grape farmers and, thus, the wine industry in Malta are exposed to several geopolitical and country-specific risks. These risks emanate from uncertainties and adverse complications on operations arising from political and economic interactions between different countries on a global level. Geopolitical risks can adversely impact trade policies, market access and political instability. In contrast, country-specific risks are unique concerning the internal context of the Maltese Islands. Country-specific risks in the Maltese islands include an ageing farmer population, grapevine diseases, land access, and climate change. (Fu, 2024) The CEO of Malta's largest wine producer, Marsovin, Mr Jeremy Cassar, expressed concerns that underscore a number of country-specific risks that adversely impact the Maltese grape farming industry and, thus, the wine-making industry. He highlighted significant problems, including rain shortages during the winter months, which directly affect water availability for farmers, ultimately increasing the risk of grapevine diseases and increased mortality rates in the vine trees. Additionally, the absence or lack of young farmers entering the industry presents a significant demographic risk, threatening the continuity and sustainability of grape farming in Malta. These risks are deeply rooted in Malta's specific socio-economic and environmental conditions, further complicating the already challenging landscape of agriculture on the island. (Pace, 2017)

A closer examination of existing literature highlights varying perspectives on risk among different farmers. Trestini et al. (2018) examined how attitudes and behaviours towards risk varied according to several factors, namely, age, production system, country of operation, and perhaps the most prominent factor, which is what different farmers produce. Risks in grape production are well-documented, which has led to a growing interest in effective risk

management strategies, particularly given the industry's complex and unpredictable nature. (Trestini, et al., 2018)

Empirical evidence from various literature highlights the absence of risk management tools in Europe compared to the US and Canada. The predominant form of risk management lies within the creation of mutual funds, whereby farmers pool money to share common risks such as yield risks. However, these are merely ex-ante mechanisms, meaning that they are based on models with underlying assumptions. (Sgroi & Sciancalepore, 2022). Crop insurance is another prominent instrument for managing risks, which has gained policymaker's attention, especially in the European Union, given the recent advancements in the Common Agricultural Policy (CAP). Insurance programs pertinent to viticulture are especially relevant in the northern Italian region. Farmers pay a premium to receive coverage for yield damage, but the specific causes of the damage must be documented in the Italian Insurance Plan for claims to be eligible. (Russo, et al., 2022)

1.2: Statement of the Problem

Malta's viticulture faces extreme climatic conditions, market fluctuations, limited land access, scarcity of young farmers, and land expropriations. Despite these risks and increased awareness of risk management frameworks for farmers, there is a noticeable gap in the literature about risk management practices adopted by farmers in Malta. The lack of literature is primarily due to the nature of country-specific risks. Countries such as Italy, Croatia, and California have adequate risk management frameworks that farmers utilise.

Upon closer examination, it is clear that an interplay exists between geopolitical risks and country-specific risks for Maltese grape farmers. The manifestation of geopolitical risks triggers country-specific risks. An ageing farmer population (a country-specific risk) will find coping and adapting to new regulations more challenging, thus exposing their vulnerability to geopolitical risks. Both types of risks are considered interrelated dimensions that necessitate careful analysis as they shape and test the vulnerability and resilience of the agricultural sector, especially in Malta, where country-specific risks are susceptible to fluctuations in geopolitical risks. Understanding the relationship between the two necessitates devising an effective risk management strategy. By understanding the interplay between geopolitical and country-specific risks, farmers can adopt risk management strategies accordingly, thus enhancing their resilience in mitigating these risks. (Soybilgen, et al., 2019)

Given the unique characteristics of the agricultural sector in terms of risk exposure and changing risk profiles, farmers must factor in external events that may adversely impact their industry. For instance, viticulturists globally experienced a significant adverse impact from

Covid-19. The absence of events such as weddings and parties and the closure of restaurants led to declining wine sales, thus reducing overall demand for grapes. This negatively impacted the farmer's yield and pricing; fixed costs, on the other hand, remained constant or increased, mainly due to expenses pertaining to supply chains. Sustainability within the agricultural sector, especially in the Maltese islands, is crucial to economic development. Farmers must strike the right balance between risk management and sustainability, which are vital in ensuring long-term success and environmental responsibility for vineyard management. Farmers are directly contributing to effective risk management by implementing sustainable practices. (Mate, et al., 2022)

Farmers, therefore, necessitate a strategic approach to manage geopolitical risks while maintaining sustainable agricultural practices properly. Biological processes heavily influence the cultivation of grapes, thus making the product vulnerable to climatic and methodological risks that limit the farmer's ability to control yields. Nonetheless, technological advancements, organisational practices and governmental policies have aided farmers in assessing, identifying and mitigating some risks. Farmers, especially within the local context, experience the presence of highly capitalised and scarcely profitable farms, which translates into high fixed costs experienced by the farmer, a rigidity of supply changes for the wineries, particularly within the local context, and high barriers to entry. Although there is existing literature regarding frameworks that farmers may implement to manage risks, the literature about risk management and sustainability frameworks within the Maltese context is quite limited. (Schaffnit-Chatterjee, et al., 2010)

1.3 Research Questions

The research questions outlined below are predominantly aimed at guiding the analysis of this dissertation, ensuring a focused and comprehensive examination of geopolitical and country-specific risks and risk management strategies adopted by Maltese grape farmers.

These research questions are predominantly designed to address several key research areas, mainly identifying geopolitical and country-specific risks, impact on operations, and existing strategies to mitigate these risks.

This study explores the risks and risk management strategies adopted by Maltese grape farmers. It also aims to identify the predominant geopolitical and country-specific risks impacting grape farming operations in Malta and understand how farmers manage risks through risk management strategies.

The primary research questions to be answered through this study aim to understand what geopolitical and country-specific risks affect grape farming operations in Malta. In essence, it

seeks to identify, categorise, and analyse the specific risks farmers face that are known to impact their operations in Malta. Understanding the dimensions of the impact of these risks on operations yields a comprehensive explanation of how these risks have shaped the different aspects of grape farming operations. The other aspect this study aims to understand and analyse is the current risk management strategies adopted by Maltese grape farmers to mitigate these risks. The objective here is to understand the methods and execution of risk management tools used to reduce risks within their operations.

These research questions guide the study through the literature review, methodology and analysis, ensuring a comprehensive examination of the research questions and the problem statement outlined above. By addressing these questions, valuable insights can be gathered, and the study can contribute valuable insights for identifying geopolitical and country-specific risks and determining the risk management strategies within the context of Maltese grape farming.

1.4 Main objective of The Dissertation

This dissertation makes a unique contribution by thoroughly examining the geopolitical and country-specific risks affecting grape farming operations in Malta. It also assesses the risk management strategies that Maltese grape farmers employ to mitigate these challenges. Given the dynamics and ever-increasing risks on a geopolitical level, this study is crucial in systematically categorising and grouping these risks that continue to adversely impact local grape production operations. (Ghiuleanu, et al., 2023)

In continuation with the above, this study aims to investigate and explore existing risk management strategies adopted by these farmers in a bid to mitigate the risks that impact operations. Given the geographical constraints and differences within the Maltese Islands, different farmers would be adversely affected by different geopolitical and country-specific risks, hence the differences in risk management strategies adopted by farmers. (Alekberova & Engindeniz, 2023). This evaluation and analysis will provide insights into Maltese grape farmers' risk management practices.

Chapter 2: Literature Review

2.1: Introduction

This chapter will outline the literature review, which provides a comprehensive overview of existing research and scholarly works relevant to studies regarding geopolitical risks and risk management frameworks adopted by Maltese grape farmers. The literature review aims to establish a theoretical and empirical foundation for understanding geopolitical risks and the risk management strategies adopted by farmers. Over the years, the agriculture sector has faced increasing challenges due to the evolving risks of operations.

The review shall commence by exploring and analysing existing literature and academic literature on the risks farmers face. The literature review will examine the existing scholarly literature from various sources. Emphasis will, however, be placed on the main risks confronted by farmers globally, particularly in regions with climates similar to Malta, such as the US (California), Italy, Croatia, Portugal, Spain, and France. Moreover, the literature review will incorporate the examination of literature concerning risk management frameworks and tools for grape farmers. As stated above, literature about risk management and sustainability frameworks is limited; however, in 2020, the European Commission published a document offering recommendations for the strategic plan under the Common Agricultural Policy specifically for the Maltese islands; the CAP policy will be examined further in the literature review.

The literature review analyses findings from a wide range of sources to provide a detailed understanding of the current state of the literature regarding the research questions: geopolitical risks and risk management strategies adopted by farmers. This chapter will also outline and discuss gaps identified within the literature.

2.2: Theoretical Framework - Geopolitical Risks and Country-Specific Risks for Maltese Grape Farmers

Compared to other countries that facilitate a climate for grape growing, the Maltese Islands are subject to several other country-specific risks, given the nature and geographical limitations of the country. Agricultural risks are predominantly influenced by climate change, diminishing land due to urban sprawls, water scarcity and an ageing farmer population. Unfortunately, the Maltese workforce has become subject to a trend that includes a declining interest in labour-intensive industries, land expropriation by governments for housing or public projects such as road infrastructure and the ever-growing competition local farmers face

through imports. In 2022, EY Malta presented an article with some concerning statistics. Over ten years (2010-2020), the agricultural labour force declined by a quarter from 18,212 farmers in 2010 to 13,511 in 2020. In addition, over the same period, registered agricultural holdings diminished by approximately 6%. (EY Malta , 2022).

The Maltese islands are characterised by typical Mediterranean weather: dry, hot summers and mildly rainy winters. Strong winds typically influence both seasons. Upon further examination of the Maltese Code of Good Agricultural Practice, the average temperature in Malta over a year generally is around 19 degrees Celsius. (Agricultural Services Gov Malta, n.d.). In addition to climate risks, agriculture in Malta is subject to several geographical constraints, namely, the depth of the soil, which is quite shallow, terraced fields, severe farming practices, and intense wind, thus instigating sea spray effects and arguably the biggest constraint being small land parcels. All these factors make agriculture in Malta challenging to manage in terms of risk and operations.

Malta is known to be the most water-scarce country within the EU and is globally ranked among the top ten countries with water shortage problems. (Malta Business Berau, 2014). The nature of the geology and topography of the Maltese islands do not permit the development of exploitable surface waters as found in other countries. The only instances where surface water flows are typically after heavy rains where rainwater flows along the beds of significant valleys, such as in the case of Chadwick Lakes and Burmarrad. (Vella, 2010). In addition, the Maltese islands are short on perennial surface waters, mainly limited to a small number of streams with a low flow. A small number of dams have been constructed across the major drainage lines of the central valleys to preserve and retain rainwater; however, these dams only hold a limited amount of water due to the nature and size of the valleys. (Malta Resource Authority , 2006). Upon Malta's entry into the EU in 2004, there was added pressure for solid environmental policy formation, specifically a statutory requirement under the Water Framework Directive. Several economic and physical barriers to increasing water productivity are currently prevalent in Malta. These are mainly due to the risks experienced by farmers, such as land fragmentation, dwindling number of farmers, access to land and climate change. (Xerri, et al., 2016). Farmers pay a relatively low price for groundwater; water is pumped with no administrative costs. However, due to limitations pertaining to the country’s water supply, crop productivity is being constrained. With changing climate patterns, differences in rainfall patterns and an ever-increasingly competitive market, irrigation has become essential for crop production to preserve productivity, increase yield and assure quality. (D’Agostino, et al., 2020).

The agricultural labour force in Malta is also a country-specific risk which needs careful evaluation and analysis. Figures from the 'Census of Agriculture' report highlight several key risks. During a reference period spanning over 12 months (September 2019 to October 2020), Malta's agricultural workforce comprised 13,341 persons, with more than 86% of the population accounting for male workers. In addition, approximately 97% of the total agricultural workforce worked in sole-holder holdings. A sole holder holding implies that the farmer assumes legal and economic responsibility for the holding, in which case the farmer is not linked to other holders within the sector. In addition to a limited agricultural workforce, the industry is also plagued with an ageing labour force. The chart below depicts the total number of persons working within the industry and their respective age gap.

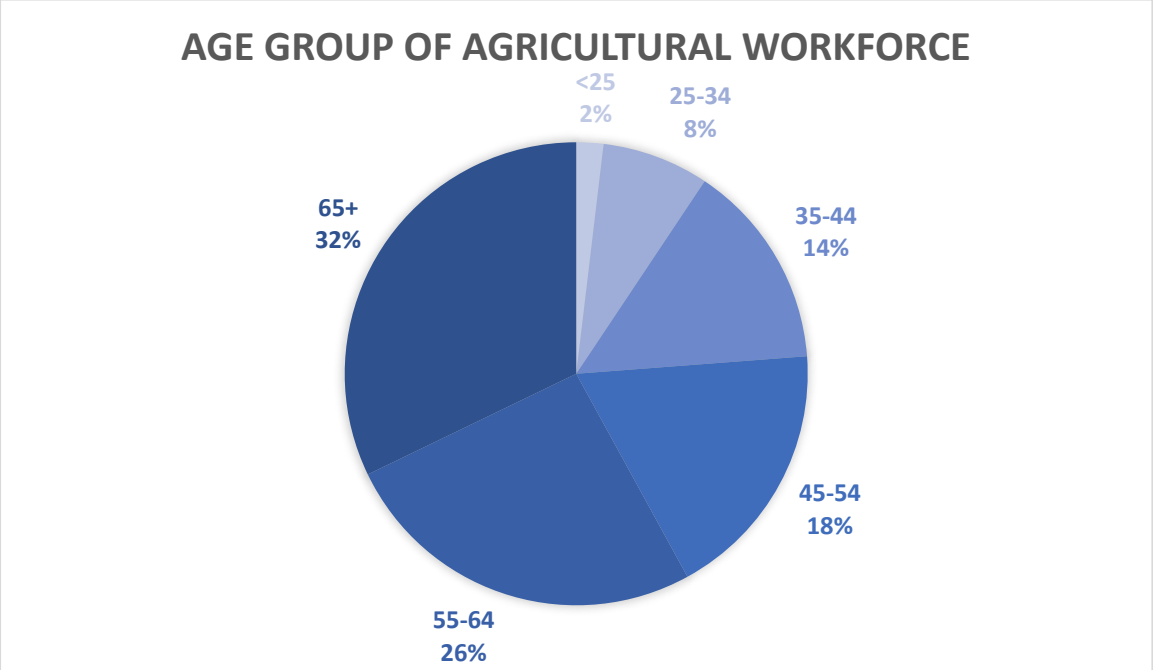

Figure 1

Access to land is another prominent country-specific risk. In 2022, Cane Vella, a local Maltese farmer, was interviewed and asked about his experience as a young farmer in Malta. Cane expressed his concerns regarding accessibility to land, emphasising that for young and aspiring farmers, obtaining access to arable land becomes close to impossible if it isn't inherited from their families. The predominant reason for this is due to the land prices and the fact that local banks won't support loans for agricultural purposes due to the volatility and nature of the industry. Cane voices his concerns regarding access to land, land prices and the banks' involvement and asks the government to intervene and alter the system to support farmers, especially for young farmers to gauge them to enter the agricultural business as well as motivate existing farmers to expand their operations. Although the EU and the government support farmers by providing funds to buy tractors and implements, Cane explains how

farmers need funds and help from the EU and the government with a completely different section, such as accessing land. (Friends of the Earth Europe , 2022).

