



DProf thesis

**How can the Cypriot potato industry sustain itself within the current local, EU and global marketplace?**

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Product management and marketing:

***How can the Cypriot potato industry sustain itself  
within the current local, EU and global marketplace?***

A thesis submitted in partial fulfilment of the requirements  
of Middlesex University Business School for the degree of  
Doctor of Professional Studies.

M00435961

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June 2023

No portion of this work referred to in the thesis has been submitted in support of an application  
for another degree or qualification of this or any other university, or other institute of learning.

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## **Dedication**

I dedicate this completed work to my wife and to my 3 daughters Savvia, Sara and Diamanto who even at their very young ages, have inspired me to proceed and finish this work.

I would also like to dedicate my work to my late grandparents Kokos and Maria who are my guardian angels.



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## **Abstract**

My research investigates the strategic connections between product management and marketing to sustain the Cypriot potato industry within the current local EU and global marketplaces. Facing dynamic market forces, European regulatory changes and evolving consumer demands, this study aims to strengthen the industry's sustainability and competitiveness.

Using qualitative data gathered from interviews with market experts and growers of various scales, the research highlights the enduring marketing practices and strategic initiatives fundamental for enhancing the industry's sustainability.

My research is focused on sustaining the Cypriot potato industry encompassing a comprehensive review of literature, research methodology, project activity, findings, and recommendations. Key findings suggest that while 'Fresh Cypriot Potatoes' have traditionally been marketed similarly over the past fifty years, significant changes such as a dramatic decrease in growers' numbers and potato quantities necessitate a reevaluation of current strategies.

The research aims to address unexplored aspects and provide valuable insights, focusing on practical improvements in product management and marketing to counter challenges focused on three major findings: the European everchanging regulations, marketing insufficiency and rising customer expectations.

Through reframing the problem, my research did more than just alter the interpretation of the data; it also revolutionized the research approach itself. By improving perception and critical thinking to a higher level, my research identified gaps, overlaps, and potential areas for further exploration, and helped me set the stage for actionable recommendations that are both innovative and aligned with broader sustainability goals.

My findings reveal the industry's crucial challenges, including climate change, water scarcity, production costs, and inadequate agricultural practices, impacting sustainability and sales. My research offers strategies and insights into managing these issues and achieving sustainable growth, emphasizing proactive regulation measures, dynamic marketing and customer focused strategy.

My research not only contributes to the theoretical landscape by addressing gaps in current literature but also proposes actionable insights and strategic recommendations aimed at strengthening the industry's market position and sustainability via direct input to the industry via my professional position as general Director of the biggest exporting organisation for the last 20 years.

## Glossary of Abbreviations

AKIS	Agricultural Knowledge and Information System
CAP	Common Agricultural Practice
GNI	Gross National Income
FAO	Food and Agriculture Organization of the United Nations
FAS	Farm Advisory System
FTA	Free trade agreements
ICT	Information and communication technologies
LAK	Local Agricultural Knowledge



## Chapter 1: Introduction

The potato industry in Cyprus serves as a cornerstone of the nation's agricultural sector and economic landscape. As the most prominent agricultural export, potatoes play a crucial role in contributing to the country's GDP and export revenue. Nevertheless, this essential industry is confronted with a range of intricate challenges that pose threats to its enduring sustainability within the local, EU, and global markets. It is imperative for stakeholders to proactively address these challenges to safeguard the industry's sustained prosperity and competitiveness on a global scale.

This research undertakes a thorough examination of the strategic and operational factors influencing the long-term sustainability of the Cypriot potato industry. With the central research query of how the industry can maintain sustainability in the current local, EU, and global markets, the study delves into the fundamental issues affecting its resilience and competitiveness.

This chapter establishes the groundwork for this detailed investigation by providing crucial background information, contextual nuances, and a precise articulation of the research problem and objectives. Notably, the researcher's personal and professional involvement in the potato industry is delineated, creating a robust insider's perspective that enhances the credibility and depth of the study.

After conducting an extensive literature review outlined in Chapter 2, I have identified notable gaps in the academic comprehension of sustainability challenges within the Cypriot potato industry. While the global significance of potatoes and the agricultural sector's role in addressing food security have been extensively documented, there exists a lack of empirical research specifically addressing the complex issues encountered by the Cypriot potato industry in light of EU integration, evolving market dynamics, and pressing environmental concerns.

By contextualizing the research within this framework of limited prior knowledge, this chapter effectively positions the current study as a timely and essential contribution to the field. Throughout my expertise alongside a rigorous qualitative methodology, my research generates valuable insights and actionable strategies to reinforce the sustainability of the Cypriot potato sector.

With a focus on sustainability, innovation, and international competitiveness, my research aims to uncover key strategies and interventions that can drive growth and sustainability in the face of changing market conditions and consumer preferences.

## 1.1 Background

Potato is regarded as one of the most attractive crop plants throughout the world and is used extensively in agricultural production systems. The reason being its high yield potential along with great nutritional values (Koch et al., 2020, pp. 97–119). Several studies have revealed that potatoes are an important and rich source of carbohydrates, starch, protein, various vitamins and potassium (Burgos et al., 2009, pp. 503–508). It is widely used as a valuable staple food worldwide and is an important raw material for many global food companies (BeMiller and Whistler, 2009). Reported that about 14% of starch in the European Union comes from the potato industry. Its use is diverse as it is used for fresh consumption as well as in processed form, such as chips and for the extraction of starch (Koch et al., 2020, pp. 97–119; Naumann et al., 2020, pp. 121–137) as it is a great source of carbohydrates. Moreover, with ever-growing global food security problems, potato is considered crucial for fighting hunger and poverty because of its diverse distribution pattern (Hareau et al., 2014).

In the EU, the potato sector is a major industry adding significant value to the agriculture sector. It can be gauged from the fact that in 2019, the EU potato industry produced over 56.62 million tons of potatoes worth over 13 billion euros (Hajdu, 2020, pp. 93–104)

For Cyprus, an island in the eastern Mediterranean Sea, the importance of the potato industry is enormous as it is the most exported product in the agricultural sector along with citrus. It brings about 50% of the total revenue generated through Cyprus' agricultural exports. Cyprus is one of the major potato exporters to the EU and other European countries. The Cypriot potato has the indigenous characteristics of Cyprus just like citrus and grapes; they are long in size and are optimally grown in red fertile soil (Katircioglu, 2006, pp. 35–39). Despite the immense importance of potatoes for the island, the production potential is still far behind expectations. The main reasons for the hurdles in

the path of achieving sustainable and improved production of potatoes are climate change, water scarcity problem (Larson et al., 2002, pp. 1057–1072) and lack of advanced farming techniques, innovation management and investment capabilities among farmers. Another reason can be the high costs of producing potatoes due to usage of large area and high-water consumption. According to an estimate, the investment costs of potatoes per hectare can reach more than 5000 Euros (Hajdu, 2020, pp. 93–104)

Moreover, Cyprus, being an island country, has a high production cost for potatoes. It is because everything is shipped in and out of the country, which results in high usage of oil and other energy resources.

It is quite necessary for Cyprus to maintain an optimal production rate of potato. This is because, without the potato industry, the GDP of Cyprus, especially its agriculture sector will collapse. The Cypriot potato exported to other EU countries is a pivotal source of earning for Cyprus' economy. In the potato market of some of the EU countries, such as Greece, Cyprus is one of the main potato exporters (Moussa and Solieman, 2016, pp. 46–50). Therefore, the sustainability of the Cypriot potato industry in the EU market, as well as other non-EU countries, is significant for the country. Efforts should be drawn towards the elimination of problems that are restraining the continuous progress of the Cypriot potato industry in the global market.

### **1.1.1 Purpose of the Research**

The purpose of this research is to closely investigate the prospects for the sustainability of the Cypriot potato industry in the local, EU, and global markets. This research will critically evaluate the position of Cypriot potato growers within the current agricultural practices, policies, and regulations. Moreover, this research also aims to identify the problems faced by potato farmers, such as climate change, high production costs, etc., that create barriers to the promotion of sustainable production systems. There has been a large body of literature reported regarding potatoes in general, their significance for economies around the globe, and their contribution to mitigating the effects of global food security. However, in the context of Cyprus, there is an explicit lack of empirical research. The potato industry in Cyprus is lagging its potential despite being the most vital crop

plant in the Cypriot agriculture sector. It is on this basis that this research aims to identify the reasons for declining potato production in Cyprus.

Agricultural practices by potato farmers in Cyprus are mostly old and conventional, which is also a reason for the low growth rate of potatoes in Cyprus. Moreover, climate change and water scarcity issues have gravely impacted potato production in Cyprus. This research aims to devise strategies to create awareness among potato growers regarding the implementation of the latest technology in the agriculture sector and bring the menace of climate change and water scarcity issues to the attention of concerned authorities.

Potato growers need to sustain their sales in the EU market. However, there has been a decline in the sustainability of the Cypriot potato industry in terms of sales in the EU market. It is because, in recent times, the image of potatoes has been projected as an unhealthy food in various EU countries. Moreover, in the EU market, the quality of potatoes has been given priority by potato distributors due to strict regulations. In this research, primary data collected from questionnaires filled out by potato growers in Cyprus, CEOs from international marketing organizations, and potato industry managers were investigated and subjected to a qualitative method to help draw innovative product and marketing strategies to protect the sustainability of the Cypriot potato industry and promote its availability for human health and global food security. These strategies will be invaluable in the sustainability of the Cypriot potato industry in local, EU and global markets.

### **1.1.2 Positioning myself**

I grew up in a farmer's family; my granddad was a farmer, and my father was an agriculturist. Almost all the family made their living from growing potatoes and some vegetables. As a teenager, in between school holidays, I grew up in the fields, on the tractor, helping whenever I could, and it was something fulfilling for me to do. This gave me a specific view on life and commerce, enabling me to see the simplicity and, at the same time, the complexity of growing potatoes on the one hand and the skill and ways of selling them on the other.

Of course, sooner than later I got into high school, and I was fascinated with economic theories and accounting laws, and sooner than expected I was in university.

I could as well be a farmer since I did enjoy it so much, but I believe that I am in a much better position today, as I am doing what I love best, working with something that I grew up with and love, and, by combining my knowledge and education, getting the most out of it.

### **1.1.3 Drive to research.**

The main reason for continuing with this research is that I believe it will allow me to uncover some key factors that have not been investigated by anyone before, because the thing itself is a niche item and the people involved in marketing the product until now are very encountered but not comfortable with compared recent changes, such as EU free marketing, economic crisis, environmental and weather changes, food crisis, and new gap regulations.

Since no one has taken the time to fully explore this topic until now, I was able to get some vital knowledge that helped me add to the stability of this sector. Since 1974 (Turkish Invasion), this sector of commerce has contributed millions to the Cypriot economy, as "in 1987, the potato earned 10% of total domestic export value, more than any other item" (Solsten, 1991, pp. 56–59) while also providing thousands of jobs; however, it has been rapidly declining in recent years.

My professional experience and education have both transformed the framework within which I examine topics and deal with problem-solving situations, with a more scientific interest in understanding why and how things operate. I believe that the practical wisdom gathered from my job experience, along with my college education and research skills, will allow me to concentrate more on the significance beyond the apparent in findings and analysis ranging from a basic sales estimate to a brand-new company strategy. By exploring my research results and then looking into and assessing the results, a trend analysis is made, leading to a forecast of customer demand, which leads to the development of new products via suggestions, and thus I had a positive impact on the sustainability of the Cypriot potato industry. For example, the new mini packaging of 3kg

premium bags of our potatoes for European high street retailers was well received and improved sales by 5%.

#### **1.1.4 Education**

My passion for scientifically explaining everything began in my early days in the field, where I was intrigued by the diversity in prices of different varieties and times of sale. My grandfather always used to explain to me the reasons behind the planning and sales strategies he had, but of course, while attending high school, I was fascinated by all the economic and accounting theories, which had, to a great extent, a positive impact on my learning and understanding. My thirst for knowledge drove me to successfully pursue and finish my undergraduate studies in BA Hons Accountancy and Business, as well as my postgraduate MAIM master's in international management.

Taking full-time undergraduate and postgraduate degree programs was undoubtedly an important moment in my journey beyond the core theories and practices of economics and accounting and into a more sophisticated grasp of important elements impacting economies and their functions.

My degrees provided me with a better but not fuller awareness of all elements and processes relating to the potato environment and its many roles. It was later in my employment that I comprehended business and product management awareness as well as knowledge in the industry.

#### **1.1.5 Experience**

Following my Degree, I worked for P&G Procter & Gamble headquarters Northeast UK.

I worked as a direct analyst for the Chief Scientist of P&G responsible for 'Ariel' for the Northern Hemisphere. My job was to analyze quantified results coming from surveys/questionnaires from all around the world concerning consumers' likes/dislikes etc. to determine new fragrances/product development and to convert them from SPSS analysis systems to Quantvert Systems for the Chief Scientist to conclude results. I had two weeks of advanced training on these new data analysis systems, and furthermore,

every so and then, we had to have a look at the actual surveys/questionnaires to determine the cultural diversity trends of different countries or areas within.

Working at P&G, I gained experience and developed my skills in analysis and research, but more importantly, it provided me with the opportunity to learn and explore competences in business and strategic awareness. I realized how the company analyzed information regarding the management and development of products in the commercial environment in which it operated, giving me a great development for my later career role in business awareness and strategic decision-making when it comes to needs. Also, I greatly improved my skills in data management and interpretation within project management and creative problem solving. I did develop my skills in analysis and research, but mainly through planning, I managed to successfully overcome difficult times when it came to big projects in my professional work.

#### **1.1.6 20 years in the potato business**

I always had a need for challenge and for going beyond the obvious, and I believe that passion paid off when I started working in the position of General Director of POP Pancyprian Potato Growers Group in October 2004.

This job is a milestone in my life, as I began my career in a high-status position, giving me the opportunity to make good use of both my education and my experiences to tackle a very challenging job. The diversity of having to associate every day with farmers as well as high-end customers from around the globe is vast and needs the good education and experience that I obtained by working as a farmer myself as well as going through the teachings and workshops of my degrees. Each needs a different approach to handle and associate with, and it's not an easy job since there is a big educational and cultural gap within the growers themselves. Also, I can better understand, based on my experiences, how and when they will grow potatoes and direct the farmers to do a better job, as well as uplift the crop in time to meet high demand and better prices, since my education concerning marketing was greatly developed via my degrees.

I am responsible for five packing houses and the head office, and I am coordinating, with factory managers, the planning of production capacities according to daily sales

projections, as well as the monitoring of production vs. sales and the reviewing of production schedules accordingly.

Among my responsibilities are to establish manufacturing standards of efficiency, minimum waste, and optimal utilization of resources (machines, raw materials, and manpower). I also supervise production processes to ensure the execution of company standards and policies, as well as to create annual production plans and obtain Board of Directors approval.

- a) In addition, I must work with factory managers to: a. plan production capabilities based on daily sales predictions.
- b) Track output against sales and adjust production plans appropriately. and guarantee enough replenishment of the finished product supply.
- c) Use efficient production plan adaptation to ensure timely delivery of special orders or marketing materials.

In addition, I must implement quality control procedures and standards to ensure rigorous conformity to ever-changing EU and food safety regulations.

Also, and perhaps most crucially, I must produce yearly reports and weekly board meeting agendas containing current issues to be resolved by the board members as well as future planning.

I am presently in charge of sales of finished goods worth more than 40 million euros per year from 550 potato farms.

In addition to the above, I must make evaluations of the performance of (150) staff members and recommend promotions, additional training, or termination.

I must associate every day with clients abroad and manage sales, as well as take on promotions and programs with supermarket chains, usually for quarterly supply at fixed or variable prices. I also suggest and develop new products to promote our sales abroad in line with new market trends.



Furthermore, I am responsible for establishing quality control standards and procedures. In my line of work, I have applied many standards for which I am responsible, the most important quality standard to date being the 'I.F.S.' International Food Standard, which is applied in one of our packing houses, ensuring the quality of our finished product.

I have undertaken some serious projects, such as proposing to the Board of Directors, by providing a feasibility study to support my views, the need for our own packing house with new quality standards as per clients' requests and new market needs. The Board granted me in a short time the funds to proceed, and the result was a modern packing house with I.F.S. certification on food safety with profits every year since 2006.

The entrepreneurial skills I acquired through my master's in international management made a difference in seeking out new opportunities to better improve our product as well as distinguish issues that give us a us a competitive advantage in our market and increase our sales. Also, skills such as marketing and management came in handy when working with customers from multinational arenas as well as working with and directing staff older than me.

In addition, I have undertaken 2 projects for which feasibility studies were prepared and submitted to the Ministry of Commerce of Cyprus, for which the company has obtained grants of 950.000 euros.

As the General Director, I have unlimited access to all companies' resources, and, furthermore, I do have the opportunity to suggest and take over new ideas and projects and, therefore, to control and monitor the developments with the goal of having good results. However, it is obvious that I must justify anything new I plan to do to get the approval of the Board of Directors, but, so far, I have been very successful with new projects or sales/marketing ideas.

### **1.1.7 Further Involvement**

My input from my position is constantly evolving since I have to work with local as well as international organizations on a day-to-day basis.

I contribute knowledge to several European magazines and journals about the potato sector and attend conferences of Europatat regulating EU new laws and promoting the potato industry in Europe.

I am an active member of the Agricultural Knowledge and Information System ( AKIS ) in, with a particular focus on agricultural advisory, and I have meetings with the Ministry of Agriculture in order to keep the potato industry at pace with the constant EU changes on new regulations on cultivation and food safety, as well as provide great input to the management of the growers and their work to match the growing needs of customers and the industry as a whole. These include agricultural policies, funding, advisory methods, and a section on how the Farm Advisory System (FAS) is implemented on Cypriot farms.

Through my work, I have been on more than 85 marketing missions abroad to develop new markets. I have attended more than 6 annual meetings of Europatat and Potato Europe (seminars) and 25 meetings in the Cyprus Parliament and Ministry of Agriculture for new EU Regulations as well as propositions for implementing or altering CAP regulations or other state regulations or funding.

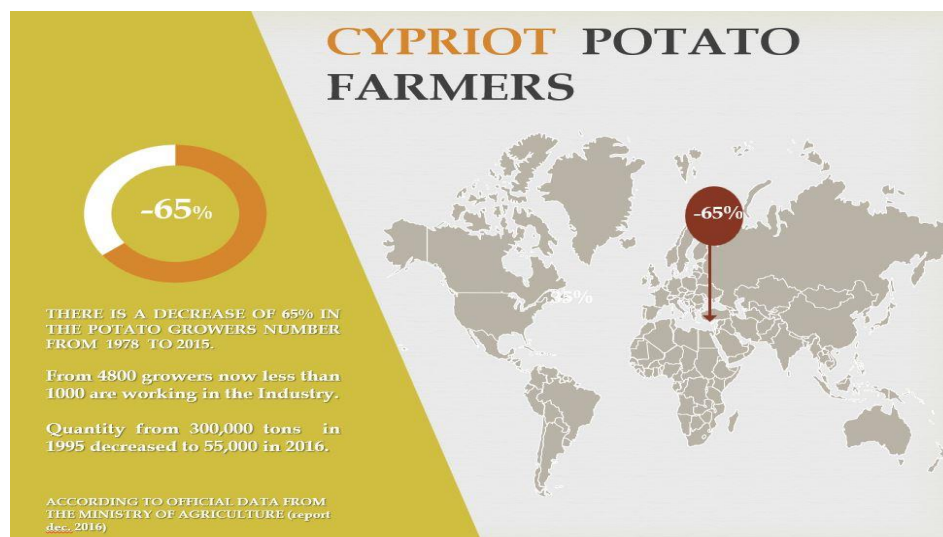
Also, through the line of my work, I am responsible for planning and attending over 50 international exhibitions, having our own stand /booth for marketing and promotion purposes, and always having multiple meetings with major multinational companies on both cooperation issues and exchanging ideas and views on many aspects of my industry in changing situations. This experience gave me a lot of understanding of how good planning and forecasting can help keep things running smoothly in every case. Organizational skills developed during my master's as well as past working experience came in handy and enabled me to objectively see and avoid potential obstacles in the cases where I organized exhibitions or missions abroad.

Also, very importantly, I came to realize that personal contact with customers and people of interest is crucial in the marketing and negotiation of prices as well as quality claims.