2.3: Grape Production in the Maltese Islands

The Maltese Islands' climate makes it an excellent location for grapes to thrive and grow. Vine trees require warm temperatures during grape ripening (March to September) and a dormant period characterised by cooler temperatures and rainfall (October to February). Rainfall during summer harms and disrupts the grape's ripening, resulting in mould. In contrast, prolonged higher temperatures during the winter periods disturb the tree's dormant period and the pruning process.

As of 2020, the Maltese Islands' total area for arable land with permanent crops amounted to 952.9 hectares, of which 456.2 hectares, making up 47.9%, were consumed by vineyards. Fruit and berry plantations covered 23.9% of the total area, amounting to 228 hectares, while olive trees occupied 154.3 hectares, constituting 16.2%. In addition, citrus plantations spanned a total of 106.7 hectares, making up 11.2%, while nurseries accounted for 7.6 hectares, thus making up 0.80% of the total permanent crops in Malta. The aforementioned numbers are represented in the pie chart below. Given that almost half of the permanent crops in Malta consist of grapes, viticulture is essential to the local agricultural sector. (NSO Malta , 2023)

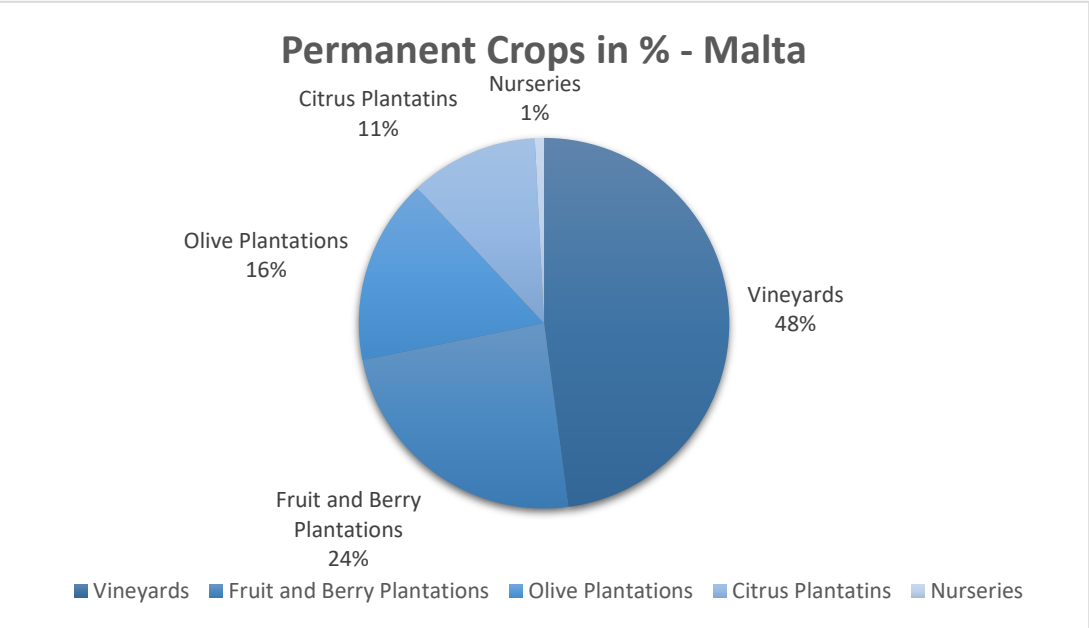

Figure 2

VitiMalta, known as by its official name ‘Organizzazzjoni Produtturi Għeneb Għall-Inbid’, is one of Malta’s prominent associations dedicated to grape production. Representing a network of more than 300 viticulture farmers across both islands, VitiMalta provides insightful descriptions of the typical responsibilities undertaken by farmers during the year. What follows is a brief description of these responsibilities segregated into different stages during different seasons.

Stage 1: Pruning

The season kicks off by pruning the trees. The aim here is predominantly to eliminate the previous season’s growth. It is a horticultural practice that involves the farmer trimming and shaping the vine tree, thus controlling the vine’s size and making it grow healthier. Pruning in Malta is often done at an angle, which allows for better circulation and airflow within the plant, given our hot and humid climate. Pruning in Malta often takes place from December to February. (VitiMalta, 2011)

Stage 2 – Bud Break and Flowering

When the tree’s bud breaks, the annual growth cycle is initiated and shortly after, these buds start producing shoots. Arguably, this is one of the year's most critical and delicate stages. Eventually, these shoots create tiny leaves, which engage the photosynthesis process, thus giving the tree the energy to accelerate growth. When temperatures increase around April, the flowering process starts with small flower clusters appearing on the tips of the shoots mentioned above. Bad weather, such as low temperatures, high winds, and rain, can adversely impact the flowering process, thus affecting the yearly grape production and quality. (Trestini, et al., 2018)

Stage 3 – The Fruit Set

At this stage, the tree starts producing a seed from the flowers; thus, a grape berry is developed to protect the seed. Not every flower on the vine produces a seed, making this stage critical for grape production as it determines an average of the potential yield for that particular season. This period often occurs during May, and climate and vine health play a vital role. Farmers must keep a vigilant eye for tree diseases that may impact the overall yield. (VitiMalta, 2011)

Stage 4 – Verasion and Harvest

By June, the grape berry assumes its traditional form, reaching its near-final size as it progresses and grows through this developmental stage. Moreover, around this time, the grape starts to ripen, which is why it starts taking its colour (black/yellow) depending on the variety. Simultaneously, the vine tree undergoes maturation, exhibiting a change in colour and

an increase in its firmness, as it diverts energy towards preparation for the next growth cycle. (VitiMalta, 2011)

Grapes are harvested upon reaching optimal ripeness and maximising sugar levels. Depending on the varieties, they are typically harvested around the end of August or the beginning of September in Malta. The looming threat of adverse weather conditions and the underlying risk of vine diseases influence the precise harvest timing. (Amaira, 2023)

The Maltese Islands are home to 18 authorised wine producers, and 12 of these establishments specialise in the creation of wines distinguished by a geographical indication commonly recognised as quantity wines. The Agricultural Directorate is the competent authority responsible for overseeing the realms of wine cultivation, production, and specifics pertaining to bottle marketing. The primary objective of this governing body is to monitor and maintain a record of all registered vineyards in both Malta and Gozo, as well as to analyse data gathered through on-site inspections. In addition, the directorate stipulates that the production of local commercial wine is restricted to those grapes produced exclusively from registered vineyards under the jurisdiction of the LANDs authority. (Agrikoltura Gvern ta Malta , n.d.)

2.4 Farmer's Risk Perceptions

Risk perception refers to how farmers perceive, analyse, and group risks to which they are inherently exposed when engaged in farming activities. Daily, farmers face diverse, challenging, and unpredictable risks such as fluctuating weather conditions, market fluctuations, technological advancements, government interventions, and crop disease outbreaks, among others. (Duinen, et al., 2015). Risk perceptions are predominantly influenced by three main factors, namely individualistic characteristics, attributes in risks, and trust in independent institutions. Individualistic characteristics such as age, gender, wealth and education levels predetermine how an individual perceives risks and their corresponding attributes. (Jamleck, et al., 2021). Literature also distinguishes between a risk assessment and a risk perception. A risk assessment attempts to evaluate and estimate the probability of the risk and its magnitude. In contrast, risk perception is subjective and ultimately dependent on person-specific factors such as experience, information, knowledge, and cultural and social factors. (Eitzinger, et al., 2018). As mentioned, risk perception is a subjective assessment of how an individual perceives the likelihood and magnitude of a risk occurring. A risk is perceived differently as different human beings undergo different cognitive evaluations and are concerned differently with the consequences of that risk. However, (Sjöberg, et al., 2004)

Argue that the perception of different risks is ultimately a construct reflecting symbols, history, ideology, and culture rather than based on individualistic behaviour.

A prominent demographic impacting farmers' willingness to take risks is their age. Younger farmers tend to be more willing to engage in risky activities than older farmers. (Ullah, et al., 2015) deduced an inverse relationship between a farmer's age and their risk perception. As farmers grow older and become more experienced, they deduce their willingness to engage in riskier activities. In addition, when a farmer becomes more educated, the farmer becomes more risk averse, thus reducing overall risk exposure. This is mainly because education provides the farmer with enhanced knowledge of underlying risk factors and provides the farmer with new opportunities and ideas to reduce risk by adopting risk mitigation strategies such as marketing contracts or insurance products. Income also impacts risk perceptions. Higher off-income farms tend to exhibit higher capacities for bearing risks due to a sense of peace of mind, whilst those lower off-income farms engage in less risky activities to limit exposure to financial losses. (Ullah, et al., 2015)

The effect of climate change is also a key determinant of farmers' risk perceptions. Climate change has and will continue to have extensive global repercussions on the agricultural sector. Unforeseen weather events, changes in disease and pest patterns, reduction in water availability, and changes in rainfall patterns are all risk factors emanating from climate change. In the past, these risks were often classified as low probability but high severity; however, the probability has been reduced due to climate change, and the magnitude has remained the same. Farmers and policymakers should focus on mitigating the effects of climate change by adopting risk management practices rather than trying to reduce climate change. The need has now shifted to adapt to these changes. (Adnan, et al., 2023). In addition, (Tzemi & Breen, 2019) found that Irish farmers perceive climate change as a long-term risk that would have detrimental impacts on their farms in the far future. Thus, they were reluctant to participate in actions to reduce greenhouse gas emissions. (Tzemi & Breen, 2019) they examined how other factors such as IT literacy, environmental subsidies, and climate change awareness courses probe farmers into adopting new greenhouse gas emission abatement tools that are more environmentally friendly. Different risk perceptions vary across different agricultural sectors operating within different countries. Torrential rainfall and hurricanes have caused disastrous weather conditions for coffee growers in Mexico and Guatemala, destroying crops before harvest. In addition, between 1999 and 2003, parts of these regions experienced little to no rainfall, coinciding with international coffee prices falling to a historic low. Years of unstable coffee prices combined with adverse weather conditions pose numerous risks and challenges for farmers, who face the question of how to adapt and manage these risks and change their risk perceptions. (Tucker, et al., 2010) found that these farmers were far more concerned about

the market's supply and demand and fluctuations in coffee prices rather than the risk of climate change. Many farmers failed to understand that these adverse weather conditions lead to product supply and demand curve shifts. (Tucker, et al., 2010) concluded that farmers perceive price shocks as being riskier, and thus, they probe farmers into adapting to risk management policies within their operations.

In agriculture, effective risk management for farmers necessitates identifying, assessing, and implementing risk management tools. The relationship between risk perceptions and risk behaviour is dominant in decision-making regarding risk-related decisions. In addition, different farmers have different risk perceptions as outlined in a paper by (O.Flaten, et al., 2005). This paper concluded that organic farmers were found to be less averse when compared to farmers who engage in conventional farming practices. In addition, the paper concluded notable differences in risk perceptions between organic and conventional dairy farmers risk perceptions ultimately suggesting that government policies need to be applied differently across both groups. Risk perceptions were analysed against socio-economic variables such as age, farm income, farmland and education levels. However, it was also found that both groups share some common perceptions pertaining to risk. Both groups identified insurance, financial products and disease-prevention pesticides as the predominant risk mitigation strategies at their disposal.

As mentioned above, farmers' risk perceptions vary according to the probability and magnitude of the risk involved and according to the circumstances and risk management tools available at the farmer's disposal. Farmers in Malta face the same risks that international farmers face, in addition to several country-specific risks such as the worryingly low number of young farmers, land expropriation, and adverse weather conditions. (Times of Malta, 2021). Over the years, Malta experienced a surge in large supermarkets thus experiencing a change in the local wholesale vegetable market structure where nowadays most fruits and vegetables are imported. These imports have made farming in Malta far more challenging and economically inviable. Given the importance and the need to rescue farmers in Malta, it is crucial to understand the role of risk perceptions about risk adaptation measures to climate change and various other country-specific risks to give policymakers the relevant information to craft the right adaptation policies for the Maltese islands. (Galdies, et al., 2016).

2.5: The Adaptation of Risk Management Tools by Farmers

Several studies highlight the importance of adapting risk management frameworks in agriculture. Most notably, a paper by (Cafiero, et al., 2007) depicts how traditional forms of risk management have often been carried out through either ex-post or ex-ante policies. Ex-post policies are risk management policies put into place after a risk, such as a catastrophic

event, materialises. In contrast, ex-ante policies are policies which aim to improve the farmer's risk management capabilities. Furthermore, Cafiero et al. note the difference in risk management approaches from farmers depending on the country and the agricultural policy objectives pursued. Various studies highlight that ex-post risk management policies predominantly consisted of subsidies in the form of contributions or tax reliefs made by the government to farmers, depending on the extent and severity of the losses suffered due to the catastrophe. In addition to such incentives, farmers may also engage in financial products such as insurance contracts or mutual funds aimed at managing business and financial risks. The former are considered to be ex-post policies, while the latter are ex-ante policies; both serve as risk management tools at the farmer's disposal. The EU has also gone a step further in strengthening the leverage of ex-ante business risk management by introducing financial instruments, namely subsidised insurance policies and mutual funds. The facilitated agricultural insurance policies are predominantly aimed at protecting farmers' profits from any crises that may occur, such as natural disasters. On the other hand, mutual funds serve as a proactive risk prevention tool, as they allow farmers to share risks. (Cafiero, et al., 2007).

A study regarding risk management strategies in the wine industry by De Salvo et al. found that grape farmers operating in the Northeast Italian Region adopt risk management strategies that are concerned with production and marketing strategies. According to this study, farmers focus on addressing immediate threats to the grape production industry, perceiving risk management not as a proactive tool but rather as a reactive measure undertaken once a risk has materialised. In contrast to traditional risk management frameworks, farmers manage immediate risks rather than developing a defined strategy to increase risk resilience to cope with specific events and risks. (Salvoa, et al., 2019).

In several European member states, crop insurance remains the predominant risk management method. (P & Cs., 2008) found that approximately 60% to 70% of farmers in Germany and Spain purchase crop insurance policies to reduce their risk exposure. In addition, German farmers have also been looking into marketing contracts as a tool for managing their risk exposure. Marketing contracts are similar to forward and future contracts typically used to hedge the price of commodities such as oil and fuel. In farming, marketing contracts are agreements between the farmer and the buyer of that agricultural product. For instance, a farmer and a winery would enter a marketing contract whereby the farmer promises to supply the winery with a pre-specified number of grapes at a pre-determined price. These forms of contracts are beneficial for both parties in providing predictability and assurance in transactions as well as a way for both parties to manage risks. (Ruml & Qaim, 2020).