## 1.2 Context of the Research

This research was carried out in Cyprus and primarily aimed to improve the agricultural practices and regulations surrounding the potato industry and strengthen the marketing strategies that will help sustain the Cypriot potato industry in the local, EU, and global markets. The potato industry in the EU has faced a decline of 155,000 tons in 2007 to 108,000 in 2017 (Statistical Service of Cyprus, (2017)). The decline is still not stopping and is intensifying the already damaged Cypriot potato industry's sustainability potential in the markets. As clearly shown in Figure 1 (Ministry of Agriculture report, Dec 2016) the grower numbers have decreased from 4800 in 1978 to less than 1000 in 2015 that's an amazing 65% decrease, with the amount of production dropping to similar percentages as well. This decline has multiple reasons, ranging from climate change and water scarcity issues to a lack of subsidies, high production costs, a lack of awareness, and the incorporation of advanced technologies. The research will collect primary data by using qualitative methods through interviews with farmers and market experts. After collecting the data, it will be analyzed with a focus on the sustainability of the industry. Findings from this will help me formulate the problem areas and recommend thereafter some solutions to them with the aim of directly helping the sector through my expertise, as well as creating some scientific results that other researchers or institutions can use.

Figure 1: Cypriot potato farmers' decline.



(Source - Ministry of Agriculture report, Dec 2016).

### **1.3 Problem Statement**

The peer-reviewed literature generally acknowledges the importance of the global potato industry and a wide range of studies have been conducted on it in a global context. The Cypriot potato industry is lacking research in terms of keeping a sustainable industry from falling apart. Over the years, the Cypriot potato industry, despite its utmost importance for the Cypriot agriculture sector, has faced many challenges of social, ecological and economic nature. There is little or no findings and solution literature regarding the problems that are exacerbating the fragile landscape of the Cypriot potato industry. Some studies have suggested techniques of smart agriculture approaches to combat ecological and environmental challenges (Adamides, 2020, p. 898). However, other challenges restraining the sales and sustainability of the Cypriot potato, such as marketing issues, policies and state and Eu regulations, environmental challenges, subsidies and prices, and alternatives to pesticides used, remain unaddressed. The present research is therefore, focused on understanding factors affecting the production, yield, progress and profitability of the Cypriot potato industry in the local and the EU market and devising effective and applicable strategies to counter these diverse issues.

### **1.4 Significance of the Research**

The proposed research has been chosen based on the notion that innovations and their management in the present marketing strategies and agricultural practices are critical for the long-term sustainability of the Cypriot potato industry in the local as well as the EU market. The importance of this research also goes over any other literature related to Cypriot potato sustainability because the subject focus of this research project has been largely left unexplored and inadequate attention has been given to the related dimensions of this subject. Thus, the current research provides an opportunity to fill the gap in the existing research pool.

The research documents in detail the problems and troubles faced by potato farmers in Cyprus and how they are bearing the losses because of the decline in potato production. Not only the problems but also the factors that have contributed to the exacerbation of these farming issues have been underlined in this research. A direct and face-to-face

approach used in the research has enabled me to assess and evaluate the problems of potato farmers with utmost hands-on accuracy.

The suggested strategies in the research may prove to be helpful in devising innovative ways to tackle the threats that are halting the continuous sales and sustainability of the potato industry. The research will also serve as a framework for concerned government organizations and other stakeholders in Cyprus to implement effective policies or strategies based on advanced agricultural and marketing practices to aid sustainability and increase sales and reputation of the Cypriot potato in the global potato market. The research will also be made available to Cypriot universities to help further explore the current subject and consolidate the findings to a greater extent for extracting the best feasible solutions for increased sustainability in the potato industry. Furthermore, this research will also act as a model in other developed or developing countries internationally for improving various crops and their value from a marketing and sustainability perspective.

The current research makes a valuable contribution in identifying key problems of potato farmers and sales experts and producing new knowledge that will immediately help the sustainability of sales and the competitiveness of my organization in the Cypriot potato industry at all market levels with the aim of achieving continuous success with better results. This research raises concerns regarding vital issues and challenges that are affecting the implementation of effective marketing and agricultural policies in developing countries. It also emphasizes and sheds light on the possible negative outcomes for the overall progress of the Cypriot potato industry if these challenges are not managed effectively. Thus, the current research adds significant value to the body of knowledge to fill the present gap and alter key factors in maintaining sustainable potato farming in Cyprus.

## **1.5 Research Questions**

The key research questions that are necessary to be answered in this research are as follows:

### **1.5.1. Research questions:**

The current study addresses the following main research question:

- How can the Cypriot potato industry sustain itself within the current local, EU, and global marketplace?

### **1.5.2. The current research addresses the following subsidiary questions:**

- Agricultural practices in Cyprus; are they sufficiently efficient within current conditions? Can they change? If so, how and at what cost?
- Marketing strategies and industry perspectives – is change needed to expand or sustain sales and if so, how?
- Is there change needed to sustain sales or to adopt better marketing strategies so as to fit in the market?

## **1.6 Aims, objectives and outcomes.**

### **Aims**

My research will make a valid addition to the subject of agricultural products management and marketing, with a focus on sustainable farming, by investigating the European effect on newly established countries and the pre- and post-induction practices used by organizations and countries in Europe. Surely the need for changes when joining the EU framework is numerous, as joining a free market might lead to the need for finding competitive advantage via differentiation to survive. To my belief, this has been greatly undermined by the stakeholders.

Given the importance of sustainable competitive advantage for the success of an organization (Porter, 2008), it is imperative to search for new sources of competitive advantage and the ways an organization can achieve it. I can argue that many associations between competitive advantage and sustainable farming exist, which is what I aim to find. My research will also investigate the link between sustainability from the point of view of farmers and governments, to investigate any correlation in the results with the aim of making a breakthrough in my findings.

My aim is to explore all the aspects that surround the Cypriot potato industry and other factors that influence it, as well as Mediterranean similarities, with the goal of making an impact by resolving a subject not specifically approached by other researchers.

## Objectives

Management theorist Peter Drucker said, “Objectives are needed in every area where performance and results directly and vitally affect the survival and prosperity of the business” (Drucker, 2010). But what are the objectives? Who sets them, and who are they for? “It is the management’s job to decide what the business is, what its objectives should be and then take active, positive steps to bring them about.” (Pollard, 1974). In my role as General Director, my objectives will be to influence the Cypriot and European decision-making processes and strengthen the position of the potato trade sector on the international trade scene. I attempted to make a difference in the sustainability of Cyprus farming and modernize an old industry by identifying the factors influencing the management and marketing of Cypriot fresh potatoes and improving the income for the growers.

I had the ability to exchange views and develop common positions with colleagues engaged in similar activities, as well as enjoy the networking opportunities offered by my organization and at an international level, in an effort to change or affect new EU CAP farming directives, helping towards agricultural sustainability since the note that you cannot truly apply the same EU farming directives in 50 member states irrespective of their location, weather, and farming conditions exists. Global versus local standards must be taken seriously.

## Outcomes

The main interest groups in my area of research involve the Cypriot industry, the Mediterranean industry, and the European potato industry. This involves growers, export organizations and firms, local government institutions like the Ministry of Agriculture, and European regulation bodies like Europatat and the European Commission.

The expected outcomes of this project include:

- A presentation of the results of the research to all participating individuals and organizations involved.
- Direct input to the Cypriot potato industry by implementing (via my position) the outcomes of my research through a sustainable management and marketing plan since research of this kind was never done and no other plan exists in the scale of my research.
- A model that will be a guide for newcomer countries to the European Union to use as a tool in their induction governance.
- A model by which Cyprus or other Mediterranean countries can survey to adjust towards better management of their agricultural sustainability.
- Presentation of the research results at the Europatat conference attended by more than 40 participant countries.
- Teaching material in the Agricultural School of Cyprus as well as the Economics and Agronomist School of the University of Cyprus.
- Other educational institutions in Europe will be able to use my published research

## **1.7 Key assumptions**

- a. Inputs from arbitrarily large and small-medium-scale potato growers in Cyprus, as well as potato administrators from various organizations in charge of the marketing and beneficial sale of the Cypriot potato in local, international, and European markets, will be used in the research.
- b. It is believed that participants will be truthful and transparent about the information they transmit throughout the conversations and will not distort any facts questioned during the interview.
- d. During the interviews, some participants' express or implicit hesitation to open up and be sincere in their comments might have an influence on the overall validity of the research's results.



e. The participants' perspectives and positions on the questions posed will be recognized as legitimate sources of data and will be used to assist in creating the summarizations for this research.

f. Prior to the interview, it is assumed that all participants have extensive knowledge and expertise of current agricultural practices in Cyprus, as well as marketing plans in place to maintain the Cypriot potato sector in the local, EU, and worldwide markets.

Finally, the participants' availability and commitment to the estimated time frame for discussions will have a direct influence on the prompt delivery of the final project.

## **1.8 Keywords and Their Meanings**

### **1.8.1 Sustainability**

Management techniques" that attempt to lower production costs, minimize environmental harm caused by these agricultural practices, and give adequate profit margins to maintain market competitiveness (Francis et al., 1988, pp. 123–126).

**1.8.2 Marketing strategy** an activity, collection of institutions, and methods for developing, conveying, delivering, and exchanging valuable offers for consumers or clients. Furthermore, it aids in the management of a strong good connection with consumers, which benefits the organization and other interested parties (Keefe, 2008, pp. 28-29).

### **1.8.3 Climate change**

A detectable change in the condition of the climate is due to human activities that modify the composition of the global atmosphere, in addition to natural climatic variability seen over extended time periods (UNFCCC, 2011)

### **1.8.4 Scarcity of water**

It is simply the marginal cost of a unit of water, where "marginal" refers to a small change in the amount of the resource, i.e., water, and "value" refers to what people want at a time when there is not enough of water at an acceptable cost to satisfy the particular requirements and needs (Jaeger et al., 2013, pp. 4506–4517)

### 1.8.5 Organic farming method

An agricultural system employs organic fertilizers, such as green manure and compost manure, and iterates the use of practices such as crop rotation and companion planting, while discouraging the use of chemical fertilizers (Paull, 2019, pp. 70–74).

### 1.8.6 Adaptation

Adaptation in natural or human systems in response to real or predicted climatic stimuli or their repercussions which aids in mitigating harms or maximizing benefits (Munang et al., 2013, pp. 47–52)

### 1.8.7 Developing nations

This word is used in this initiative to designate nations whose economies do not rely heavily on current technical breakthroughs. It generally (but not perfectly) correlates to the World Bank's low, lower medium, and higher middle categories. It is neither as loaded with meaning nor as biased as the other possible phrase in "industrializing countries."

Every year on July 1, the World Bank revises the analytical categorization of the world's economy based on estimations of GNP per capita for the preceding year (World Bank, 2021). The Gross National Income (GNI) per capita estimated using the World Bank Atlas technique is shown below.

The terminology below will be utilized throughout the research as needed for the purposes of this investigation.