The consequences of climate change also necessitate enhanced and robust risk management policies and procedures. Unfavourable effects on agricultural production, including grape production, have resulted from new climate trends and shifts, including variations in CO2 emissions and rainfall patterns. There are two predominant ways that greenhouse gas emissions affect traditional agricultural methods, as identified in a comparison study by (Antón, et al., 2012). First, the pace at which crop plants and weeds grow is impacted by a rise in atmospheric CO2 emissions. Secondly, the increase in atmospheric CO2 emissions disrupts the balance of temperature, rainfall, and sunlight variability – three essential factors vital for the optimal growth of vine trees. The optimal temperature for grape growth and ripening is determined by the duration of the growing season. It is thought to impact the grape's development, processes and ripening, thus maximising optimal sugar levels. It is worth noting that different crops respond differently to increasing temperatures, ultimately based on whether their yield is impacted by insufficient warmth. (Anwar, et al., 2013).

Risk management tools for climate change are modelled under three distinct layers in a comparative study of risk management in agriculture under climate change by (Antón, et al., 2012). Despite differences within industries, such as the financial services and agriculture sectors, risk is typically divided into different categories based on the likelihood and impact of potential events. Various risk mitigation techniques are employed to transfer, pool, or manage residual and inherent risks. The table below depicts the three distinct layers and standard risk reduction techniques.

Layer	*Description*	*Tools/Strategies*
Risk Retention	Probability is notable, but the magnitude of losses is considerably low.	Such risks are often self-managed by farmers themselves.
Market Insurance Layer	The probability of occurrence is less; however, the magnitude of losses is notably higher.	Insurance pools, hedge funds and mutual funds
Market Failure	Features risks with large and severe magnitude with a very minimal probability.	Government intervention through ex-post payments.

Table 1

Although this approach, as explained by (Antón, et al., 2012), is considerably straightforward on paper, it isn't practically nor conceptually straightforward to implement. A predominant gap

can easily be identified. For instance, the specifics of the boundaries between the layers, as mentioned earlier, are not specified. In addition, the definition of catastrophic risks is determined by how the corresponding government reacts to these events and how the government classifies a catastrophic and thus manages the demand for assistance to farmers. Diversification is often a term used in the world of investments, it is a form of risk management whereby investors diversify their investment share within a portfolio in a bid to reduce their exposure to a particular company, industry, country or currency. A study by (Duong, et al., 2019) found that one prominent form of risk management strategies adopted by farmers was animal and crop diversification. Through diversification, farmers enhance their resilience, thus making them more flexible and able to adapt to changing environmental conditions. Diversification also contributes to integrated farming, whereby combining crops and animals fosters synergies where one component benefits the other. For instance, farmers could use the animal manure to fertilise the crops. Another risk management tool farmers adopt, as established by (Duong et al., 2019), is off-farm work, whereby farmers undergo other jobs to support their farms part-time.

2.6: Evolution of the CAP for the winemaking sector

Although the agricultural sector is vast and farmers often participate within different sectors, they all fulfil an intensive international role of supplying the population with an adequate food supply. Throughout the year, they have to practice their traditional skills and adapt to new and emerging technologies to produce and provide sustainable, healthy crops at an affordable price. (Bogucki, 1996). Food products in the world are predominantly exported by the EU, which is also the largest importer of food products. The Common Agricultural Policy (CAP) is a policy developed by the European Union (EU); its purpose is to provide member states with a framework for agricultural support and development. Initially introduced in 1962, the policy has undergone several amendments; however, the primary objectives remain, namely, ensuring food security and stability within agriculture markets, all the while promoting sustainable agriculture and providing an adequate standard of living for farmers. (Zanten, et al., 2013). In addition, the CAP also serves as a medium to allow the combination of free trade within the community based on typical prices, yielding preferences for European production of the community markets albeit granting total financial responsibilities to all stakeholders. (Pe'er, et al., 2019).

Around twenty years after its adoption, the CAP entered a crisis predominantly due to oversupply, leading to surpluses. Eliminating these problems resulted in challenges, namely, budgetary constraints and exacerbated environmental pressures caused by induced and secondary intensification. Consequently, the policy's trust and legitimacy diminished in a

society with an ever-increasing environmental awareness. Over the years, the European Commission gradually adapted and tailored the policy to meet the ever-changing environmental requirements. (Poblete, et al., 2024).

Grape and wine policy within the policy 2014-2020 emanates from three predominant CAP regulations accompanied by legal acts which outline the operational details for their adoption. (i) As of 2013, farmers with registered vineyards may gain income support from the EU. (ii) Market measures, which include financial support, should be introduced, combined with a thorough system of regulatory measures concerning marketing and wine production. (iii) Grape farmers may apply to benefit from resources of the rural development policy, which allows farmers to compete with other farmers of other agricultural sectors in the framework of the rural development plans. (Pomarici & Sardone, 2020). The CAP aids farmers by providing various forms of financial support, employing direct payments for plants and machinery such as tractors, funding for rural development programs and subsidies for planting and building vineyards and restructuring. By providing farmers with financial support, competition within the grape industry is enhanced, more sustainable practices are encouraged, and incomes are generally stabilised. (Toteva, 2011). Environmental and sustainability measures, such as regulations about pesticide control, have placed greater emphasis on ecological sustainability. The CAP adopts a policy whereby farmers participate in eco-friendly farming practices with less chemical use, thus promoting biodiversity preservation and inclusion within vineyards. Although climate change will continue to adversely affect vineyards across Europe due to prolonged summer periods and changes in rainfall patterns, the CAP is continuously updated to assist farmers in coping with these climate-related challenges. (Cots-Folch, et al., 2006).

In 2018, Maltese stakeholders requested an agriculture policy document for the Maltese islands. The Maltese government formulated a ten-year policy based on the common agriculture policy and other relevant regulations, aiming to direct the agriculture industry in a more sustainable direction by providing means to achieve this. (Government of Malta, 2018, p. 7). A total of twelve horizontal issues were established, which prompted the relevance of this report. The predominant aim of the policy objective was to ensure adequate farm income levels, which are crucial to sustain the agricultural sector and make farming profitable, thus keeping farmers on the land and making the industry attractive to new and ensuing farmers. (Tongeren, 2008) A noticeable issue that was ranked relatively low despite being one of the sole principles of the CAP was safeguarding the environment and biodiversity. The policy stresses the need for further research and ongoing data collection to enhance the development of agricultural policies regarding environmental sustainability and biodiversity conservation. The Maltese Government asks the private sector and research institutions to collaborate on research proposals within the policy document and the CAP to bridge the gap

between practicality and research. (Government of Malta, 2018, pp. 101-102). Furthermore, given the nature and urbanisation of rural areas, the policy encourages the regeneration of an attractive countryside employing agriculture through funds provided under the rural development programme for Malta. (Agriculture Services Malta, 2016).

Shortly after Malta entered the EU, Maltese markets were saturated with cheap wines, which adversely affected grape prices and made grape farming very unprofitable. Through the introduction of quality certification and marketing regulations, the of quality the traditional ‘gellewza’ and ‘girgentina’ wines increased considerably. The price of wine bottles increased, hence the increase in grape prices over recent years. Moreover, quality wines in Malta are made from ‘D.O.K’ vineyards, which are regulated under legal notice 416 of 2007. These wines are made from the highest quality grapes, which are grown under stricter parameters. Legal notice 416 of 2007 provides farmers with all the parameters to grow and treat vineyards if they wish to sell and market their product as D.O.K. (Legizlazzjoni Malta , 2007). Those farmers who do not farm their grapes concerning the D.O.K parameters fall under the category of table wines. Given that these grapes are grown under less stringent regulations, the yield is noticeably higher than D.O.K grapes, and thus, the price is lower. These grapes are used to produce commercial wines, which are sold on the market at a more competitive price. (Falzon, 2013) The policy predominantly aims to strengthen the viticulture industry through black swan structural events such as the prolonged drought in 2015. Between 2015 and 2016, the Maltese islands experienced a severely dry winter season. The following summer, many vines succumbed to the heat and loss of water, ultimately resulting in vine scarcity. (Government of Malta, 2018, pp. 51-52)

Overall, the Common Agriculture Policy plays a significant role in shaping economic variability, promoting quality and authenticity, and steering the wine industry towards a more sustainable future. Given the wine industry's ever-changing market conditions, such as market regulations, quality and assurance controls, climate change, yields, and other geopolitical risks, policymakers must update the CAP and align it with current risks.

Chapter 3: Methodology

3.1: Introduction

This Chapter will describe the approach taken to investigate geopolitical risks and risk management strategies adopted by a Maltese grape farmer. This chapter also comprehensively describes the methods used to gather data for analysis, including sampling methods. The chosen methods, sampling techniques and data analysis tools aim to provide a comprehensive understanding of the geopolitical influences and risks within the grape farming sector in Malta. The chapter will incorporate and provide details on the research design, data collection methods, sampling techniques and data analysis tools, ensuring that the research process is transparent and commensurate with the research questions outlined in Chapter 1 of this dissertation. By outlining all the relevant steps in carrying out this study, this methodology aims to substantiate and enhance the validity of the analysis, thereby contributing insights towards risk management for grape farming within the Maltese Islands.

3.2: Methodological Plan

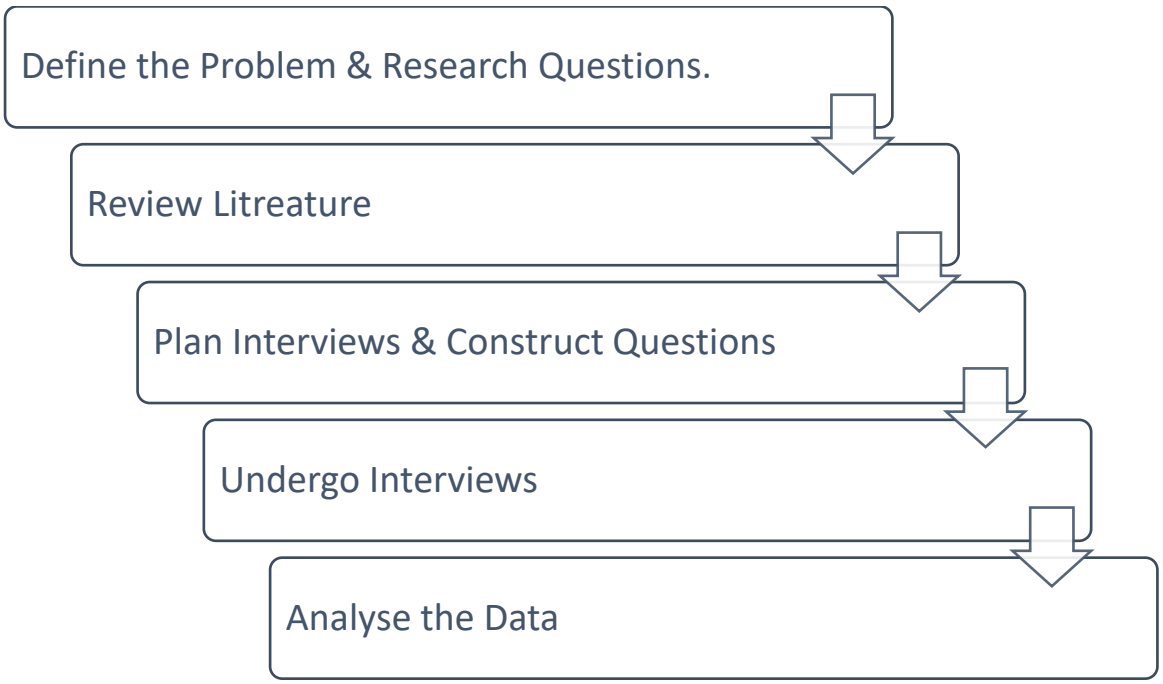

Figure 1

3.3: Research Approach

3.3.1: Inductive Approach

An inductive approach was deemed appropriate for the research questions portrayed by this study. The primary goal of an inductive approach is to facilitate research findings emerging from pre-existing themes emanating from the raw data. An inductive approach is usually commensurate with several types of qualitative data analysis. (Thomas, 2006). The basis for this decision was determined after the research questions were created. The research questions aim to explore and understand how Maltese grape farmers are impacted by geopolitical risks and how these farmers adopt risk management strategies to mitigate these risks. Existing literature pertaining to geopolitical risks within the Maltese context was limited. Hardly any literature was found concerning some of the geopolitical risks mentioned in Chapter 2 of this study. (Overmars, et al., 2007). Through an inductive approach, themes and patterns were identified from geopolitical risks and risk management strategies adopted by farmers abroad in a climate like Malta, such as Italy, Spain, Portugal, and the US (California). This approach will aid in building broader generalisations and theoretical frameworks on existing literature on risk management in grape farming. (Armat, et al., 2018). Although an inductive approach may be depicted as being time-consuming and relatively subjective, it allows for new theories to be developed in areas where literature is constrained, such as risk management within the agricultural sector in Malta. This approach also allowed for flexibility and adaptability during the research process, which led to new directions, albeit expanding on the research questions outlined in Chapter 1. (Samanta, 2021).

3.3.2 Structured Interviews

Qualitative Data was collected through structured interviews with a sample of farmers growing grapes in Malta. Although structured interviews are typically used for quantitative data collection, the type of questions asked during the interviews were facilitated to accommodate qualitative data. Structured interviews incorporate questions asked to a sample of interviewees, allowing the researcher to compare responses between participants while keeping a uniform context easily. This homogeneity between the questions asked will benefit the research in identifying the relative themes and potentially highlight areas for further research ventures on geopolitical risks and risk management in Maltese grape farming. (Tanniru, 1990). In addition to the above, asking participants the same questions enhances the overall reliability and validity of the data gathered.

The interviews were conducted face-to-face between the researcher and the interviewee, allowing for a more transparent exchange of information. Another advantage of face-to-face

interviews was that there were no unanswered questions. When the interviewee found a question to be complex, he/she opted to ask for an explanation, thereby ensuring transparency and accuracy while reducing the risk of misunderstanding or giving incorrect data.

All questions presented during the interview were open-ended, encouraging an insightful and meaningful answer from the interviewee. (Rashidi, et al., 2014). All interviewees were asked the same questions, albeit in different order. The questions were designed to allow the researcher to probe deeper into the subject of the question to gain a detailed understanding of the answer. These open-ended questions aimed to encourage a conversation with the interviewee. Although the questions were numbered, the interviews didn't follow the same sequence of questions. During the interviews, the sequence and wording of the topic and research questions were adjusted to understand better how these risks impact farmers and what measures are being taken to mitigate these risks.

3.4 Interview Guide

Nine questions were developed before conducting the first interview, and questions were designed to probe comprehensive responses about the geopolitical risks Maltese grape farmers face and how they manage these risks through risk management strategies. Therefore, the interview questions were divided into geopolitical and country-specific risks and risk management strategies. Questions relating to geopolitical and country-specific risks aimed at understanding how farmers perceive, assess and rate geopolitical risks impacting their operations, whilst questions related to risk management aimed to explore the methods and mitigants farmers adopted to reduce the probability and magnitude of these risks. Farmers were also asked to describe the predominant risks encountered during grape farming, providing detailed responses about how different farmers rate different risks.

As mentioned above, the first set of questions aimed to capture how farmers perceive risks. Farmers were asked to describe the primary risks they faced during their operations and whether they have seen a change in risks over the years. These questions ensure that the researcher gains an insight into how and what risks influence grape farming decisions and operations. In addition, asking about how risks have changed over the years gives insight into how risk perceptions have evolved and shaped and whether certain risks have become more prominent or diminished over time. As mentioned in Chapter 2, risk perceptions are crucial in analysis; not all farmers have the same risk perceptions, which is why these questions help document the diversity of responses and perceptions among different farmers operating within the same agricultural sector. In Continuation with the above, farmers were also asked about the criteria for evaluating risks, such as economic impact, magnitude, and likelihood of a potential risk materialising.

The second set of questions aimed to capture data on how farmers manage these risks. The questions were structured so that the interviewee would start thinking about the risks that impact their operations to match risk management strategies with those risks. The rationale behind this set of questions was to document and gather insights into how local farmers mitigate these risks through risk management strategies. By asking farmers to describe how they manage risks, the data collected through the responses uncovers how these concepts are applied in real-world scenarios as opposed to that found in the literature. In addition, such questions probe farmers in providing a first-hand perspective on which strategies work well, which are challenging to implement and how these strategies are customised to accustom risks. This is especially crucial in light of the fact that Maltese grape farmers are constrained by how they can manage risks when compared to farmers from other larger countries such as Italy and France. Given the Maltese islands' geographical, political and resource limitations, these questions give a first-hand impression of how farmers manage risks and bridge the gap in the literature between local risk management strategies and those of countries less affected by the aforementioned limitations. A forward-looking question asking which risks farmers think will become more prominent shortly seeks to gain insights and data about any future concerns likely to impact grape farming in Malta. Through such a question, data could also be gathered regarding developing risks, whether farmers have any proactive risk management strategies, and whether they are preparing for such an eventuality to materialise soon.

In conclusion, the questions during the interview aim to cover a broad range of topics emanating from the research questions, mainly geopolitical, country-specific risks and insight into risk management strategies adopted by Maltese grape farmers. By probing questions and gaining insights on current risks, risk changes, prioritisation of risks for operations, existing risk management strategies, and education about risks and future risks, these questions aimed to gain insight into the risk management practices within the Maltese grape farming sector. Given the gap in the literature on risk management in grape farming within the local context, these questions bridged the gap between literature and practice within the local context.

3.5 Ethical Considerations.

This section provides an overview of the ethical considerations addressed during interviews. Before proceeding with the interviews, participants were provided with two documents: a consent form and an information letter.

The information letter provides the interviewees with information pertaining to the research aims, methods and intended use of data. The letter further explained how the responses from the interview will be handled and stored in an anonymised manner. Moreover, the letter

explained how participation in the study is entirely voluntary and that participants at any stage during the study do not need any explanation. Participants were also informed of their rights under the General Data Protection Regulation (GDPR). Information was provided on the rights participants can enjoy pertaining to GDPR, such as data access, correction, and deletion.

The consent form ensures that participants are fully informed of the nature and purpose of the study and that their consent is made voluntarily. Although already provided in the information letter, the consent form details the study's objectives, risks, benefits, and confidentiality limits. This ensures transparency and enhances resilience between the researcher and the interviewee. The consent form was given to the participant before the interview. The participants were given ample time to read and sign the document, acknowledging their understanding and agreement to participate in the study.

Both the consent form and the information uphold the principle of anonymity in protecting the identities of those individuals participating in the study. Participants were also made aware that their data would be pseudonymised and that a code would be assigned to link the data with the participant. This code was used in all the documentary analyses emanating from their responses. The fundamental aspect of anonymity through pseudonymised codes was to engage the participant in providing useful data without fear of exposure. Through a combination of the information letter, consent form and the pseudonymised codes the aim was to foster a trustworthy and resilient ethical research environment where participants could freely express their views on the questions put forward by the researcher.

3.6 Sampling

3.6.1 Purposive Sampling

Participants chosen for the interviews were chosen employing purposive sampling. Through such a sampling method, participants were selected based on specific characteristics namely knowledge and experience relating to grape farming within the Maltese Islands. Purposive sampling was deemed the ideal sampling method as it is a non-probability sampling method where participants are selected based on the researcher's judgement, which is commensurate with the research questions. Purposive sampling involved choosing farmers specifically operating in grape farming, which was deemed appropriate for providing data and insights for the study. Given the significant gap in the literature on risk management strategies utilised by Maltese grape farmers, purposive sampling enabled the study to benefit from context-specific insights rather than achieving statistical representativeness with limited context. (Ryzin, 1995) Purposive sampling is often used by researchers when they want to understand a complex phenomenon rather than generalise findings; given the lack of literature on geopolitical risks

and risk management strategies adopted by Maltese grape farmers, purposive sampling within the context of this study allows the selection of information-rich cases. (Campbell, et al., 2020)

Initially, three farmers were contacted and asked whether they would want to participate and contribute to the study by undergoing a face-to-face interview. After meeting the first group of farmers, they suggested and provided contact details of other farmers from different regions who face similar risks and adopt risk management strategies. These farmers were then contacted and asked whether they would like to participate or not. These farmers also provided details of other farmers deemed fit for the study. This method is better known as snowball sampling, which is a type of purposive sampling where the initial participants recommend and help the researcher find additional participants. (Acharya, et al., 2013) This method was deemed appropriate given the diminishing number of farmers actively operating within the grape industry. (Valerio, et al., 2016)

3.6.2 Criteria for Participation Selection.

The predominant aim of this thesis is to explore the geopolitical risks that affect grape farming operations and how farmers adopt risk management strategies within their operations. Hence why the participants approached for interviews on this study needed to have relevant knowledge and experience about grape farming in Malta. Through carefully selecting local experienced grape farmers, the study benefited from rich, detailed data that directly addressed the research questions. In addition, targeting knowledgeable and experienced farmers who engage in grape production allows for diverse perspectives and experiences critical for understanding the complexities of risks and the effectiveness of the risk management strategies adopted by farmers. An effort was also made to ensure that the sample size included farmers from different regions of Malta. As mentioned, the Maltese islands are characterised by different regions and different soil types. Efforts were therefore made to include farmers from the different areas (North, South, East and West) to account for that sector-specific geographical variability in soil compositions, risks and risk management strategies.

Concerning grape farming experience, preference was given to farmers with numerous years of experience in grape farming. The reason was mainly related to gathering insightful data, as experienced farmers are more likely to have encountered experiences about risk management and would have different views on geopolitical risks. Farmers with numerous years of experience will also be able to distinguish between new and evolving risks compared to previous years.

Ten farmers were contacted and interviewed to gather data. As mentioned above, three farmers were initially contacted and interviewed. Those three farmers then provided contact details for other farmers. After ten interviews, saturation was reached. At this stage, no new data was being gathered from the interviews. A total of ten farmers were contacted and interviewed to gather data. As mentioned above, three farmers were initially contacted and interviewed. Those three farmers then provided contact details for other farmers. After ten interviews, saturation was reached; at this stage, no new data was being gathered, which is why farmers stopped being contacted after this stage.

3.7 Data Analysis Tools

In the context of analysing geopolitical risks and risk management strategies adopted by Maltese grape farmers, adopting a thematic analysis as described by (Braun & Clarke, 2006) provides a structured approach to analysing the data gathered from the interviews. This approach was deemed suitable for this study as it allows for a flexible yet comprehensive strategy for identifying and analysing themes emanating from the interviews. (Braun & Clarke, 2006)

One benefit of the thematic analysis chosen for this study is the high degree of flexibility, making it suitable for several research questions and data types. Keeping the research questions in mind, mainly understanding the geopolitical risks faced by Maltese grape farmers and how they adopt risk management strategies, the thematic analysis provides a systematic framework that accommodates the diverse perspectives and intricacies gathered throughout the interview process. (Abedin, et al., 2021)

As mentioned above, the predominant aim is to uncover insights regarding geopolitical and risk management strategies local grape farmers adopt. The thematic analysis allows for a comprehensive understanding of the data gathered through the identification of codes, which ultimately yield different themes in relation to the research questions developed at the start of this study. Through the identification of themes, thematic analysis facilitates the understanding of commonalities in key risks currently impacting grape farming operations and risk management strategies across the entire sample. (Castleberry & Nolen, 2018). Another benefit of thematic analysis is that through themes, data was segregated and organised in a manner that promoted data-rich detail and highlighted the difference in patterns that contribute to understanding the research questions. (Hayfield, 2020)

Compared to the Grounded Theory as developed by Glaser and Strauss, thematic analysis was deemed more suitable due to its predominant effectiveness in identifying and interpreting patterns within the data. In contrast, while the Grounded Theory would be more ideal for

studies focused on developing new theories, this approach needs to be commensurate with exploring the geopolitical risks and risk management strategies adopted by Maltese Grape farmers. (Glaser, 2014).

In conclusion, thematic analysis was deemed the correct method of data analysis for this study due to the inherent flexibility involved and the approach it provides in analysing data. The systematic framework provided in developing themes makes it insightful in uncovering and segmenting data according to themes, thus making it easier to understand the geopolitical risks faced by Maltese grape farmers and how they manage risks through risk management strategies.

3.8 Limitations

Despite best efforts to adopt a robust methodology for exploring geopolitical risks and risk management strategies adopted by Maltese grape farmers, several limitations were encountered.

One predominant limitation is that this study's findings and analysis are context-specific to Maltese grape farmers. Given the unique socio-political and geographical differences found in other regions of the world, the findings and analysis may not be generalisable to grape farmers in other regions outside of the Maltese Islands.

In addition, the relatively small sample size of 10 participants may not capture the full diversity of experiences and perspectives of different grape farmers. However, opting for purposive sampling mitigated this risk as the farmers interviewed all had previous experience in grape farming. Efforts were also made to ensure that the sample size included participants with diversity in experience, operations, farm sizes and grape vines in different regions of the Maltese Islands. Data collection resumed until saturation, meaning that data collection stopped after no new themes emerged thus ensuring that the sample size was sufficient to capture the key questions emanating from the research questions of this study.

The grape farming industry in Malta, although quite small, is a tight-lipped industry; upon contacting the participants, some were reluctant to participate in the study. This was due to concerns about disclosing sensitive information, operational tactics and secrets, and possible repercussions. To mitigate these concerns and provide participants with peace of mind, an information letter and a consent form were provided to participants, ensuring strict confidentiality and anonymisation of data. This established trust between the researcher and the participants, which, in turn, encouraged them to share information and experiences more openly.

In conclusion, while this study adopts a rigorous qualitative methodology to explore geopolitical risks and risk management strategies adopted by Maltese grape farmers, it is essential to note the aforementioned limitations. However, best efforts were made to mitigate the severity of these limitations, contributing to the overall credibility, reliability, and validity of the findings emanating from the interviews.

Chapter 4: Analysis and Discussion

4.1 Introduction

This section explores and analyses the empirical data collected from structured interviews conducted with Maltese grape farmers. The data gathered will yield a detailed analysis of the intricacies of geopolitical risks and the corresponding risk management strategies adopted by Maltese grape farmers. Through ten structured interviews, comprehensive insights were gathered about firsthand experiences, challenges, and methods used by Maltese farmers.

This section is predominantly structured in a way that systematically presents the themes that emanate from the interviews. Furthermore, this chapter will provide a thematic overview by segregating the different themes which emanate from the interviews. A distinction is made upon categorising the primary geopolitical and country-specific risks farmers face in their day-to-day operations and the specific risk management strategies adopted, showcasing innovative practices and common trends across the responses originating from the interviews.

Upon concluding the analysis, the aim is to provide a detailed and coherent description of the current risks Maltese grape farmers face and what is being done to mitigate these risks, albeit ensuring that the findings align with the broader existent scholarly literature on grape farming risk management as outlined in Chapter 2. The table below (table 2) summarises the common themes identified upon analysing the interview responses corresponding to the research question as depicted. The codes listed ensure that data is sorted systematically to capture standard features in the responses across the sample of participants.

4.2 Demographic Segmentation

For this chapter, it is critical to understand the demographic characteristics of the participants to provide a comprehensive understanding of the views of geopolitical risks and risk management strategies adopted by these farmers. The tables below summarise the demographic segmentation by region, age, and years of experience in the grape farming industry. Such segmentation contextualises the findings and highlights any response variations that may be attributed to these three demographics.

Efforts were made to capture data from farmers with grape fields in different regions across the Maltese Islands. The interviewees were drawn from the Northern, Western, Southern and Gozitan regions, ensuring that the sample represents and captures geographical variations such as soil type, land size, availability, and water quality.

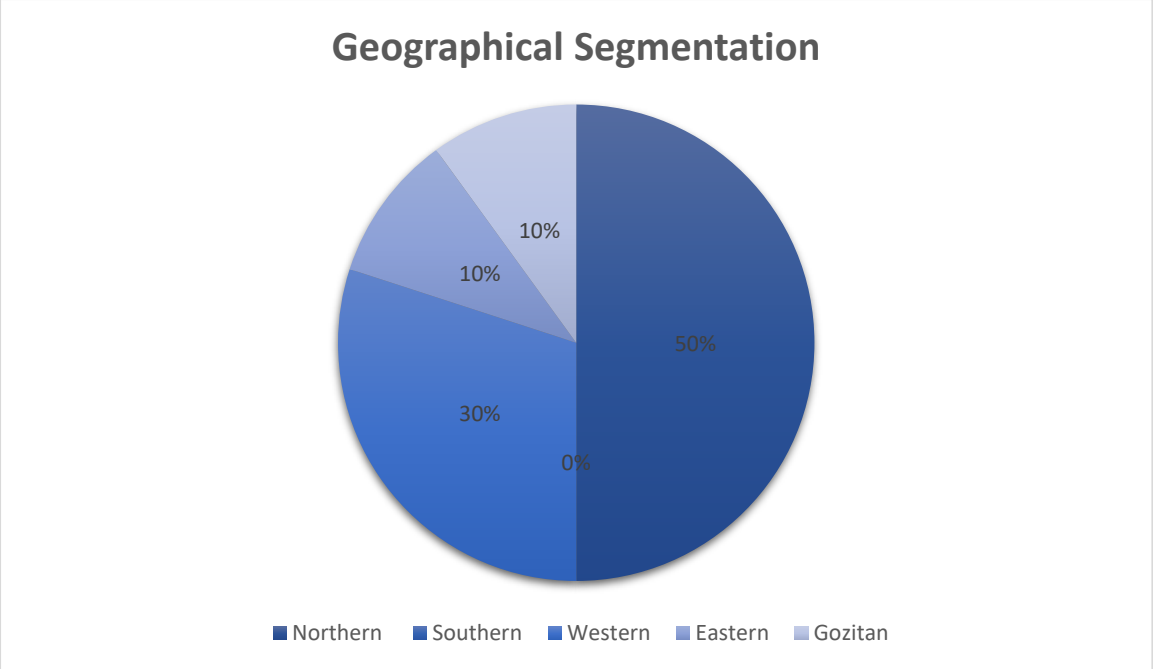

Figure 2

Age distribution was another demographic employed; however, it was pretty challenging to achieve in practice. Trying to find and interview young farmers was quite challenging. The table below shows that the youngest farmer was 41 years old. Interviewing younger farmers would have allowed for a more comprehensive understanding of how age influences risk perceptions and the changes in the adaptation of risk management strategies. Nonetheless, senior farmers offered a wealth of knowledge supported by historical expertise on the subject matter.