Low-income nations are those with a GNP per capita of \$1,045 or lower in 2020.

Middle-income nations are defined as having a GDP per capita of more than \$1,045 but below \$12,746 in 2020.

- Lower-middle-income nations will have a GDP per capita of between \$1,046 and \$4,095 in 2020.

- Upper-middle-income nations are classified as having a GNP per capita ranging among \$4,096 and \$12,695.
- High-income nations have a GNP per capita of \$12,696 or above.

## 1.9 Outline and Structure

The research comprises seven chapters. This section provides a brief description of the chapters that have been covered in this research.

### 1.9.1 Chapter 1: Introduction

This chapter comprises an introduction, background, and context of the research. It also outlines the key research questions, research problem, and purpose, as well as the alignment of relevant studies.

### 1.9.2 Chapter 2: Literature Review

This chapter presents a review of the literature on topics related to the main and subsidiary research questions. The literature review will focus on the sustainability of the Cypriot potato industry in the local, EU, and global markets. It also focuses on the current agricultural practices and strategies in place in Cyprus and identifies whether there is a need to modify or change. If yes, then in what ways is it possible? It identifies how these traditional practices have failed to combat environmental challenges. Furthermore, it gives special attention on the current marketing strategies and the reasons for their ineffectiveness in enhancing sales in the EU market. This chapter explores sufficient literature to highlight feasible solutions to increase sales and production of the Cypriot potato at all levels.

The main themes of the research identified that this chapter has attempted to address are as follows:

- Significance of potato for Cyprus
- Emerging challenges for the Cypriot potato industry

- Strategies and efforts to tackle the sustainability challenges of the Cypriot potato industry.
- Patterns of production

### 1.9.3 Chapter 3: Methodology

This chapter presents and discusses the research methodology used in the research and how it assists the researcher in understanding the issues of the Cypriot potato industry and devising valuable strategies to combat them in a systematic manner.

### 1.9.4 Chapter 4: Project activity

This chapter investigates and analyses data in five phases. Data familiarization involved multiple reads of interview transcripts, and transcripts were reviewed to ensure an accurate representation of participant experiences. Annotated lists of commonly used phrases and reported experiences were created for each interview transcript before categorization. The original codes and transcripts were re-examined to uncover hidden meaning and patterns beyond their surface interpretations. After condensing the codes, the data was analyzed by providing answers to crucial questions about the data's quality, bounds, supporting data, and coherence. The relevance and significance of themes to the research questions and theoretical frameworks were assessed. Each emerging sub-theme was examined for its bearing on the research questions, and extracts from the data items that provided the most convincing evidence for the topics of interest were reviewed. The findings summary writing process began with a review of the data summary and a careful evaluation of all research questions. Extracts from interviews with many individuals were used to corroborate generalizations about themes, and surprising new insights emerged as the implications of the research were discussed. Eight themes emerged related to the four research questions.

### 1.9.5 Chapter 5: Project findings

This chapter refers to the results and outcomes obtained from my analysis and interpretation of the collected data from interviews. This chapter focuses on organizing

the findings from NVivo software and presenting them objectively with facts and data to support my summary.

Also, qualitative findings will be presented in a narrative format using quotes, examples, or themes to convey the key insights derived from my qualitative data analysis.

In addition, I also related my findings to my research objectives and clearly connect my findings to the research objectives I set out to address. I demonstrated how my findings contribute to the overall understanding of the research problem.

I identified and discussed patterns, trends, or relationships in my findings and brought out any significant findings that support or challenge existing theories or knowledge in the field.

Also, I addressed limitations and acknowledged constraints in my research that may have affected my findings. Also, I discuss potential sources of bias, data limitations, or other factors that may impact the reliability of my findings.

Lastly, I interpreted and explained the findings and provided explanations of the findings, offering insights into their meaning and implications. Also, I discussed the practical and theoretical implications of the findings and how they contribute to the broader field of research.

#### 1.9.6 Chapter 6: Recommendations and findings

This chapter consists of the research's findings, which shed important new light on previously unknown or unseen significant aspects of this study. These findings have practical effects for numerous field stakeholders, in addition to adding to the body of knowledge. Additionally, a set of suggestions is made based on these findings to address the gaps and difficulties found to enhance present procedures and future results.

## 1.9.6 Chapter 7 A reflexive account of my personal learning and professional journey

In this chapter, I reflect on my personal experiences and the process of development, self-awareness, and transformation. Sharing insights from the reframing of the main problem and its impact on my knowledge and skills development.

I reflect on the development of my knowledge through my DProf as well development of other vital skills like critical thinking, problem-solving, and effective communication.

### 1.10 Summary

In this chapter I introduced the problem and placed myself as an insider researcher to address and solve the major problem of a dying industry with the aim of researching and discovering, if so, how the Cypriot potato industry can sustain itself within the European, and global marketplace. Through a thorough examination of the industry's background, challenges, and the researcher's own positionality, this chapter has effectively framed the significance and originality of the proposed study.

A key strength of this chapter lies in the researcher's deep understanding of the Cypriot potato industry, derived from his extensive personal and professional experiences. By openly acknowledging my family background in farming, education, and my 19-year experience as the General Director of the largest exporting organisation establishes a strong foundation of credibility and insider knowledge. This allows the me to bring a unique perspective to the research, blending academic rigor with practical, real-world insights.

The formulation of the research problem and objectives is equally robust, demonstrating a clear grasp of the industry's multifaced challenges. From the impacts of climate change and water scarcity to the evolving EU regulations and shifting consumer perceptions, the researcher has adeptly identified the key factors threatening the industry's long-term sustainability. By framing the research questions to address these complex issues, the chapter sets the stage for a comprehensive and solution-oriented investigation.

Moreover, my decision to employ a qualitative methodology, involving personal interviews with a diverse range of stakeholders, further strengthens my research design. This approach associates seamlessly with my insider status, enabling to get real views though

the experiences and perceptions of those directly involved in the industry. The resulting data provide rich and contextualized insights, advising the development of practical and impactful strategies for the industry.

Through the development of the research, my strong understanding of the relevant theoretical and empirical literature, as evidenced in this chapter, undoubtedly served as a valuable basis to my research. The comprehensive review of existing knowledge, paired with the identified gaps, places this research as a necessary contribution to the field of agricultural sustainability research.

## Chapter 2: Review of Literature

### 2.1 Introduction

This chapter offers a crucial evaluation of the existing literature on the sustainability of the Cypriot potato industry. It aims to map out the areas of past research, pinpointing significant gaps and unexplored areas. Special attention is given to the industry's complex challenges, from climate change impacts to market competition. Through this review, the thesis will present an integrative combination of the findings, acting as a steppingstone for understanding the existing knowledge on the subject as well as exploring similar literature and reviewing the connection in the research questions. This literature review critically evaluates the existing research on the sustainability of the Cypriot potato industry, a fundamental sector within Cyprus's agricultural framework and economy.

A comprehensive search for prior studies on the specific sustainable practices within this industry has revealed a significant gap; there is a notable absence of comprehensive research on my research subject to address the complex aspects of agricultural sustainability with the economic strategies necessary for the Cypriot potato sector to survive in the EU and global markets. Some marketing and economic theories surrounding the agricultural sector were found, but not in the matter of getting the correct mix to apply to my research subject. These were helpful, of course, but different from tackling the matter of addressing the specific topic of the sustainability of potatoes or, in that matter, other agricultural products, which considers post-EU strict regulation, ever-changing policies, and the high cost of production in conjunction with lower yields, rising costs, and a decline in the growers' numbers and production.

The absence of such studies underscores the originality and necessity of my research. By determining this gap, the current work contributes particularly to the field by offering an in-depth examination of the industry's challenges, from climate change effects and water scarcity to the competitive marketplace and ever-changing agricultural European regulations. It will provide an integrative combination of findings that will act as a basis for developing innovative strategies to reinforce the industry's sustainability.



The main areas of literature that will be reviewed in this research are:

- **Significance of potato for Cyprus**

This section will provide a brief discussion regarding the importance of the potato industry for the overall stability of the Cypriot agriculture sector as well as the economy of Cyprus. Moreover, its export to the EU and other countries will also be reviewed to gauge an idea about the revenue generated by Cyprus through this industry.

- **Emerging challenges for the Cypriot potato industry**

In this section, a detailed review of the challenges and hazards to the sustainability of the Cypriot potato industry is provided. It gives special attention to environmental problems such as climate change, weather pattern fluctuations, and water scarcity issues that have caused significant disruption in the progress of the Cypriot potato industry. Moreover, the section also outlines the issues that have created problems for the Cypriot potato industry in the EU market, such as the extensive use of chemical fertilizers and pesticides and the reduced quality of potatoes. The local challenges, such as lack of awareness regarding modern techniques in Cyprus, a majority of uneducated and old farmers, lack of competitiveness in the international market and other socio-economic factors, have been placed under discussion.

- **Strategies and efforts to tackle sustainability challenges.**

This section aims to identify and propose viable solutions and strategies to overcome the challenges described in the previous section. The section describes solutions in a systematic manner, pinpointing previously practiced strategies along with new and innovative strategies to be implemented for improvement in the future. It also tries to propose those plans and strategies that involve government and policymakers directly collaborating with potato farmers to achieve the desired goal of sustainability for the Cypriot potato industry.

- **Patterns of production**

In this chapter, I examine the complex patterns of production of Cypriot potatoes. Gaining knowledge of these patterns is essential for understanding the behaviour and features of the potato industry. It is important to understand the underlying processes and trails involved in biotechnological applications, as well as the management of production systems, challenges, opportunities, and strategies.

## **2.2 Review Of Literature**

The objective of this literature review is to collect knowledge and information provided by previous publications and journals that primarily focus on viable sustainability strategies and decisions in agriculture practices that stakeholders adopted to achieve the sustainability of potato cultivation and production businesses and establish their presence in the EU as well as the global market. A thorough examination of important issues and relevant research is done in the literature review on product management and marketing in the context of maintaining the Cypriot potato sector in the regional, EU, and international markets. In this literature review, I have reviewed important key aspects of the industry involving eco-friendly cultivation methods, resource optimization, and adherence to regulatory standards. Furthermore, I have explored the regional and global market dynamics, which I considered vital in reviewing, considering factors such as trade policies, international practices, and production management, by synthesizing findings from diverse literature with the aim of getting a holistic understanding of the subject of my research.