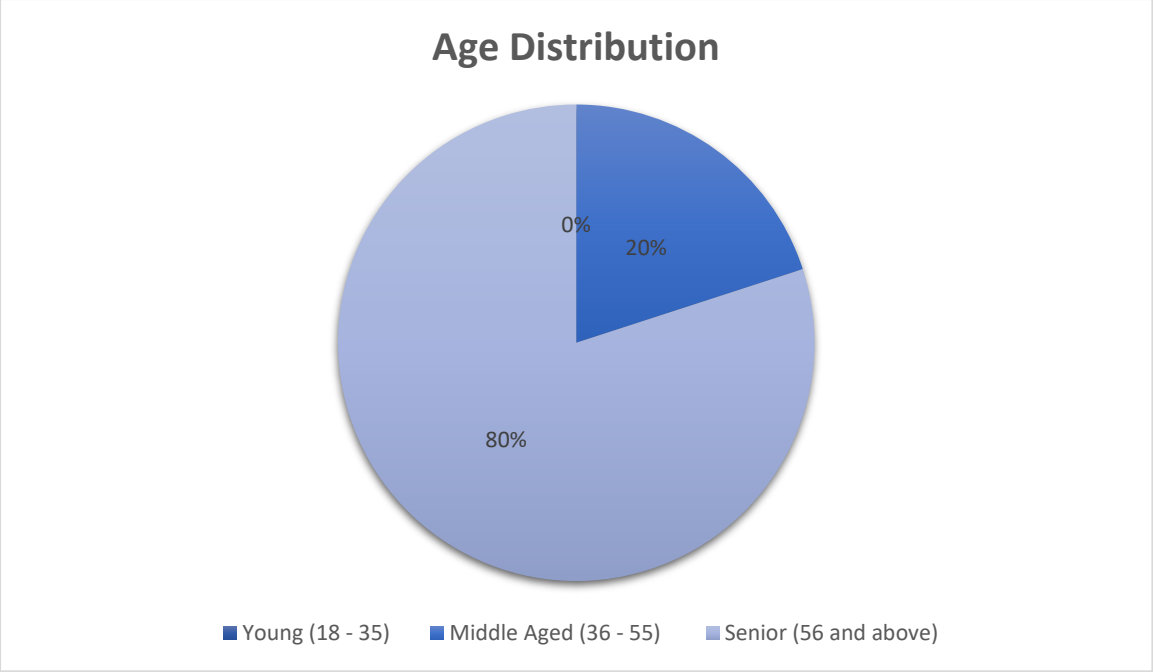

Figure 3

In continuation with the above, given the fact that interviewing young farmers was quite a challenge, the farmer's years of experience in grape farming corresponded to the age distribution of the farmers mentioned above. Data from experienced and veteran farmers overshadowed the lack of data from novice farmers. They provided deep insights, long-term strategies and an overview of how risks have transformed and impacted the industry.

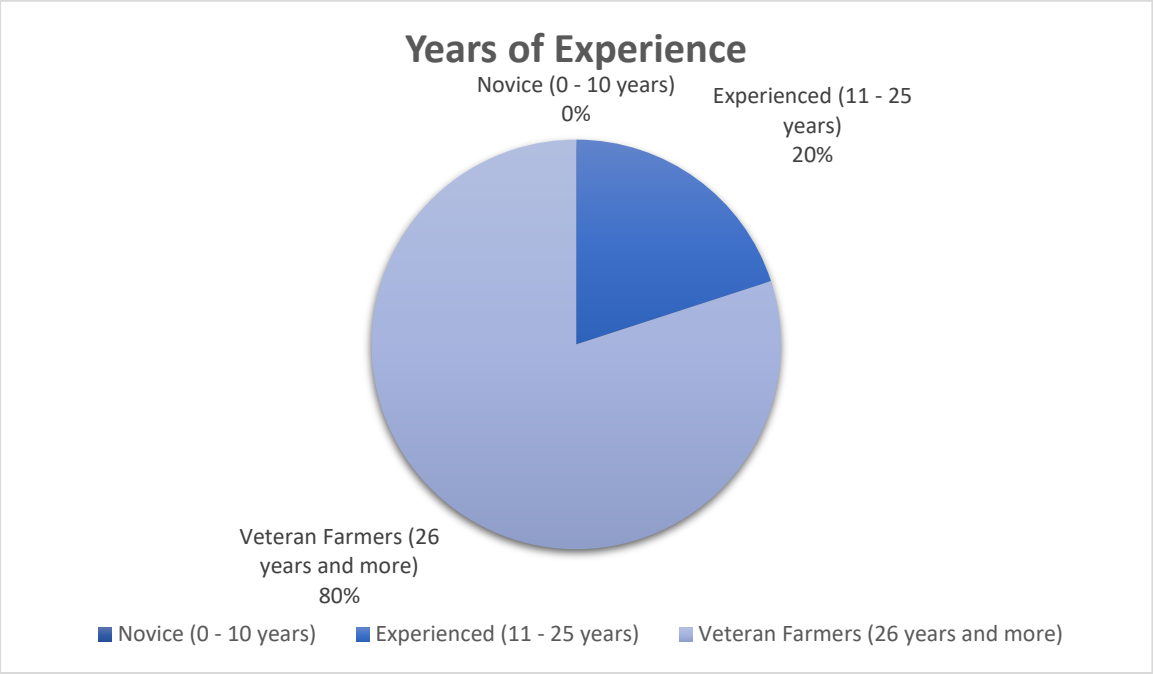

Figure 4

In conclusion, by segmenting the participants based on farm region, age and years of experience, the study benefits from analysing several risk perceptions and management strategies adopted by Maltese farmers. Through such a segmentation, the emergent themes outlined further below benefit from the ability to draw meaningful connections between the demographic characteristics and the approaches to identifying the geopolitical risks and the risk management strategies adopted.

4.3 Presentation of Findings: Questions, Codes and Emergent Themes.

The following table was created to systematically analyse the data obtained from the structured interviews and undergo a rigorous thematic analysis. This table outlines the key questions asked during the interviews, the corresponding codes applied to the responses, and the themes that emanated from the coded data. The table summarises the representation of the analytical process undergone when conducting a thematic analysis. It also showcases how raw data was transformed into meaningful insights.

Question	Codes	Themes
Can you list and explain what country-specific risks impact your operations?	Scarcity of natural resources.	Resources
Which risks have you seen become more prevalent over the years as a farmer?	Grapevine diseases	Climate Change
How do you determine and prioritise which risks to manage?	No Year is like the previous one	Adaptability
Do you have any risk management policies in place?	Impact on yield and profitability	Risk Management & Perceptions
Which geopolitical risks impact our country the most, and how do these impact grape farming?	Politics and Policies	Fertiliser and Pesticide Use

Table 2

4.3.1: Resources

When the participants were asked about the predominant country-specific risks that impact grape farming operations, a recurring theme was the significant challenges related to resources, namely, land and water. All participants voiced their frustrations with these issues, which impact their ability to sustain and grow their farming operations effectively.

4.3.1.1 Land Expropriation

One of the primary concerns is the scarcity of natural resources, particularly land and water. Regardless of their years of experience, farmers from all regions highlighted the issue of government expropriation of land for non-agricultural uses. One farmer who is set up in Burmarrad (Northern Region) explained how the government expropriated a piece of land in 2019 to create a man-made valley that diminished his total land area and destroyed his vine trees, which were planted over ten years ago. Although the farmer understood the necessity of the expropriation due to the geographical characteristics of the land, the frustration emanated from the abrupt and destructive manner in which it was carried out, stating, ***"I coincidentally passed by the field and saw three excavators and six lorries digging up the land".*** The farmer could not salvage equipment, such as poles and machinery. When he expressed his frustration, the authorities explained that the land had been expropriated in 2008, so prior warning was not mandatory. This incident highlights the authorities' lack of communication and consideration, which significantly impacted the farmer's operations in the end.

Another farmer who has his vine trees situated in Żebbuġ also voiced his frustration against a governmental expropriation of his land to widen a road in the Central Link project. Recognising the severe impact this would have on his operations, the farmer sought compensation from the government. The farmer requested the allocation of another piece of land where he could restart his grape farming activities. The loss of the field in Żebbuġ posed a significant threat to his business, potentially forcing him to cease operations. This situation again highlights the need for more considerate and supportive measures when carrying out road works. Adequate compensation and assistance in relocating operations can be critical in maintaining and preserving the grape farming community.

Continuing with the above, a senior farmer voiced his concerns over transferring land deeds from one person to another. The farmer emphasised how the Land's authority, which is the governmental agency responsible for agricultural land deed transfers, involves an extensive durational period to transfer portions of land, often spanning several years. These complexities and inefficiencies are also problematic due to another country-specific risk impacting grape operations: the lack of young farmers entering the profession. The complex and lengthy

process is a deterrent for those young farmers aspiring to enter the industry. Access to land is already a significant hurdle in Malta due to new demographic trends such as extreme housing and geographical constraints.

4.3.1.2 Water Resources

Many farmers also expressed their perceptions of the 'New Water' technology. This technology filters water, making it suitable for agricultural use, given that the water used for irrigation from boreholes contains a high element of salt, making it unsuitable. This innovative irrigation system has proven to be highly effective for farmers, especially grape farmers. However, other farmers were frustrated with the fact that this technology is only available in the Northern region, particularly Mġarr, Żebbiegħ and Manikata. The limited availability of this technology puts farmers outside of the localities mentioned above on the back foot. Many feel they operate at a disadvantage compared to farmers in those locations. One farmer argued that should this technology be made available to farmers in other localities, it would improve their operations and reduce the risk of irrigating vine trees with inappropriate water, which could lead to different risks materialising, such as grapevine diseases.

Addressing these issues, which emanated from asking farmers about country-specific risks, can better equip farmers to manage those risks which directly impact operations and enhance the resilience of their agricultural practices for future generations.

4.3.2: Climate Change

Over the years, climate change has been increasingly challenging agriculture operations on a global level, and Maltese grape farmers are no exception. Prolonged warm seasons, changes in rainfall patterns, high winds, and lack of rainfall have proven to threaten grapevine health, productivity, and yields. This theme will analyse the climate-related issues grape farmers encounter and the relation between climate change and grapevine diseases.

4.3.2.1 Lack of Rainfall

Upon asking farmers to describe the main risks that impact operations, almost all ten participants mentioned the lack of rainfall in some form or another. A particular farmer with over fifty years of experience under his belt explained how the amount of rainfall each year has been decreasing steadily over the years. He explained that rainfall was predictable and moderate during the seventies and eighties. Furthermore, this farmer also explained how the grapevine trees benefitted from adequate and moderate rain, mainly due to the cooling effect on the soil and the protection of the plants from heat stress. Humidity from rainfall also benefits the vine tree by maintaining a balanced humidity level, thus preventing diseases during the summer season, which typically results from prolonged drought conditions. One farmer who

was fortunate enough to plant vine trees in 1991 and 2019 noticed several observations. In contrast to 1991, 2019 saw a lack of consistent and insufficient rainfall, whereby the farmers noticed an increased mortality rate. The lack of rainfall adversely impacted the young vine trees' ability to establish themselves, leading to many losses. The increased mortality rate of the young vine trees underscores the critical importance of adequate water supply for vine tree establishment and growth.

4.3.2.2 Extreme Weather Conditions

In continuation with the above, interviews with farmers reveal that extreme weather conditions such as heavy rain and excessive winds contribute to the prevalence and severity of grapevine diseases. While all participants argued that lack of rainfall harms vine trees in terms of diseases and mortality rate, other farmers also argued that extreme rainfall can cause as much harm as no rainfall, if not more. One farmer operating in the western region shared that, in addition to the ongoing issue of insufficient rainfall, the infrequent rains that do occur are often torrential. These intense downpours result in fields flooding and cause runoff from roads and valleys to carry dirty water into the fields. He further explained how, due to the nature of vineyards, the poles and stainless-steel wire often act as a filter for the debris, destroying the trees themselves and the poles and wires on which the trees rest.

During March and April, when strong winds are common, the trees begin to flower. These strong winds often cause buds to fall off or break, leading to a drop in yield for that given year. One farmer, who has his vineyard on a hill, expressed how damaging excessive winds truly are. He added that on top of the broken buds and broken branches from March to May, excessive winds also damaged the poles and wire, leading to added costs due to these winds. Another farmer also explained how excessive winds blowing from the south contain high humidity and bring about warm temperatures. A rise in humidity accompanied by high temperature blowing winds leads to dried-up vine tree leaves. Several farmers also explained how wind carries diseases from one tree to another by spreading pathogens. For instance, excessive winds carry diseases such as bacteria or viruses from one tree to another.

To summarise, the impact of climate change, namely, the lack of rainfall and extreme weather conditions such as heavy rain and excessive wind, is quite significant. These conditions impact yields, mortality rates, and infrastructure costs, giving rise to several grapevine diseases. Farmers must adapt and develop risk management strategies to protect their vineyards and ensure sustainable viticulture practices in the face of climate change.

4.3.3: Adaptability in the Face of Geopolitical and Climate Risks

Adaptability is crucial for Maltese grape farmers as they navigate through the challenges encountered from geopolitical risks, climate change, and other country-specific challenges. During the interviews, one question asked farmers about prioritising risks during operations. This theme will explore how farmers navigate risks, priorities and strategies. Farmers sometimes adapt to risks rather than prioritise them and plan any mitigatory policies to reduce them.

4.3.3.1 Adaptability

After putting forward the question on prioritising risks, one farmer said, ***"No year is like the previous one***". He explained how the likelihood and magnitude of risks have increased significantly. Climate change has disrupted operations, which is evident through extreme weather conditions and lack of rainfall, making vineyard management more complex. This farmer explained how he stopped trying to forecast risks and forecast risk mitigation strategies during the year. Instead, he focused on changing operations to align and adapt to the ever-evolving risks. Farmers have stopped trying to manage certain risks traditionally; another veteran farmer explained that throughout his career, he has noted that he and other farmers have shifted from risk management to adaptability. Instead of focusing on controlling specific risks such as extreme weather, lack of rainfall and climate change, farmers are adopting a broader strategy of changing operations to adapt to new realities. Farmers have learnt to demonstrate flexibility and resilience whilst undergoing grape farming operations.

4.3.3.2: Seasonal Risks

To prioritise risks, other farmers take a seasonal approach and try to proactively manage the risks that different seasons and temperatures bring about. One farmer explained that he prioritises risks as the year progresses and as the seasonal operations of grape harvesting progress. From March to July, when the vines flower and the fruit begin to ripen, he shifts his focus to mitigating the risk of grapevine diseases. This process typically involves fertilising the vineyard with pesticides and fertilisers and continuously monitoring its fields for any signs of grapevine disease or mould on the grapes. During this period, the farmer irrigates the vines in a bid to keep the soil fresh and cool. Furthermore, he emphasised the criticality of this practice, especially if there has been little or close to no rainfall during the dormant season (December to February). During the harvest season, the primary risk that needs to be managed is securing sufficient labour to harvest the grapes.

4.3.4: Risk Management and Perceptions

Understanding how farmers manage and perceive risk is crucial in the context of Maltese grape farming. This theme explores the existence and nature of how farmers adopt and implement risk management policies through insights and analysis gathered from interviews. By asking farmers to share their risk management strategies, insights can be drawn into how farmers perceive risks, prioritise them, and the various methods employed to address and mitigate risks, both emanating from geopolitics and country-related risks.

After analysing the data from the interviews, it was noted that grape farmers exhibit a range of approaches to risk management that are also shaped and influenced by their perceptions of various risks.

4.3.4.1: Irrigation as a Key Risk Management Tool

As highlighted above, vine tree stress management has become crucial due to the lack of rainfall and changes in rainfall patterns caused by climate change, especially during the hot summer months. Irrigation has become an essential risk management tool for Maltese grape farmers to mitigate the impact of climate change, ensure vine tree health, and preserve yields during the summer.

After conducting the interviews, it was evident that Maltese farmers, particularly over the previous 15 years, started irrigating their vine trees during the summer period. One farmer explained how irrigation starts in June and typically ends two to three weeks before harvest. Farmers described the hot and humid summer months as stressful for the vine trees, especially if the year lacked rainfall. From the interviews conducted, it was evident that there are two predominant ways of irrigation: drip and trench irrigation.

Many farmers opt to use drip irrigation systems, which trickle water directly into the base of the vine, thus ensuring that the soil remains fresh and humid. Drip irrigation systems also ensure that water is delivered directly to the vine tree, ultimately reaching the tree's root. This method is favourable as it ensures efficiency since water is concentrated and helps maintain optimal soil conditions during summer. Farmers often have these drip irrigation systems set up on timers, thus making them efficient, easy to manage and easy to implement.

Other farmers use trench irrigation. In this case, a trench is ploughed between the rows of the vines and water is pumped into these trenches. It was noted that farmers who use this form of irrigation have large plots of vine trees and plain fields. In addition, trench irrigation allows for more extensive water distribution; however, farmers also mentioned that an ample water supply is required for this form of irrigation to work. One farmer explained how he irrigated his fields throughout the night, stating, ***"Irrigating the vineyard during the day is less effective***

since the ground is too hot, which causes the water to seep through instead of filling up the trench". Irrigation through the night allows the ground to remain fresh during and throughout the early hours of the morning. This way, the ground remains moist and fresh for a considerable amount of time.

One farmer, whose vineyard is situated in clay soil in the western region, explained that the soil dries out without consistent irrigation, which inevitably leads to grape desiccation. This is when the tree itself dries out the moisture from the grapes it produces, reducing the yield and adversely affecting the harvest's quality.

Irrigation has, therefore, become a cornerstone of risk management for Maltese farmers operating in the grape production industry. By implementing tailored irrigation practices, farmers can control and manage risks emanating from climate change and changes in rainfall patterns, thus ensuring the sustainability of operations while preventing yield losses and maintaining vine health.

4.3.4.2: Diversification of Grape Varieties as a Key Risk Management Tool

Throughout the interviews, it was noted that another significant key risk management tool is grape diversification, particularly for those farmers with large plots of land. Diversification helps farmers mitigate several geopolitical and country-specific risks related to climate change and grapevine diseases, among others.

It was noted that farmers diversify their grape varieties as part of risk management to reduce their exposure and vulnerability to the risks mentioned earlier. This is because different grape varieties react differently to various scenarios, such as lack of rainfall, scattered rainfall patterns, and other environmental-related changes. Diversification allows farmers to spread these risks across multiple varieties, thus ensuring that if a single variety of grape is affected by a specific risk and experiences a reduction in yield, other varieties may be less affected and, therefore, thrive.

Farmers highlighted that, ironically, native Maltese grape varieties, such as Gellewza and Girgentina, have become increasingly vulnerable to certain risks. Over the years, the industry has experienced a reduction in yield due to the vulnerability of these varieties to grapevine diseases emanating from climate change risks. In contrast, alien grape varieties such as Trebbiano demonstrate greater resilience and respond better to these risks. Farmers explained how this variety is less sensitive to climate change risks and is less vulnerable to grapevine diseases. Diversification in grape varieties also impacts yields and profitability. Different varieties are priced differently, which is why farmers plant different varieties to mitigate their exposure.

Diversification in grape varieties allows farmers to enhance the resilience of their vineyards, making it a vital risk management strategy for Maltese grape farmers. This strategy also highlights the importance of adaptability and innovation in an industry littered with uncertainty and risks that change year in and year out.

4.3.4.3 Risk Perceptions

When analysing the risk management strategies of Maltese grape farmers, risk perceptions vary significantly across the sample. Their perceptions of risk vary significantly based on their experience and approach to grape farming. As mentioned, different farmers showcased differing risk perceptions, highlighting a significant variance in mindsets across veteran and less experienced farmers.

It was noted that veteran farmers with several years of experience in the industry tend to have an adaptive approach to the ever-evolving risk landscape and risk management. Rather than trying to predict potential risks, veteran farmers emphasised flexibility and adaptability. Over the years, these farmers have witnessed how risks have evolved and how new risks have emerged. As a result, these farmers have shifted their focus to adaptability. Furthermore, veteran farmers perceive risks and thus risk management as requiring flexibility. Strategies and mindsets are adjusted as conditions change throughout the year. One farmer stated that the agricultural industry, specifically the grape farming industry, is a survival of the fittest; an adaptive and flexible mindset is required to respond to risks effectively and efficiently.

In contrast, those farmers with less experience tend to adopt a proactive approach, aiming at innovating and leveraging modern technological innovations. Compared to veteran farmers who prioritise adaptability and flexibility, other less experienced farmers perceive risks as something which can be managed or minimised. One farmer invested in purchasing a tractor specialised for grape farming, which uses cutting-edge technology and makes fertilising and land management more accessible and faster. He explained how this tractor allows him to respond to risks with incredible speed and effectiveness, given that it is tailored to be used in vineyards.

In conclusion, the differing risk perceptions between veteran and less experienced farmers underscore the contrasting risk management approaches in Maltese grape farming. While veteran farmers view risks as demanding adaptability and flexibility, less experienced farmers tend to focus on proactive strategies. However, despite these varying risk perceptions, all farmers share a common goal: achieving farming success and promoting sustainable farming practices.

4.3.5: Fertiliser, Pesticide and Sulphur: Navigating Politics and Policies.

After conducting the interviews and reviewing the responses, it was found that fertiliser and pesticides are the predominant forms of risk management in combatting the pervasive threat of grapevine disease. However, farmers face significant challenges and threats in acquiring these products due to the complexities of geopolitical risks and local politics.

4.3.5.1 The Predominant Risk: Grape Vine Disease

During the course of the interviews, farmers, irrespective of region, age or years of experience, identified grapevine disease as the predominant risk they face. This risk predominantly emanates from other material risks, such as climate change. Farmers explained how changes in rainfall patterns, extreme weather and lack of rainfall have contributed to a heightened increase in grapevine diseases. Some farmers also explained how grapevine diseases lead to a drop in yield for that given year and a heightened increase in the vine's mortality rate. In some cases, grapevine disease can also lead to lower-quality production. Infected vine trees produce fewer grapes of lower quality, affecting the taste, colour and overall market value. Given Malta's heightened climatic risks and the vulnerability to grapevine diseases, farmers turn to pesticides, sulphur and fertilisers to manage this risk.

4.3.5.2: The Role of Sulphur in Grapevine Disease Prevention

Farmers noted the role of sulphur as a critical tool in mitigating grapevine diseases. Sulphur was described as a key component in preventing grapevine disease. Farmers explained how this substance creates a protective barrier on the vine's surface, providing farmers with a proactive approach to vineyard management.

Farmers spread sulphur during the early stages of the vine's growth cycle in March and early April. The timing of spreading sulphur is crucial since, during March and April, the buds start to break open, with one farmer stating***, "If you don't apply sulphur during March and early April, you might as well start stocking up on fertilisers and pesticides for the remainder of the season"***. At this stage, the tree is vulnerable to several infections, which can yield diseases as the year progresses and the fruit begins to develop. In addition, sulphur must be applied during the early hours of the day, ideally on a day with scattered clouds or overcast. One farmer explained how crucial the timing of applying sulphur is by sharing an experience. One year, this farmer applied sulphur during the afternoon, and within a few days, he noticed that the buds and leaves began to dry out. Reflecting on the case, the farmer admitted, ***"That year, I experienced a significant drop in yield when compared to the industry, and it was entirely my fault; I damaged the crop by applying sulphur late during the day".***

Further on during the year, the farmer noticed a significant drop in yield because the buds struggled to flower in March and April.

Another farmer mentioned spreading sulphur multiple times during March and the first few days of April. The motive behind multiple spreads is to ensure ongoing protection and to ensure that the vineyard is well protected from diseases and infections during the early stages. Not all vine trees flower at the same time within the same field, which is why ongoing sulphur spreading ensures that the fields are well protected against diseases and infections.

In summary, sulphur plays a pivotal role in managing risks emanating from climate change. It provides farmers with a proactive strategy to mitigate and reduce the risk of grapevine diseases. The cost-effectiveness of sulphur compared to other fertilisers makes it a critical component of grape farming.

4.3.5.3: The Intricacies of Politics and Policies in Fertiliser and Pesticide Use

As mentioned throughout, grapevine disease is Maltese grape farmers' predominant risk. Fertiliser and pesticide use is the only form of risk management available to farmers to mitigate or reduce this risk. However, farmers need help accessing these tools due to the complexities of politics and policies. Farmers noted and expressed their frustrations with the availability of specific and compelling fertilisers and pesticides emanating from regulatory changes.

One of the primary challenges farmers face is the need for more market availability of fertilisers and pesticides. One farmer explained the difficulties and challenges brought about last year due to severe rainfall in June of 2022, which triggered widespread grapevine diseases. In a bid to reduce the effect and recover the grapes, this farmer opted to use a specific fertiliser, which proved to be highly effective as the farmer managed to recover a good portion of the grapes when compared with other farmers who lost a substantial amount. However, despite its success, the fertiliser was discontinued in Malta. The farmer expressed anger and frustration because the discontinuation was due to an abrupt regulation change. The farmer also voiced his frustration over the fact that the same product was still available for purchase in Sicily. However, due to specific import regulations, local farmers are prohibited from bringing in their fertilisers. He questioned***, "Why is it still available in Sicily but not here? Aren't we part of the same European Union?"***

Other farmers also expressed frustration and anger over discontinuing certain fertilisers and pesticides deemed highly effective in mitigating and reducing the risk of grapevine disease. This sudden unavailability and discontinuation of products highlighted farmers' ongoing struggle to purchase reliable fertilisers, further complicating their efforts to mitigate risks, remain resilient and maintain sustainable operations.

Fertilisers and pesticide use are core pillars in grape farming risk management in Malta for all farmers, irrespective of geographic location and years of experience. However, the complexities of politics and regulatory policies are increasingly compromising the effectiveness of these tools and risk management. Inconsistent market availability, cross-border discrepancies, and import restrictions hamper farmers' ability to adopt risk management strategies. Farmers' frustrations underscore the need for consistent and new policies designed to help farming operations and support sustainability and success in the industry.

4.4: Discussion of findings

4.4.1 Introduction

This section will contextualise the findings derived through the key themes emanating from a thematic analysis through the lens of Maltese farmers being subject to geopolitical and country-specific risks.

The global agricultural industry is increasingly vulnerable to geopolitical and economic risks, instigating adverse ripple effects in countries such as Malta that rely heavily on imports, exports and international trade. As identified by Maltese farmers during the interviews, geopolitical risks and country-specific risks lead to several profound impacts on grape farming operations, such as the availability of land, water supply, fertiliser and pesticides. In addition, Maltese grape farmers face several vulnerabilities in managing these risks.

The discussion will also compare the tools and strategies available to Maltese farmers for managing these risks to those of other farmers in other regions, as identified in the Literature Review. Grape farmers operating in other agriculturally advanced regions, such as Italy and North America, have greater tools and resources to manage these risks. By doing so, this section will highlight the limitations of Maltese grape farmers in navigating an ever-increasing geopolitical landscape and the country-specific risks triggered by the geopolitical landscape.

4.4.2: Findings on Geopolitical and Country-specific Risks

After analysing the data and segregating it into codes and themes, it became apparent that farmers prioritise grapevine disease as their primary risk. This risk is primarily managed by applying fertilisers and pesticides, which make these products crucial for Maltese farmers. The frustrations amplified by farmers during the interviews about the availability of these pesticides and fertilisers are also a product of supply chain risks materialising. Disruptions in supply chains caused by geopolitical activities such as the war between Russia and Ukraine and sanctions and trade embargoes have led to several disruptions in supply chains.

Given Malta's heavy reliance on imported agricultural products and tools such as fertilisers, any political turmoil affecting exporting countries will inevitably impact Maltese grape farmers. As highlighted above, the war between Russia and Ukraine triggered high volatility in the demand and supply of fertilisers and pesticides as both countries are major fertiliser and pesticide producers. These geopolitical conflicts and the sanctioning of Russian companies by the EU create ripple effects which reach and impact Maltese grape farmers. Disruptions in the fertiliser supply chains affect product availability, pricing, and availability time. As highlighted, farmers must be adaptable and proactive regarding risks such as grapevine disease. If Malta experiences rainfall during the summer, farmers need to apply pesticides and fertiliser to reduce the risk of grapevine diseases. The delay in availability or unavailability can lead to the risk of materialising and, thus, a reduction in crop yields and overall productivity for that year, ultimately threatening the viability of Maltese grape farming.

While understanding the clear relationship between geopolitical risks and country-specific risks, it was found that grape farming operations are adversely impacted due to country-specific risks materialising. Throughout the interview, Maltese grape farmers identified several risks tied to Malta's unique geographical and demographical characteristics and other risks emanating from climate change. The predominant country-specific risk Maltese farmers face is the scarcity of availability of land and water resources. Over the years, Malta has experienced significant population growth, dramatically reducing the availability of arable land due to a boom in the housing market. Large plots of land were purchased and developed, diminishing the space available for agriculture. As the population continued to rise, so did the demand for housing, driving up land prices and making it increasingly difficult for farmers to afford land. Furthermore, expanding infrastructure to accommodate this growing population led to additional loss of farmland through government expropriation. As a result, farmers' access to land has become increasingly challenging in two keyways: land is now prohibitively expensive, and the overall supply of arable land continues to shrink.

This observation closely aligns with the findings discussed in Chapter 3, where Cane Vella, a local farmer, brought forward his concerns regarding the difficulty in accessing arable land. Mr Vella also highlighted that financing land purchases as a farmer is already a significant challenge and calls out the EU and local policymakers to intervene in the matter. His concerns mirror the broader issues identified in this discussion, where land scarcity and high land access costs are significant obstacles for local grape farmers. The lack of accessible land threatens the sustainability of their operations and hinders their ability to expand or adapt to evolving agricultural challenges. This underscores the importance of implementing more supportive policies, as discussed, to ease access to land and provide financial assistance, thereby strengthening the resilience of local farmers.