Potato Crop output is presently estimated to be over 813.5 million tonnes globally. Global changes, especially severe climate change, are increasingly likely to have an impact on agricultural production, posing a threat to global food security (OECD/FAO, 2021). In the face of globalisation, outbreaks of pests and worms, and plant-borne infections (viruses, bacteria, phytoplasma, and fungus), and weeds are more likely to occur, posing a significant barrier to crop output. However, many of these pests (including weeds and illnesses) are difficult to manage owing to the introduction of pest resistance 50 years ago. In the United States, damage to insects and worms varies from 8 to 23%, with a

projected loss of 5-15% from a total of \$ 200 billion each year (Elbehri, 2015). As global commerce expands and the environment changes, invasive pests pose new hazards and concerns. According to current estimates, agricultural losses caused by pest infestations would increase to 25% in the EU by 2080. The misuse of substance plant confidence items to control arthropods, illnesses, and weeds presents another challenge due to the accumulation of poisons in the environment and food, financial and social issues, access to and accessibility of innocuous to the ecosystem synthetic compounds, and public policy. Developing and implementing naturally attractive biopesticides, as well as adopting horticulture production systems that solve the challenges given by globalisation, should be a priority for both governments and business (Copping, 1998, p. 353).

### **2.3 Genetic Engineering in Agriculture Development**

Humans have been cultivating plants for at least 10,000 years. Individual plants, organic products, seeds, flower buds, or other propagules were selected as early plant recovery markers of interest. Among the selected (highlights) are high return, reduced poisonousness, increased taste or morphology of seeds or organic products, and seed heads (grains) or (cases) that did not break to make harvesting simpler. Individuals used determination to cultivate a variety of wild plants, including wheat (*Triticum aestivum*), rice (*Oryza sativa*), maize (*Zea mays*), potatoes (*Solanum tuberosum*), and tomatoes (*Solanum lycopersicum*). The breeding ground is based on the application of fundamental genetic ideas to the use of biodiversity in the stone type. Mutations (changes in individual DNA sequences) occur naturally in plants, as with the replication of alleles (genetic variations) in humans via sexual reproduction and the introduction of new genes or alleles from a range of donors. Exploration throughout the late nineteenth and early twentieth century improved horticulturists' knowledge of genetic features, which they employed with greater accuracy. They actively changed plant hereditary makeup by crossing certain parent plants to generate offspring with the desired features. They also devised methods to accelerate the development and detection of hereditary variants, resulting in more focused and efficient distribution of natural hereditary variations (Ossowski, 2010, pp. 92–94). In any event, scientists have found that they can use synthetics or radiation to produce mutations in DNA at very rapid rates (Roychowdhury and Tah, 2013), increasing

genetic diversity in organisms. Human and created by human's mutations are planned (since they may impact any gene), thus farmers should have an intriguing test to eliminate individuals with undesired or harmful qualities and choose people with developed traits to progress ahead (Agricultural Statistics, 2015 pp 315-323). Due to board choices made by food merchants in the private sector and competition from other vermin control items, GE potatoes with IR and VR characteristics structure and outline of the GE crop were eliminated from company development. Monsanto received government financing in 1995 for potatoes with the gene Cry3A (Bt) to regulate the Colorado potato scarab (*Leptinotarsa decemlineata*) and planted six hundred hectares of IR potatoes. In 1998, GE potato-safe potato leaf roll infection (*Polerovirus* spp.) was approved, and several potato Y-safe strains were approved in 1999. A potato leaf virus or Y-potato virus was used to label the Bt factor. From 1995 to 1998, GE potato output expanded to 20,000 hectares, or 3.5 percent of total potato production in the United States. However, the planting area fell dramatically in 2000 due to rejection by select customers. A large low-cost food group stated in the year 2000 that it will no longer accept GE potatoes (Guenthner, 2002, pp. 309–316).

The potato business was unable to distinguish and assess the supply of non-GE potatoes to consumers and farmers worried about higher yields that their customers would not purchase. Furthermore, of planting GE, many farmers are using a recently developed herbicide to manage the Colorado potato beetle and other insects. Consumer acceptance has restricted the market for genetically engineered potato goods. Growth activities were used to mimic market development trends for three related items: food beverages, frozen potatoes, and microwave ovens. I am presuming that the adoption of GM potatoes was based on mid-comparable goods. According to the model, consumer acceptance will remain in the initial phase of the product life cycle for 14 years (Guenthner, 2002, pp. 309–316). The European Commission issued Communications titled "European Green Deal" in December 2019, demonstrating its duty to characterise and implement plans to solve environmental and ecological issues (Pianta and Lucchese, 2020, pp. 633–641). According to the research, the air is warming, and the ecosystem is changing with time, and one out of every eight million animal species is in risk of extinction. The European Green Deal aims to respond to these challenges by establishing a new development

system that will, among other things, secure, monitor, and operate on the biological system of the European Union (EU), as well as protect residents' well-being and prosperity from natural disasters. According to the research, the air is warming, and the ecosystem is changing with time, and one out of every eight million animal species is in risk of extinction. The European Green Deal aims to respond to these challenges by establishing a new development system that will, among other things, secure, monitor, and operate on the biological system of the European Union (EU) and protect residents' well-being and prosperity from natural disasters. The development and interest in the critical computerised change devices that will help the execution of the critical problematic cycles and will fill in as a considerable booster of the thought about change are critical to finishing the Green Deal.

Water shortage, according to the Food and Agriculture Organisation of the United Nations (FAO), is one of the key issues of the twenty-first century. The progress and interest in major computerised change instruments that will aid in the execution of the essential disruptive processes and will function as an important contributor to the contemplated transformation are critical to achieving the Green Deal (Dubois, 2011, pp.6-7). Agriculture consumes over 70% of the world's water supply. Dehydration is about twice as fast as global population increase (Connor, 2015, pp. 67–69). Given that water assets impact to environmental transformation and that food demand is expected to double by 2050 due to population increase, ranchers must address both water scarcity (i.e., water disparity and demand) and water proficiency (Hatfield and Dold, 2019). The agricultural industry accounts for around 2% of GDP and 4% of the workforce in Cyprus, with crude farmed products accounting for approximately 11% of total domestic production.

2016 National Agricultural Statistics Service. The most popular vegetable goods are potatoes, oranges, vegetables, and grapes, while the most common animal products are meat (pork, hamburger, poultry, sheep, and goats) and milk (hamburger and sheep/goats) (Markou et al., 2020, p. 483). Small split farms, high installation costs (e.g., pesticides, fertilisers, irrigation), ageing as well as low levels of farmer education, skills deficiencies, underdevelopment, water shortages, and water shortages are all issues that must be addressed (Stylianou, Sdrali and Apostolopoulos, 2020, p.15). The bulk of farmers in

Cyprus, on the other hand, are subject to high market and volatile stocks, have little bargaining power, and are unable to benefit from the normal economy. It is also said that the consequences of climate change, such as increased temperatures, will have a significant impact on Cyprus. These negative consequences have the potential to result in large losses in agricultural productivity and finance (Sofroniou and Bishop, 2014, pp. 2898–2928). Adding to these issues is the fact that the agricultural sector in Cyprus is falling behind in terms of the adoption of new agricultural technologies and the broad introduction of agricultural technology, which is the future policy framework (2021-2027). Nonetheless, in the long run, Cyprus has sent different efforts to expand the area, in areas such as ranch modernization, water and sterilisation the board, increased cultivating and asset utilisation, and natural assurance. Critically, Cyprus is now focusing on the quality of agricultural commodities rather than the price, taking use of its advantages such as early planting/creation of a few harvests, such as potatoes. Cyprus's potato production is estimated to be about. 14% of total yield production, 6% of total harvest and domesticated animal creation, and 5% of total agricultural area (yield and domesticated animal being, ranger service, fishing, hunting, resource development). Furthermore, potatoes are an important horticulture component for Cyprus diet, accounting for ca. Even though potatoes are one of the two most water-escalated crops in Cyprus (e.g., oranges and potatoes) due of the vast agricultural territories they utilise (Service, 2016), they account for 40% of total crude horticultural commodities marketed. However, a variety of challenges and events have hampered the potential of the Cypriot potato business. Cyprus has been identified as one of the most susceptible nations in the European Union to climate change. Heat stress, drought, and unusual swings are being caused by climate change. Consequently, potato production has been hampered, with major losses in the Cypriot potato industry.

The local potato industry has a lot of challenges, including limited and narrow cultivated land areas. Furthermore, the deteriorating climate change conditions in Cyprus threaten potato production. Because potatoes are a rainfed crop, they have been affected by droughts and heat stress. Yield losses have been an issue over time since the potato crop requires a lot of resources, yet output isn't up to standard (Kanetis, Tsimouris and Christoforou, 2016, pp. 591–598)

Another major issue jeopardising the long-term health of the Cypriot potato business is a lack of high-quality water. According to research, Cyprus has the most severe water shortages (Eleftheriou, 2001, pp. 56–59)

Indeed, depending on the collect days, the spring harvest produces around 2641 m<sup>3</sup>/ha/year, with a double winter crop. Cyprus is an uncommon example of a nation where various measures, particularly in agriculture, are in place to improve total water efficiency. Some of the successful farmer-level methods in Cyprus include and reproduction as a means of increasing yields per unit of water (Nikolaou et al., 2020, p. 302). Despite this, ongoing investigations by the Republic of Cyprus's Department of Agriculture, Rural Development, and the Environment, as well as other research foundations, which focus on changes in the environment in the context of horticulture in Cyprus, have shown that environmental modifications is likely to increase water system needs, reduce yields, and raise land debasement. These analyses demonstrated that Cyprus's environment is changing, both geographically and through time. Techniques for agricultural environmental transformation that draw on the needs of current good governance may improve the availability of water while contributing directly to practical achievements (Constantinidou, Zittis and Hadjinicolaou, 2019, p. 26) New technologies, such as smart farming, are required for climate change adaptation and mitigation. Research (in-plant trials in Cyprus, innovative farming practises, telemetric stations, and soil sensors) is undertaken to give critical knowledge that applies to the whole Mediterranean area. Data-Driven Potato Production (IoT4Potato) for IOF2020 is one such example (which integrates IoT with land survey data to assist farmers cut the cost of potato production and increase product quality while decreasing environmental impact (Villa-Henriksen et al., 2020, pp. 60–84). Agriculture in the Mediterranean EU nations of Italy, Spain, France, Greece, and Portugal, as well as two new members, Malta and Cyprus, is quite comparable to agriculture in California. 1 Crop diversity is comparable, and meteorological and soil conditions do not change much. Both the EU's and the US's "Mediterranean" areas have comparable challenges in increasing exports to global markets, and both sell substantially into each other's domestic markets. Public policies, on the other hand, vary significantly, and these differences have historically led to antagonism and distrust. Trade wars have been widespread and prolonged, rivalling the

more well-known concerns that have characterised grains, oilseeds, and other agricultural commodities (Candel et al., 2014, pp. 47–58). Aside from increased rivalry, European potato producers must contend with crop pests, diseases, and climate change. Consequently, this use case takes a comprehensive approach based on research and a unique combination of cutting-edge technology, while yet offering farmers with low-cost but significant guidance. A new, market-ready smart agricultural technology supports irrigation, pest control, and fertilisation. The use case employs a network of telemetric IoT stations put in potato fields to automatically gather air and soil data, which is then combined with satellite data and farmer-supplied information on agricultural operations. The findings support a new business model built exclusively for SMEs and smallholder farmers, based on profit sharing, cost reduction, and selling information to third parties, while farmers continue to control their data (Adamides, 2020, p. 898).