Despite these apparent risks, it is noteworthy that none of the farmers interviewed mentioned or highlighted the funds available at their disposal offered by the EU. The Common Agriculture Policy, as discussed in Chapter 3, highlighted its significant role in providing farmers with funds and subsidies intended to support agricultural activities such as technological investments. It was found that farmers operating in other countries view these funds as forms of risk management. However, the interviews conducted outlined a contrasting perception. Farmers do not perceive these funds as risk management, highlighting a disconnect between the CAP's intended purpose and Maltese farmers' perceptions.

The fact that Maltese farmers did not perceive EU funds as a form of risk management suggests a disconnect between the available resources and their utilisation of such tools. This may be due to a need for more awareness, lengthy application processes, or the perception that these funds are insufficient to address the immediate risks posed by geopolitical factors due to the time taken for such funds to be provided. Farmers may also prioritise more immediate, tangible forms of risk management, such as securing an adequate supply of fertiliser or pesticide for an entire year. In addition, this disconnect suggests a potential gap in risk management strategies where Maltese farmers are trying to be proactive rather than reactive. They are overlooking the valuable tools available to them which can help them manage and mitigate some of the risks they face.

The ageing farmer population in Malta also represents a risk for the industry. According to the literature, in 2020, 32% of all farmers in Malta were aged 65 and older. This statistic was also reflected in the age group of the farmers in the sample. The interviews conducted in addition to the farmers referred to through the sampling method were predominantly senior farmers, with the average age of the sample being 65.3 years of age. This demographic factor further fuels concerns regarding the future of the farming industry in Malta. In addition, the number of young farmers pursuing agriculture could be a detriment to the industry. In continuation with the above, this demographic trend should also prompt policymakers to engage in initiatives to encourage younger generations to enter the industry.

4.4.3: Climate Change, Adaptability, Risk Management, and Risk Perceptions

Climate change poses significant challenges for agriculture globally, and Malta is no exception. Over the years, farmers have seen increasingly difficult challenges and risks from climate change, such as changing rainfall patterns, rising temperatures, and extreme weather

conditions. These threaten crop yields, vine tree mortality, and the long-term viability of farming operations.

Upon discussing the data, it is crucial to highlight the significant difference in the availability of resilience systems and risk transfer mechanisms available to farmers in other regions, such as Italy and Croatia, as identified in Chapter 3. In these regions, farmers have access to crop insurance and mutual funds, where farmers collectively pool premiums in a fund, which can then be distributed to cover losses such losses emanating from adverse weather conditions. These mechanisms allow farmers to transfer a portion of the risk and foster a sense of resilience. In contrast, Maltese farmers lack access to these policies and funds, which increases their vulnerability to financial shocks when losses occur. Currently, Maltese farmers must bear the full extent of losses, which can adversely impact the resilience of their operations. This difference in risk management and risk transfer mechanism availability outlines a critical gap in risk management strategies available to Maltese grape farmers.

However, despite these risks, Maltese grape farmers have demonstrated adaptability and resilience. Some farmers have started implementing new techniques to mitigate the effects of climate change, such as diversifying grape varieties and adopting grape varieties that are less vulnerable to risks emanating from climate change, such as prolonged warm temperatures. Farmers have also improved water management practices in a bid to reduce the risk of grapevine mortality and maintain yields during years when the country experiences a severe lack of rainfall. However, the capacity for adaptation is often limited by the small scale of Maltese farms and the high costs associated with technological advancements in agriculture.

Risk management has become crucial for Maltese grape farmers concerning climate change. Nonetheless, there are several challenges to risk management in Malta. Many farmers lack access to innovative technological equipment that could improve their ability to predict, mitigate, and manage risks emanating from climate change. For example, while larger agricultural economies often benefit from crop insurance schemes, precision agriculture, and advanced irrigation systems, Maltese farmers lack the money, economies of scale and access to such resources.

The themes of adaptability, risk management, and risk perceptions are deeply interconnected when discussing climate change. How farmers perceive climate risks directly affects their willingness to adapt and invest in long-term risk management practices. Farmers with a high level of climate awareness are more likely to implement changes that can improve their resilience, such as adopting new technologies or diversifying their crops. In contrast, risk management depends on both perception and adaptability. A farmer who recognises the risks posed by climate change and is willing to adapt will likely explore various risk management

strategies, whether through changing farming practices, investing in new tools, or accessing external support like EU funds.

4.5 Conclusion Factors in the Analysis and Discussion.

This chapter showed that Maltese grape farmers operate within a unique agriculture landscape plagued and influenced by geopolitical and country-specific risks. Malta faces land and resource scarcity coupled with its heavy reliance on imported agriculture inputs such as fertiliser and pesticides. In addition, climate change has wholly disrupted and impacted grape farming operations, necessitating continuous adaptation by Maltese grape farmers.

The discussions highlighted a strong connection between adaptability and farmers' risk perceptions. Farmers who recognise the increasing threats posed by climate change and geopolitical instability are more likely to adopt innovative farming techniques and consider risk management strategies, even if they remain constrained by limited access to advanced technologies and funding. Meanwhile, the underutilisation of EU funds reflects a disconnect between available resources and practical engagement with long-term sustainability measures.

Chapter 5: Recommendations and Conclusion

This research aimed to examine the geopolitical and country-specific risks affecting grape farming operations and identify the strategies and tools that farmers use to manage these risks and minimise their impact on their operations. The literature review provided a comprehensive overview of the existing literature on geopolitical and country-specific risks, grape farming in Malta, the Common Agriculture Policy, and different risk perceptions of different farmers operating across several countries. It was also noted that literature regarding grape farming in Malta was limited.

Furthermore, this study has explored the interconnected relationship between geopolitical and country-specific risks while also analysing how and what strategies Maltese grape farmers adopt to manage these risks. In addition, this study has looked at how geopolitical risks, such as political instability and supply chain risks, ripple down to local farmers. It was also found that farmers face several unique country-specific risks, such as geographical constraints and the need for natural resources such as clean water for irrigation. It also became apparent the extent of climate change's impact on operations and will most likely continue to have as farmers endlessly try to adapt year in and year out. The research has demonstrated that while geopolitical risks play an increasingly influential role in Maltese agriculture, many of the vulnerabilities experienced by farmers are deeply rooted in Malta's small size, limited resources, and specific socioeconomic and environmental circumstances.

Several complex and multifaced challenges emerged through a combination of qualitative interviews and a thematic analysis of the data gathered. These themes highlighted the complex and interrelated factors influencing farming decisions and ultimately shaping farmer's risk perceptions. Farmers must adapt and accustom operations with limited access to land, rising costs of inputs, and changing weather patterns, all of which have been exacerbated by geopolitical risks and local challenges. These disruptions have placed further pressure on farmers, who are already dealing with country-specific challenges like land scarcity, limited water resources, and the high cost of fertilisers and pesticides.

In addition, farmers demonstrated a strong sense of adaptability through resilience in responding to the adverse effects of climate change and shifting economic conditions. Nonetheless, this adaptability is often limited by constraints on the local grape farming industry, where access to advanced farming technologies, financial resources, and educational support still needs to be improved. Climate change, in particular, has emerged as a critical concern, with unpredictable weather patterns, increased droughts, and water shortages posing significant threats to crop yields. The farmers' capacity to adapt to these

changes has been essential to their survival, but their long-term resilience still needs greater access to resources.

In summary, the future of Maltese grape farming and, ultimately, farming as an industry in Malta depends on addressing the ever-increasing risks and fostering long-term operational resilience through the understanding of the geopolitical and country-specific risks. This thesis contributes to this understanding by highlighting the unique challenges faced by Maltese farmers, providing a foundation for further research to support the future of grape farming in Malta.

In light of these findings, making actionable yet reasonable recommendations to benefit farmers and policymakers in addressing the risks to grape farming operations is critical. The following suggestions are based on insights and reflect what the sample of farmers interviewed brought forward during the interviews.

5.1: Recommendations

One of the most pressing issues identified through the interviews was the need for more education and training courses for farmers to mitigate risks. During the interviews, one question was about education and training and whether they had received any training. None of the farmers interviewed experienced any form of training or education, hence why the Maltese government, in collaboration with local wineries and VitiMalta, should develop and provide training and educational courses on risk management in grape farming. These courses should be designed to cover various topics such as fertiliser use, sulphur use and water management. By improving farmers' understanding of the risks they face and training them with the tools to manage risks, they will be in a better position to respond to challenges during operations.

Other farmers feel that access to land is a critical and concerning issue that can adversely impact operations. The current process of transferring land ownership, even from a father to a son, is complicated and timely. In turn, this adversely affects the potential expansion of operations. Policymakers should streamline the process by ensuring a smooth and straightforward method for farmers looking to transfer land to other farmers looking to expand operations.

Continuing with the above, land expropriation due to governmental infrastructure projects has become a crucial risk for Maltese grape farmers, especially those full-time farmers whose earnings emanate solely from their farmland. Although understanding that expropriation of arable land is necessary given the rise in population, farmers must be compensated for their losses of vineyards. Policymakers should, therefore, ensure that expropriated land is

adequately compensated for. In cases where the fields are state-owned, the government should provide alternative plots of arable land suitable for farming. In turn, this mechanism allows for the continuation of operations and will enable farmers to reduce expropriation's economic and social impact.

As discussed in the previous chapter, farmers don't seem to acknowledge the availability of EU funds and subsidies as risk management. The EU provides an essential lifeline for grape farmers by providing funds as financial support to encourage machinery purchase and the implementation of sustainable farming. On a local level, the government should assist farmers in applying for these funds and subsidies. Given that noteworthy sums of money are involved, it is understandable that the process is long and the application would require different levels of information. Farmers should be assisted, and dedicated support teams should be created to help with the application process. They should also be able to provide farmers with real-time updates on the status of their applications.

Another concern outlined in the previous chapter is farmers' frustration when a fertiliser or pesticide proven helpful in mitigating and reducing the risk of grapevine disease becomes unavailable for purchase on the local market. With proper communication and guidance, farmers can navigate these changes independently, often with little understanding of the reasons for discontinuation or available alternatives. Policymakers following local agriculture regulatory bodies should create and maintain an efficient and transparent system for communicating valid reasons for discontinuing fertilisers and pesticides. In addition, these bodies should also recommend and suggest alternatives equally effective in mitigating the risk of grapevine disease.

The recommendations outlined above are designed to address the critical gaps as outlined throughout this study. By providing training and educatory courses on risk management, improving and providing alternatives to fertilisers and pesticides, ensuring fair compensation and allocation of arable lands in the case of governmental expropriation and simplifying access to EU funds, Maltese farmers can be more resilient and, in a better position to manage the risks brought about geopolitical risks and country-specific risks.

5.2: Suggestions for Further Research

This study provided insights into the geopolitical and country-specific risks and risk management strategies adopted by Maltese grape farmers through a qualitative approach. Research is needed to deepen the understanding of the issues identified. Hence, further research could benefit from a quantitative study to expand on the findings from this study. A quantitative study would also benefit the research, given the need for more literature and data

available on geopolitical risks and risk management in Maltese grape farming. In contrast to a qualitative study, quantitative research can provide policymakers with numerical and statistical evidence on the pressing issues identified in this study. In conclusion, a future quantitative study can enrich the understanding of what risks impact Maltese grape farming operations and how risk management strategies are adopted, providing robust data that can inform policy and practice.

References

Abedin, B., Maloney, B. & Watson, J., 2021. Benefits and Challenges Associated with Using Online Communities by Social Enterprises: A Thematic Analysis of Qualitative Interviews. *Journal of Social Entrepreneurship,* 12(2), pp. 197-218.

Acharya, A. S., Prakash, A., Saxena, P. & Nigam, A., 2013. Sampling: Why and How of it?. *Indian Journal of Medical Specialities ,* 4(2), pp. 330-333.

Adnan, K. M. M. et al., 2023. Catastrophic risk perceptions and the analysis of risk attitudes of Maize farming in Bangladesh. *Journal of Agriculture and Food Research ,* Volume 11.

Agricultural Services Gov Malta, n.d. The Maltese Code of Good Agricultural Practice. *Nitrates Action Programme Regulations,* 1(1), pp. 3-9.

Agriculture Services Malta, 2016. *Rural Development Programme for Malta, 2014-2020,* s.l.: s.n.

Agrikoltura Gvern ta Malta , n.d. *Viticulture and Oenology.* [Online]
Available at:
https://agricultureservices.gov.mt/en/agricultural_directorate/Pages/viticultureAndOenology.aspx
[Accessed 18 February 2024].

Alekberova, M. & Engindeniz, F. A. &. S., 2023. Risks in Grape Producing and Alternative Risk Management for Viticulturists: A study case from Azerbajian. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development,* 23(4), pp. 45-56.

Amaira, R., 2023. *Jiftaħ l-istaġun tal-qtugħ tal-għeneb għall-produzzjoni tal-inbid.* [Online]
Available at: https://tvmnews.mt/news/jiftah-l-istagun-tal-qtugh-tal-gheneb-ghall-produzzjoni-tal-inbid/
[Accessed 18 January 2024].

Antón, J., Kimura, S., Lankoski, J. & Cattaneo, A., 2012. A Comparative Study of Risk Management in Agriculture under Climate Change. *OECD Food, Agriculture and Fisheries Papers,* Volume 58.

Anwar, M. R., Liu, D. L., Macadam, I. & Kelly, G., 2013. Adapting agriculture to climate change: a review. *Theoretical and applied climatology,* Volume 113, pp. 225-245.

Armat, M. R. et al., 2018 . Inductive and Deductive: Ambiguous Labels in Qualitative Content Analysis. *The Qualitative Approach ,* 23(1), pp. 219-221.

Battaglini, A., Barbeau, G., Bindi, M. & Badeck, F.-W., 2009 . European winegrowers' perceptions of climate change impact and options for adaptation. *Reg Environ Change,* 9(2), pp. 61-73.

Bogucki, P., 1996. The Spread of Early Farming in Europe. *American Scientist,* 84(3), pp. 242-253.

Braun, V. & Clarke, V., 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology,* Volume 3, pp. 77-101.

Cafiero, C., Capitanio, F., Cioffi, A. & Coppola, A., 2007. La gestione del rischio nelle imprese agricole tra strumenti privati e intervento pubblico. *agriregioni europa,* 3(8), pp. 6-9.

Campbell, S. et al., 2020. Purposive sampling: complex or simple? Research case examples. *Journal of Research in Nursing,* 25(8), pp. 651-661.

Castleberry, A. & Nolen, A., 2018. Thematic analysis of qualitative research data: Is it as easy as it sounds?. *Currents in Pharmacy Teaching and Learning,* pp. 807-815.

Cots-Folch, R., Martínez-Casasnovas, J. & Ramos, M., 2006. Land terracing for new vineyard plantations in the north-eastern Spanish Mediterranean region: Landscape effects of the EU Council Regulation policy for vineyards' restructuring. *Agriculture, Ecosystems & Environment,* 115(1-4), pp. 88-96.

D'Agostino, D. et al., 2020. Multi-stakeholder analysis to improve agricultural water management policy and practice in Malta. *Agricultural Water Management,* 229(28).

Duinen, R. v., Filatova, T., Geurts, P. & Veen, A. v. d., 2015. Empirical Analysis of Farmers' Drought Risk Perception: Objective Factors, Personal Circumstances, and Social Influence. *Society for Risk Analysis,* 35(4), pp. 741-755.

Duong, T. T., Brewer, T., Luck, J. & Zander, K., 2019. A global review of farmers' perceptions of agricultural risks and risk management strategies. *Agriculture,* 9(1), pp. 10-15.

Eitzinger, A., Binder, C. R. & Meyer, M. A., 2018. Risk perception and decision-making: do farmers consider risks from climate change?. *Climatic Change,* Volume 151, pp. 507-524.

EY Malta , 2022. *The road to COP27 Series (3/4).* [Online]
Available at: https://www.ey.com/en_mt/articles/the-road-to-cop27-series-pt3
[Accessed 5 January 2023].

Falzon, J., 2013. Sustainable management of the main two Maltese indigenous grape varieties for winemaking. *JMU Scholarly Commons,* Volume 200.

Friends of the Earth Europe , 2022. *Story from the ground: farming in Malta.* [Online]
Available at: https://friendsoftheearth.eu/news/story-from-the-ground-farming-in-malta/
[Accessed 18 January 2024].

Fu, K. L. &. Q., 2024. Does Geopolitical Risk Affect Agricultural Exports? Chinese Evidence from the Perspective of Agricultural Land. *Land,* 13(3), p. 371.

Galdies, C., Said, A., Camilleri, L. & Caruana, M., 2016. Climate change trends in Malta and related beliefs, concerns and attitudes toward adaptation among Gozitan farmers. *European Journal of Agronomy,* Volume 74, pp. 18-28.

Ghiuleanu, I. V., Tudor, C. S. B. V. C. & Smedscu, R. P. &. C. A., 2023. Risk Analyses and Challanges in Crop Management in Romania. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development,* 23(4), pp. 353-364.

Glaser, B. G., 2014. Applying Grounded Theory. *The Grounded Theory Review,* 13(1), pp. 45-51.

Government of Malta, 2018. *National Agricultural Policy for Maltese Islands 2018-2028,* Valletta: The Government of Malta.

Hayfield, G. T. a. N., 2020. Chapter 38: Reflexive thematic analysis. In: M. R. W. a. S. Delamont, ed. *Handbook of Qualitative Research in Education.* s.l.:s.n., pp. 430-441.

Jamleck, O., Ruben, R. & Girvetz, E., 2021. Farmer Perceptions of Agricultural Risks; Which Risk Attributes Matter Most for Men and Women. *Sustainabile Agriculture,* 13(23).

Legizlazzjoni Malta , 2007. *D.O.K. Wines Production Protocols Regulations, 2007.* [Online]
Available at: https://legislation.mt/eli/ln/2007/416/eng
[Accessed 18 March 2024].

Malta Business Berau, 2014. Recommendations - National Water Management. *Technical Report for EU Life+ Investing in Water Project.*

Malta Resource Authority , 2006. Malta water resources review. *FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS,* pp. 30-34.

Mate, A. -. C., Onofrei, M. & Cuza, A. I., 2022. Impact of Risk Management on Sustainable Farming Business. *Studies and Research ,* 7(12), pp. 143-163.

NSO Malta , 2023. Publications. *Census of Agriculture - 2020 Report,* pp. 60-72.

O.Flaten, et al., 2005. Comparing Risk Perceptions and Risk Management in Organic and Conventional Dairy Farming: Empirical Results From Norway. *Livestock Production Science ,* 95(2), pp. 11-25.

Overmars, K. P., Verburg, P. H. & Veldkamp, T. (., 2007 . Comparison of a deductive and an inductive approach to specify land suitability in a spatially explicit land use model. *Land Use Policy ,* 24(3), pp. 584-599.

Pace, Y., 2017. *Viticulturist: Ageing farmer population, longer droughts threatening viability of wine industry.* [Online]
Available at:
https://www.maltatoday.com.mt/environment/nature/80059/viticulturist_ageing_farmer_population_longer_droughts_threatening_viability_of_wine_industry
[Accessed 16 December 2023].

Pe'er, G. et al., 2019. A greener path for the EU Common Agricultural Policy. *AGRICULTURE,* 365(6452), pp. 449-451.

Poblete, C. D., Valero, J. S. C. & Garcia-Cortijo, M. C., 2024. Environmental assymetry between the pillars of the CAP: the case of Spain. *Environment, Development and Sustainability .*

Pomarici, E. & Sardone, R., 2020. EU wine policy in the framework of the CAP: post-2020 challenges. *Agricultural and Food Economics ,* 8(17).

P, P. & Cs., S., 2008 . Farmers' Risk Perception and Risk Management Practices in International Comparision. *Research in Agricultural & Applied Economics ,* pp. 265-276.

Rashidi, M. N., Begum, R. A., Mokhtar, M. & Pereira, J. J., 2014. The Conduct of Structured Interviews as Research Implementation Method. *Journal of Advanced Research Design ,* 1(1), pp. 28-34.

Ruml, A. & Qaim, M., 2020. Effects of marketing contracts and resource-providing contracts in the African small farm sector: Insights from oil palm production in Ghana. *World Development,* 136(1), pp. 105-110.

Russo, S., Caracciolo, F. & Salvioni, C., 2022. Economies. *Effects of Insurance Adoption and Risk Aversion on Agricultural Production and Technical Efficiency: A Panel Analysis for Italian Grape Growers,* 10(20), pp. 3-5.

Ryzin, G. G. V., 1995. Cluster Analysis as a Basis for Purposive Sampling of Projects in Case Study Evaluations. *American Journal of Evaluation,* 16(2).

Salvoa, M. D., Capitello, R., Gaudenzi, B. & Begalli, D., 2019. Risk management strategies and residual risk perception in the wine industry: A spatial analysis in Northeast Italy. *Land Use Policy,* 83(1), pp. 47-62.

Samanta, R. P., 2021. Inductive Approach: Its Pros & Cons. *Scholars International Journal of Linguistics and Literature ,* 4(11), pp. 351-353.

Schaffnit-Chatterjee, C., Schneider, S. & Peter, M., 2010 . Risk management in agriculture. *Deutsche Bank Research ,* pp. 3-29.

Sgroi, F. & Sciancalepore, V. D., 2022. Climate change and risk management policies in viticulture. *Journal of Agriculture and Food Research ,* Volume 10, pp. 2-6.

Sjöberg, L., Moen, B.-E. & Rundmo, T., 2004. Explaining risk perception.. *An evaluation of the psychometric paradigm in risk perception research,* 10(2), pp. 612-665.

Soybilgen, B., Kaya, H. & Dedeoglu, D., 2019. Evaluating the effect of geopolitical risks on the growth rates of emerging countries. *Economics Bulletin,* 39(1), pp. 717-725.

Tanniru, R. A. a. M. R., 1990. Knowledge Acquisition Using Structured Interviewing: An Empirical Investigation. *Journal of Management Information Systems,* 7(1), pp. 123-140 .

Thomas, D. R., 2006. A General Inductive Approach for Analyzing Qualitative Evaluation Data. *American Journal of Evaluation ,* 27(2), pp. 145-288.

Times of Malta, 2021. *Local farming is in need of life support.* [Online]
Available at: https://timesofmalta.com/article/farming-in-need-of-life-support.862899
[Accessed 10 March 2024].

Tongeren, F. V., 2008. Agricultural Policy Design and Implementation. *OECD Food, Agriculture and Fisheries Working Papers No. 7,* Issue 7.

Toteva, D., 2011. Impact of the Common Agricultural Policy on the development of viticulture in Bulgaria. *Uludağ Üniversitesi Ziraat Fakültesi Dergisi,* 25(2), pp. 109-120.

Trestini, S., Szathvary, S., Pomaric, E. & Boatto, V., 2018. Application of the Income Stabilisation Tool in Italy. *Assessing the risk profile of dairy farms,* 78(2), pp. 195-208.

Tucker, C. M., Eakin, H. & Castellanos, E. J., 2010. Perceptions of risk and adaptation: Coffee producers, market shocks, and extreme weather in Central America and Mexico. *Global Environmental Change,* 20(1), pp. 23-32.

Tzemi, D. & Breen, J., 2019. Climate change and the agricultural sector in Ireland: examining farmer awareness and willingness to adopt new advisory mitigation tools. *Climate Policy ,* 19(5), pp. 611-622.

Ullah, R., Shivakoti, G. P. & Ali, G., 2015. Factors effecting farmers' risk attitude and risk perceptions: The case of Khyber Pakhtunkhwa, Pakistan. *International Journal of Disaster Risk Reduction ,* 13(1), pp. 151-157.

Valerio, M. A. et al., 2016. Comparing two sampling methods to engage hard-to-reach communities in research priority setting. *Medical Research Methodology,* 16(146).

Vella, S. S., 2010. Sustainable agricultural management and landscaping through agroforestry and premaculture case study: Northern Malta. *Agriculture Commons,* pp. 34-50.

VitiMalta, 2011. *Our Work.* [Online]
Available at: https://www.vitimalta.org/ourwork.php
[Accessed 18 January 2024].

Xerri, F., Jeffrey, P. & Smith, H. M., 2016. Unpacking organizational capacity in the context of the Water Framework Directive. *International Journal of River Basin Management ,* 14(3), pp. 317-327.

Zanten, B. T. v. et al., 2013. European agricultural landscapes, common agricultural policy and ecosystem services: a review. *Agronomy for Sustainable Development,* Volume 34, pp. 309-325.

Appendices

Appendix 1: Interview Questions with Maltese Grape Farmers

Geopolitical and Country-specific Risks

1. Which geopolitical risks do you think impact your operations the most?
2. Can you mention some country-specific risks that have impacted operations over the years?
3. Have you seen a change in risks over the years, as a grape farmer?
4. As the season progresses, how do you prioritise risks

Risk Management

1. Do you have any risk management policies in place? If so, can you explain how you adopt them?
2. Do you encounter any challenges or obstacles upon implementing risk management strategies?
3. Can you share an experience where risk management prevented a loss?
4. Have you received any form of training or education relating to risk management?
5. Looking ahead, what risks do you think will become more prominent within the Maltese context?

Appendix 2: Consent Form

Participant's Consent Form

Geopolitical Risks and the Adaptation of Risk Management Strategies Adopted by Maltese Grape Farmers.

I, the undersigned, give my consent to take part in the study conducted by Neil Camilleri. This consent form specifies the terms of my participation in this research study.

1. I have been given written and/or verbal information about the purpose of the study; I have had the opportunity to ask questions and any questions that I had were answered fully and to my satisfaction.
2. I also understand that I am free to accept to participate, or to refuse or stop participation at any time without giving any reason and without any penalty. In the event that I choose to withdraw from the study, any data collected from me will be stored anonymously.
3. I understand that I have been invited to participate in interviews in which the researcher will put forward questions pertaining to geopolitical risks and risk management strategies adopted by Maltese grape farmers to explore and analyse the predominant geopolitical risks Maltese grape farmers face, risk perceptions and how they implement risk management strategies. I am aware that the interview will take approximately fifteen to thirty minutes. I understand that the interview is to be conducted in a place and at a time that is convenient for me.
4. I understand that my participation does not entail any known or anticipated risks.
5. I understand that there are no direct benefits to me from participating in this study.
6. I understand that, under the General Data Protection Regulation (GDPR) and national legislation, I have the right to access, rectify, and where applicable, ask for the data concerning me to be erased.
7. I understand that all data collected will be stored in an anonymised form on completion of the study and following publication of results/within four months of completion of the study.
8. I have been provided with a copy of the information letter and understand that I will also be given a copy of this consent form.

I have read and understood the above statements and agree to participate in this study.

Name of participant: _____

Signature: _____

Date: _____

Neil Camilleri
neil.camilleri.20@um.edu.mt

Dr Jonathan Spiteri
jonathan.v.spiteri@um.edu.mt
Room 216

I am aware that, if I give my consent, this interview will be audio-recorded and converted to text as it has been recorded (transcribed).

I am aware that, if I give my consent, extracts from my interview may be reproduced in these outputs, either in anonymous form or using a pseudonym (made up of a code name)

I am aware that my data will be pseudonymised, i.e., my identity will not be noted on transcripts or notes from my interview, but instead, a code will be assigned. The codes that link my data to my identity will be stored securely and separately from the data, in an encrypted file on the researcher's password-protected computer, and only the researcher will have access to this information. Any hard-copy materials will be placed in a locked cupboard. Any material that identifies me as a participant in this study will be stored securely for the duration of the study/

I am aware that my identity and personal information will not be revealed in any publications, reports or presentations arising from this research.

Appendix 3: Information Letter

17/04/2024

Information letter

Dear Sir/Madam,

My name is Neil Camilleri, and I am a student at the University of Malta, presently reading for a Master of Science in Insurance and Risk Management. I am presently conducting a research study for my thesis titled Geopolitical Risks and the Adaptation of Risk Management Strategies by Maltese Grape Farmers; this is being supervised by Dr Jonathan Spiteri. This letter is an invitation to participate in this study. Below you will find information about the study and about what your involvement would entail, should you decide to take part.

The aim of my study is to explore the predominant geopolitical risks Maltese grape farmers face, risk perceptions and how they implement risk management strategies. Your participation in this study would help contribute to a better understanding of Maltese geopolitical risks and their impact on the agriculture sector. Your participation will also contribute to a better understanding of risk management strategies adopted by grape farmers. Any data collected from this research will be used solely for purposes of this study.

Should you choose to participate, you will be asked to participate by answering and engaging in a discussion regarding geopolitical risks and risk management strategies adopted by Maltese grape farmers.

Data collected will be handled and treated anonymously, the data gathered will be analysed and summarised within the thesis.

Participation in this study is entirely voluntary; in other words, you are free to accept or refuse to participate, without needing to give a reason. You are also free to withdraw from the study at any time, without needing to provide any explanation and without any negative repercussions for you. Should you choose to withdraw, any data collected from your interview will be stored anonymously.

If you choose to participate, please note that there are no direct benefits to you. Your participation does not entail any known or anticipated risks.

Please note also that, as a participant, you have the right under the General Data Protection Regulation (GDPR) and national legislation to access, rectify and where applicable ask for the data concerning you to be erased. All data collected will be stored in an anonymised form on completion of the study within four months of completion of the study.

A copy of this information sheet is being provided for you to keep and for future reference.

Thank you for your time and consideration. Should you have any questions or concerns, please do not hesitate to contact me by e-mail at neil.camilleri.20@um.edu.mt; you can also contact my supervisor over the phone: 356 7984 3910 or via email: jonathan.v.spiteri@um.edu.mt

Sincerely,

Neil Camilleri
neil.camilleri.20@um.edu.mt

Dr Jonathan Spiteri
jonathan.v.spiteri@um.edu.mt
Room 216