Food security has gotten a lot of attention in European agricultural policymaking, while the specifics of the policy are still unclear. Food security has emerged in the public discussion about how the European Union (EU) should organise its major agricultural steering device, the Common Agricultural Policy (CAP), after being mostly ignored for decades. From 2009 to 2013, the CAP was amended, and it is slated to take into effect in 2014 (Grant, 2012, pp. 420–434). Food security is quite prevalent in the European context. Even though the original CAP aims outlined in the 1958 Treaty of Rome have not been officially reviewed in any subsequent EU treaties, food security has been a significant component of various modifications since its inception. Furthermore, while one of the objectives for the Foreword of the Common Agricultural Policy (CAP) in 1962 was to ensure European food supply, the EU now produces far more food than it can use, and the majority of its citizens have never encountered food shortages (Zahrnt, 2011). The vast bulk of food security research backs this up. Academic publications have paid a lot of attention to food security in recent years, but only a tiny fraction of this research concentrated on the EU environment (Fish, Lobley and Winter, 2013, pp. 40–49). The ambiguity of the word "food security" makes its use in the post-2013 CAP discussion fascinating. A broad range of stakeholders in the CAP reform discussion have highlighted worries about food security. However, the interpretations assigned to food security by various stakeholders, as well as the claims they make referencing food security, varied



greatly. Previous study has argued that the "fractured consensus" on the notion of food security originates from the varied stakeholder interests and policy viewpoints. In this research, (Lang and Barling, 2012, pp. 313–326) investigate the level of variation in the use of food security arguments, as well as which stakeholders apply these distinct interpretations. By presuming that food security serves as a framework for agreement, we can argue that this is a basis for framework. A consensus framework is a notion or word derived from widespread agreement and consent but utilised to make inaccurate, and often conflicting, assertions. Alternatively, the consensus framework might be built up of several frames that reside under framework. Frames here relate to the concept's various and accompanying definition sets. Identifying these frames is important because the concepts contained inside them may have a significant impact on policy-making and institutional processes (Schmidt, 2008, pp. 303–326).

Simultaneously, EU free trade agreements (FTAs) are encouraging agricultural states to create their own European lingering creation markets, aided by strong CAP assistance. However, local ranchers and processors in the South who can't compete with European-sponsored goods fear extradition due to unfair competition. The EU is also a key shipper of farm commodities, mainly animal feed like beans, thus it includes many hectares overseas on ranches that are now not used for local food generation. As a result, every change in the EU's needs and arrangements has a significant impact on horticulture and global food security. The Commission released a news source in November 2010 showing future CAP decisions and its commitment to food security. Regardless, despite any recognised adjustments - specifically the skilful distribution of appropriations - it is still because of the European rural industry's global invention and severity. According to the Commission, the EU should contribute to meeting the "developing worldwide interest for food, which the FAO expects to increase by 70% by 2050" (Commission, 2011, pp. 45–48). Developing interest may give "openings for EU food retailers," however, abuse should "further develop intensity and efficiency in the EU's agrarian area."

(De Schutter, 2011) In any event, the risks associated with the continued abandonment of EU food products in global business sectors and the more notable importation of food, notably to the European farming industry, are undeniably the risks. By boosting

competition and trade in the European agricultural industry, the EU is addressing the most pressing challenge for food-stressed countries today: reducing their dependency on foreign speculation. Most agricultural countries have shifted from net exporters to importers of inexpensive food types during the 1980s. Currently, 66% of them are suffering from currency shortages and rising prices for grains, dairy products, and vegetable oils on the global market. To mitigate their vulnerability in the face of recurrent prices and repeated food challenges, these countries urgently need policy reforms that promote local rural production and reduce dependence on imports. Given Europe's global commitment to fight hunger, the EU should go out of its way to facilitate such transformation. Regardless, the CAP is now headed in the other direction. It extends trust to the South to protect send-out business sectors from the European food industry (Fritz, 2011). Previous revisions to the General Agricultural Policy ignored their role in poverty and ill health. Even though European strategy makers are transforming the CAP into a 6-year global political change, they have yet to make a coordinated effort to ensure its conjunction with put forth progress goals like eradicating destitution and longing. To meet its global obligations, the EU will need to make radical changes to the CAP (Fritz, 2011). Cyprus is an island republic in the southernmost part of the Mediterranean, and potato production, while limited, is seen as a source of public agricultural income. Phytophthora infesting was broken down with an example of 539 secludes collected in all key potato developing locations of Cyprus between 2010 and 2012, the late scourge in the nation (Kanetis et al., 2021, pp. 407–417)

### **2.3.1 Agricultural sustainability**

This chapter critically engages the peer-reviewed literature on the Cypriot potato and its significance for Cyprus in terms of economic, health, and social stability. Moreover, literature regarding the factors that have negatively impacted the growth and sustainability of Cypriot potatoes has also been put under the microscope and critically evaluated. Then, various strategies to control such troubles and problems have been discussed, supported by peer-reviewed literature. Having a lucrative enterprise, especially in the field of agriculture, can face many challenges. The stakeholders, i.e., farmers and owners, will inevitably make an effort to coordinate all the variables that affect the sector. This

research is intended to give a comprehensive framework on how farming enterprises can be operated to attain gainfulness atomically and subsequently strengthen the national market to tackle European as well as global competition. The target of the research is not only to devise a framework for the economic profitability of the stakeholders but also to maintain the Cypriot farmer's sustainability, comprising ecological issues, alterations, and possibilities, enhancing integrated sustainability. As Schaffner et al. state (2006, pp. 229–232), sustainability should not be the goal itself but instead the means for achieving stability and economic sustainability in agrobusiness.

The objective of this literature review is to collect knowledge and information provided by previous publications that primarily focus on viable sustainability strategies and decisions in agriculture practices that stakeholders are urged to adopt to achieve the sustainability of potato cultivation and production businesses and establish their presence in the EU as well as the global market. These recommendations include agronomic policies and directives, strategic and operational management practices, and research-approved procedures and approaches.

The need for this secondary research is to summarise the present data to supply the farmers with a feasible disentanglement. State guidelines and bylaws undergo constant alterations based on scientific knowledge, ceaselessly changing the background and enforcing regulations and practices to restructure, accompanied by the vigorous growth of technology, making it complex for the agriculture practitioners to follow.

### **2.3.2 Sustainability**

This chapter reviews the literature relevant to the sustainability of the Cypriot potato industry in the local, EU, and global marketplaces. It contains five sections, and these sections are divided into subsections where necessary. The first section (1.2) entails the critical evaluation of the varying definitions of sustainability, and various dimensions of the definition will be subjected to discussion where necessary. Then, it offers the definition around which the chapter revolves. This is followed by Section 1.3 which includes a detailed discussion on highlighting the significance of the Cypriot potato industry, which is the main subject of this research. The next section (1.4) is concerned with those

emerging challenges that have negatively impacted or can impart negative influence in the future on the sustainability prospects of the Cypriot potato industry in the local, EU and global market, such as climate change, water scarcity, socio-economic barriers, competition barriers, high production costs, etc. In Section 1.5, a discussion pertaining to the strategies and measures to tackle the challenges in the path of a sustainable Cypriot potato industry is executed. The last section (1.6) summarises the whole chapter and brings it to a close.

### *2.3.2.1 Defining sustainability*

The main focus of this chapter is on the accomplishment of sustainability of the Cypriot potato industry at all levels including, viz. local, EU and global levels. Therefore, it is quite pertinent to begin the chapter by properly defining the term sustainability and exploring different dimensions of these terms that relate to the main objective of this literature review. Sustainability is a multifaceted idea that is defined differently by different people (Dobson, 1996, pp. 401–428). As sustainability is a broad term and concepts regarding it varies in different research, its definition is underlined by critically evaluating the concepts put forward by previous empirical studies. To this end, sustainability will be put under the microscope of three different dimensions, i.e., social, ecologic and economic, and then the final definition upon which this literature review is based will be outlined.

### *2.3.2.2 General concepts*

(Hansen, 1996, pp. 117–143.) defined sustainability as a philosophy, concept or a set of strategies that lead towards the accomplishments of set goals, or the ability to make incessant improvements over time without being negatively affected by changing circumstances and conditions. The author also argued that agricultural sustainability is only defined on the basis of boundary conditions built for the purpose of analysis of a question (Von Wirén-Lehr, 2001, pp. 115–129) argued that it is a goal-oriented concept that aims at transforming theory into practice. (Halberg, 2012, pp. 981–996) narrowed in on the definition by putting forward the argument that sustainability in agriculture seems to be ideal and desirable for agriculture that has a positive frame in every aspect whether it is marketing, profits or food security.

### **2.3.3 Social and ecologic dimensions**

However, sustainability in agriculture has been treated as a confusing concept that has been challenged in multiple ways. No one universal definition of this concept and it continues to vary in accordance with the dimension for which it is used (Boogaard, Oosting and Bock, 2008, pp. 24–33) (Farshad and Zinck, 1993, pp. 1–12) opined that sustainability can be defined on the basis of attributes that one considers while defining it, such as economic, social or ecologic. Some authors describe sustainability as a concept to support the agenda of non-depletion of natural resources (Payraudeau and van der Werf, 2005, pp. 1–19)

Other scholars refer to sustainability in terms of social dimensions which alludes to "sustaining farm families and SMEs" (Thompson, 1992, pp. 11–19). Finally, a number of researchers have combined all three concepts into one and have devised a single framework of agricultural sustainability (Van Calker et al., 2005, pp. 53–63)

### **2.3.4 Economic dimension**

However, for farmers, there is another important dimension that decides their presence in the competitive market. That is to say that economic factors contribute directly to the farmers' ability to sustain in the market. (James, 2006, pp. 427–438) Treated sustainability as a concept that lies at the core of economics. He argued that sustainability refers to sustainable agriculture with the focus on economic considerations such as profitability, productivity, market competitiveness, etc. (Foy, 1990, pp. 771–778) argued that from an economic viewpoint, sustainability alludes to the fact that future generations will not be disproportionately burdened, and they will get a sustained platform.

### **2.3.5 The definition**

The current research subscribes to the notion represented by (Francis et al., 1988, pp. 123–126) whereby the concept of sustainability colludes with agricultural sustainability. According to the authors, agricultural sustainability refers to the "management strategies" that aim to reduce the cost of production, minimise the damages caused to the

environment due to these agriculture practices, and provide sufficient levels of profit margin to sustain competitiveness in the market.

The current research will use this definition to devise a strategic framework for potato farmers in Cyprus to meet the standards required to sustain them within the local, EU, and global markets. The use of such a definition will help to avoid the confusion present in the literature regarding the accurate position of sustainability due to varying dimensions of use.

The next section will aim to represent the vitality of the potato crop for the economy, GDP, and overall stability of Cyprus' progress, as it is the most important raw food product in the country in terms of export. Post- and pre-accession backgrounds will also be discussed in relation to potato exports to highlight their ever-growing significance.

## **2.4 Significance of potato for Cyprus**

Cyprus is the southernmost country of Europe. It is in the Mediterranean and has a limited cultivated area (Kanetis et al., 2021, pp. 407–417). Despite such limited area, potato, arguably, is the most dynamic as well as an important sector of the country's economy (Adamides, 2020, p. 898; Katircioglu, 2006, pp. 35–39). According to Cyprus Statistical Service (2015), the potato has the highest contribution to the overall agricultural export revenue of Cyprus which is almost 50%. Also known as "early potato", Cyprus exports potato to European countries and earns a significant amount of profit (Ierna, 2010, pp. 85–90). Especially, in April-May, the demand for potato in the EU countries climbs to a great height, enabling potato producers such as Cyprus to earn a great fortune by exporting large stocks of potato to the EU market (Haverkort and Anisimov, 2023). Moreover, it is one of the biggest potato exporters to the UK market with budget amounting to about 27% (Hatab and Surry, 2016, pp. 39–48).

(Lombardo, Pandino and Mauromicale, 2012, pp. 1249–1254) also reported that increased yields and optimum nutritional content make potatoes one of the major contributors to the overall stability of Cyprus. Also, it adds the highest value to the raw agricultural export to other EU countries which is around 40%. Furthermore, in Cyprus,

value added by potatoes accounts for almost 14% of the total crop production and 5% for the whole of the agricultural sector. (Adamides, 2020, p. 898). Moreover, it is the country's biggest export to other European countries, especially northern and central European markets (Ierna, 2010, pp. 85–90; Timpanaro, 2002, pp. 109–116)

Its significance can be gauged from the fact that even before accession to the European Union, potato constituted about 50% of the total agricultural exports (Larson et al., 2002, pp. 1057–1072) (Vakis, 1990) and it mainly exported to other West European and Middle Eastern countries (Chiurciu, Cofas and Dragomir, 2020, pp. 243-251); (Vakis, 1990). In Cyprus, it is grown throughout the year and usually, two potato crops are grown per year (SgROI et al., 2014, pp. 1598–1603). (Birch et al., 2012, pp. 477–508) argued that the demand for potatoes will continue to increase due to their high nutritional value which can cater to the needs of ever-growing population.

Having discussed the importance of potatoes for Cyprus, it is pertinent to turn the discussion towards the factors that have negatively impacted such a crucial industry. Therefore, the next section contains a discourse on the challenges that started to emerge decades ago, and their aftereffects are becoming clearer with every passing year in the form of potato production losses.

## **2.5 Emerging challenges for the Cypriot potato industry**

Cyprus, the southernmost island of the Mediterranean, had favourable conditions for farming. However, the share of agricultural farming began to decline in the 1990s (Solsten, 1991, pp. 56–59). The main reason behind this is the inadequate supply of water to the potato crop which consumes a high amount of water.

The local potato industry is linked with various challenges such as limited and narrow cultivated land areas. Moreover, the worsening climate change conditions in Cyprus pose a serious threat to potato production. Being a rainfed crop, droughts and heat stress have been damaging for potato production. Over the years, the yield losses have evolved into a challenge as potato crop requires high input resources, but the output is not up to its potential (Kanetis, Tsimouris and Christoforou, 2016, pp. 591–598). Evaluation research

conducted by (Chiurciu, Cofas and Dragomir, 2020, pp. 243-251) showed that the yield potential of potatoes in Cyprus in the European Union declined from 23.92 tons/ha to 22.49 tons/ha in 2018. However, research conducted by (Wadas and Rymuza, 2019, pp. 59–68) showed that the potato varieties imported from Cyprus into the European market had high quality in terms of taste and after-cooking characteristics.

Therefore, farmers' vulnerability regarding climate change, along with socioeconomic factors, is given special attention in the discussion, followed by barriers that are halting their adaptation to climate change control practices. Moreover, barriers to their ability to compete in the EU market are also highlighted to extract improvements for the upcoming sections. In order to have a clear idea about the challenges that are haunting potato production sustainability in Cyprus, these challenges are discussed one by one in detail.

### **2.5.1 Climate change and production yield**

A big concern about sustaining the potato cultivations and the production at satisfactory rates are the effects of global warming. Cyprus is the only EU country to be at the lowest Eastern warm climate, influenced by repeated droughts and extreme warm climate and high humidity. Water shortage has been a chronic challenge for Cyprus. As a matter of fact, it has been regarded among those European Union countries that have the highest levels of water scarcity (Sofroniou and Bishop, 2014, pp. 2898–2928). Various studies have explicitly shown that climate in Cyprus is prone to high variability which would lead to soil degradation, yield reduction and increased water demand (Constantinidou, Zittis and Hadjinicolaou, 2019, p. 26) (Lange, 2019, p. 455); (Papadavid et al., 2017, p. 30). Research conducted by (Markou et al., 2020, p. 483) showed potatoes among the most vulnerable crops to climate change.

As the research by (Behrens, Georgiev and Carraro, 2010, pp. 87–98) indicates, eastern European agriculture will be negatively affected by the temperature changes, declining almost 30% in crop yields. The heat-free period that is the optimal condition for potatoes to grow, fluctuate between 18–27°C (Haverkort et al., 2004, pp. 29–46). The suitable period for the growing season will shorten because of the increasing temperatures, resulting in even lower production (Haverkort and Struik, 2015, pp. 76–85). Especially



Mediterranean countries will undergo drought and heat stress, to the point that by 2050 tuber crops yield will have a decrease of -14 to 7%, and potato cultivations will have an increase in water demand of 6-10%. Such a scenario will negatively impact the livelihood of farmers worsening their current living standards (Giannakis and Bruggeman, 2015, pp. 26–35)

Utilizing and improving irrigation systems is an advisable practise, yet it is not sufficient. To obtain the greatest potential yield of production, (Malek and Verburg, 2017, pp. 821–837) evaluate optimal to invest in improving the production systems. (Haverkort and Verhagen, 2008, pp. 223–237) backing up, economic development is of greater significance than climate consideration and that should be the priority of the European growers to invest in, such as expanding farm size and reinforce the production.

Climate change conditions in Cyprus are also exacerbated because of the lack of awareness among the farmers. (Gifford, Kormos and McIntyre, 2011, pp. 801–827) regarded a lack of understanding about climate change problems among farmers as a major constraint in the path of controlling climate change. Moreover, (Jones and Boyd, 2011, pp. 1262–1274) considered insufficient funding and inadequate technological know-how as another big reason for the heightening of the climate change issue.

Climate change has worsened the already damaged water resource scenario in Cyprus, which has led to an unprecedented level of water scarcity.

### **2.5.2 Water scarcity and quality issues**

(Falkenmark et al., 2007) defined water shortage as a condition in which there is inadequate water supply to fulfil the needs and demands of all sectors. According to (Gleick, 1994, pp. 6–42), the most major causes contributing to water shortage are climatic conditions and the deterioration of ground and surface water. Cyprus has the most severe water scarcity problem in Europe, and it has been utilising groundwater beyond acceptable limits (Eleftheriou, 2001, pp. 56–59) (Raso, 2013), particularly in years of extreme drought stress (Bixio, 2008). Reduced irrigation has put the country's agricultural output in jeopardy (Christou, Dalias and Neocleous, 2017, pp. 1311–1323).

The fact that potato is Cyprus' most important export commodity and one of the two most water-intensive crops in Cyprus (citrus and potato) raises severe worries about the sustainability of the Cypriot potato business in the EU market. The significance of water for potato producers may be gauged by the fact that potatoes, together with citrus, absorb almost one-third of total Cypriot water (Sofroniou and Bishop, 2014, pp. 2898–2928). Reduced irrigation water availability would reduce nutrient absorption in the potato, resulting in yield and production losses, threatening the Cypriot potato industry's long-term competitiveness in the EU market.

Not only is a shortage of water an issue, but a lack of excellent quality water is also a worry for the Cypriot potato, which is the principal product of irrigated agriculture (Nikolaou et al., 2020, p. 302)). This resulted in groundwater overexploitation of over 40% of the acceptable sustainable limit (Demetriou and Georgiou, 2004, pp. 43–46). (Georgiou and Pashalidis, 2007, pp. 104–110) discovered that the groundwater utilised for irrigation in Nicosia contains a high level of Boron. This generated severe concerns about the long-term sustainability of potatoes grown with such low-quality water in the EU market, which is heavily controlled by environmental laws and regulations.

### **2.5.3 Intensified use of chemical fertilizers and pesticides**

In Europe, there has been an expanding tendency toward intensive agriculture with the goal of providing an unprecedented quantity of agricultural food supply to the globe. Furthermore, the rising economic value of potato goods has prompted farmers to supplement potato crops with chemically manufactured fertilisers, resulting in a significant rise in potato production. Fertilizers rich in nitrogen, phosphorus, and potassium are often used. However, overuse of these fertilisers has been shown to be detrimental to the long-term accomplishment of Cypriot potato sustainability objectives.

Chemical fertiliser application intensification may have two effects on the sustainability of Cypriot potatoes. The excessive use of nitrogen fertilisers, for example, would have a significant influence on the nitrogen content in the groundwater table (Darwish et al., 2003, pp. 1–11). It degrades the quality of surface waters (Ierna et al., 2011, pp. 35–41),

resulting in water scarcity, which is detrimental to potato crops due to their high-water consumption.

Another problem is that in the EU market, potato tubers with nitrate levels over a predetermined limit (200mg/kg) are not permitted by distributors (Ierna, 2009, pp. 551–555), posing a major threat to the sustainability of the Cypriot potato in the EU market. Furthermore, surface water in Cyprus is becoming progressively contaminated with chlorinated pesticides above the EU limit (Sofroniou and Bishop, 2014, pp. 2898–2928), which might be detrimental to the prospects of Cypriot potato sustainability in the EU market. According to (HIID,2000 pp56-62) Cypriot potatoes had very excellent quality and were used to be sold at premium pricing compared to other potato rivals in EU markets, demonstrating how high the sustainability Cypriot potatoes had before producers resorted to extensive fertiliser and pesticide use.

#### **2.5.4 Socio-economic constraints to Cypriot potato sustainability**

The European Commission report published in 2019 illustrated another worth-mentioning factor that serves as a barrier to potato sustainability. Sustainability in terms of a social dimension is not very impressive. The report depicted that Cyprus has the lowest ratio of young farmers, and more than 40% of farmers in Cyprus are above the age of 64 while the mean age is 59. Moreover, only a small number of farmers (only 8%) are well trained and skilled in farm management practices.

In Cyprus, a large number of farmers are uneducated, and risk-aversion is a common feature of the older and low-educated potato farmers in Cyprus. A study conducted by (Adamides et al., 2013, pp. 16–36) showed that uneducated and older farmers are more reluctant to adopt to latest and advanced agricultural technologies. These farmers tend to rely mostly on experience and the traditional practices carried out by their forefathers. (Gangwar, Tyagi and Soni, 2019, pp. 4123–4132) argued that the use of advanced ICT in agriculture is greatly hindered by the lack social acceptance shown by farmers. (Markou and Stavri, 2006, pp. 67–74) reported that during the period 1990-2001, 39.6% decline in the Cypriot potato export market occurred mainly due to farmers' insistence on using old

and traditional methods and denial of using modern technology. It greatly undermined their competitiveness in the highly advanced European marketplace.

A study conducted by (Giannakis and Bruggeman, 2015, pp. 26–35), (Giannakis and Bruggeman, 2018, pp. 94–106) had showed that Cyprus has low economic performance in agriculture with low labour productivity. Moreover, investments in the agriculture sector are not substantial, and there exists an over-dependence on subsidies. Moreover, (Chimonidou, 2004) noted that in Cyprus, the role of women regarding the decision-making of farm production is the lowest among other EU nations.

For a country like Cyprus, it will entail a high cost for achieving potato sustainability in the EU and other competitive global markets. A report published by the European Commission in 2017 showed how important it is for Cyprus to introduce innovations to compete in the global market. It iterated the adoption of modernization in farms, resource efficiency, and the implementation of environmental protection measures to enhance potato sustainability and competitiveness.

### **2.5.5 Competition barriers for Cypriot potato sustainability at EU and global level**

One of the main challenges, Cyprus faces in its path towards potato sustainability is its small market. According to (Adamides et al., 2013, pp. 16–36), agriculture contributed about 20% to the Cypriot economy before its accession with the EU in 2004. However, according to Cyprus Statistical Service (2015) it showed a sharp downward bent, contributing only a meagre contribution of 2% to the national GDP.

Moreover, the European Commission report published in 2019 showed that the number of farms in Cyprus shrank by 23% during 2005-2016 while agricultural areas decreased by 33%. According to a report released by the European Commission in 2017, 75% of all farms in Cyprus have only an average of 2 hectares area. (Stylianou, Sdrali and Apostolopoulos, 2020a, p. 104722) argued that the small agriculture sector of Cyprus cannot easily compete in the large and highly competitive environment of the European Union. (Adamides, 2020, p. 898) argued that farmers' lack of awareness further aggravates the prospects regarding Cypriot potato's ability to compete in international and EU markets. Also, these farmers possess low bargaining power, making them unable

to take any significant advantage of the economies of scale. Their incomes are unstable and prone to losses as compared to incomes in other sectors.

### **2.5.6 High costs of production**

To be able to make efficiency improvements and effectiveness computations for yield and productivity is key to determining the economic factors that regulate Cyprus and its markets.

Cyprus being an island, entail higher transportation costs, both for the resources that are used for the production and the distribution of the final product, inevitably adding to the product price. Focusing on the procurements needed, (Camilleri and Falzon, 2013, pp. 131–164) are proposing a "Controlled Input-Cost Model" that anticipates the sustainable use of natural resources, especially for energy and fuels, to manage their expenses. In addition, (Larson et al., 2002, pp. 1057–1072), claim that when environmental regulations increase the input prices, farmers may have the motive they need to use their resources more efficiently. (Stylianou, Sdrali and Apostolopoulos, 2020, p. 6105) reported that Cyprus relies heavily on agrochemicals, fertilizers, and other manures which it largely imports from foreign countries. This causes an increased cost of potato production, posing serious threats to its sustainability as it troubles the potato growers.

Another factor that has caused increased costs of production is the high prices of irrigation water required for potato cultivation. (Larson et al., 2002, pp. 1057–1072) had reported that the government of Cyprus used to give considerable subsidies to potato farmers on irrigation water. In 1998, it was about \$0.13/m<sup>3</sup>, which has continued to decrease ever since due to the water scarcity issue. Moreover, it was almost eliminated for the potato farmers in the south-eastern coastal region of Cyprus. To counterpoise the high total expenditure of the production is essential to comprise value adding elements on the product (Markou et al., 2006). The current section has critically analysed the issues that are plaguing potato production in Cyprus and harming its sustainability in the local, EU and global markets. With all such challenges under discussion, it is necessary to devise applicable strategies and solutions that could help overwhelm these problems. The strategies will include recommended suggestions extracted from various studies and

research projects, designed specifically for the control of challenges under discussion faced by the Cypriot potato industry.

## **2.6 Strategies and efforts to tackle sustainability challenges.**

The strategies described in this section will enable stakeholders to take decisions and implement innovations that will help them counter the previously mentioned challenges. It would then eventually lead them to enhance the ability of the Cypriot potato industry to sustain its worth in the local and EU marketplaces. Before describing the strategies and measures taken for this purpose in detail, certain sustainability indicators are discussed to get a basic idea of the shortcomings in the present frameworks, after which the proposed strategies and previously undertaken measures are briefed.

### **2.6.1 Strategies and Sustainability indicators**

It could be argued that the lack of entrepreneurship and thus farming strategies are absent in Cyprus since the monopoly ended in 2004 of Cypriot potatoes and liberation of the market and with it the collective control of farmers and varieties could have played a major role in the reduction of numbers. According to (Sgroi et al., 2014, pp. 1598–1603), farming enterprises occupied in growing early potatoes in the Mediterranean region, can be economically sustainable and be viable. The results though, display very moderate earnings, due to the absence of entrepreneurial strategies that are needed in order to increase production, augment the profit and strengthen the sustainability.

Also, (Larochelle and Alwang, 2015, pp. 285–308.) made a clear point that in order for farmers to access bigger and more lucrative markets, they will be needing high liquidity and production levels, but still, to do that, they will be needing more assets, such as land and agriculture equipment.

In Cyprus, the use of high-tech equipment is absent since the growers still use the same machinery as they did 20 years ago to cultivate land and uplift potatoes. The land itself, as well as the absence of research and development in the Cypriot potato industry, played a big role in this.

To ease the uncertainty of potential sustainability, (Blair and Lovecraft, 2020, p. 2446) support that, assessing the risks and appraising the factors each community individually has to contemplate and not universally, will be able to devise the adaptations and the fitting changes to accomplish its best potential.

It is, in my opinion, this lack of research as well as the implementation of new strategies and information that have left the industry on an automatic pilot, with the growers in one hand just to grow potatoes and the market to absorb the product under market conditions of any kind with fluctuating results each year. The lack of further investigation of the real factors affecting the product and hence the sustainability of the potato industry is absent, which means that the growers are left abandoned, just to grow potatoes and wait for the results.

(Hayati, Ranjbar and Karami, 2010, pp. 73–100), argued that having indicators for measuring their sustainability could help the farmers to understand their current condition and guide the way to move forward. These indicators, so to be valuable and useful, should be determined based on the location and the governance, economic, ecological and social aspects situation of each farm and country they are monitored in. Even so, (Rasmussen et al., 2017, pp. 33–46) found that these indicators were not evaluated effectively by practitioners, and so would have minimum impact on the application.

### **2.6.2 Precision Agriculture**

As reported by many researchers, precision agriculture (PA) is a management concept or strategy that can turn into an efficient and profitable strategy for both farming enterprises and the environment (Gebbers and Adamchuk, 2010, pp. 828–831); (Pierce and Nowak, 1999, pp. 1–85); (Stafford, 2000, pp. 267–275). (Kountios et al., 2018, pp. 537–554) argued that PA effectively helps in increasing agricultural income by increasing net yield and lowering the cost of production, while at the same time reducing pressure on the environment. (Bongiovanni and Lowenberg-Deboer, 2004, pp. 359–387) had rightly argued that PA promotes all elements of sustainable agriculture, viz. ecology, sociology and economics.

The initial reason farmers should comply with precision agriculture is fundamentally economical (Adrian, Norwood and Mask, 2005, pp. 256–271), although it can substantiate the decision process, in an effective approach. As (Karim, Karim, and Frihida, 2017, pp. 402–409) point out, there is an underlying need for a decision-support system, necessary to increasing production potential. However, these decision support systems should be validated by taking into account the specific conditions of the geographical area where potatoes are cultivated (Escuredo, 2019, pp. 354–361).

(Bongiovanni and Lowenberg-Deboer, 2004, pp. 359–387), explain how restraining the use of resources and supplies can sustain agriculture production in the long run. Evert, (van Evert, 2017, p. 1863) calculate that with precision agriculture in potato cultivations, they could increase profit by 21%, and social profit by 26%. However, proceeding from research to the application (Adrian, Norwood and Mask, 2005, pp. 256–271), deal with some concerns that prevent farmers' from adopting the system, even if they understand the efficiency that may enjoy from precision management. The main issue being the "problem of implementation", (Lindblom et al., 2017, pp. 309–331) as in limited funds to begin, slow adoption in innovation, and lack of willingness in training learning.

(Bujdos, 2018) argued in his study that suitable incorporation of precision agriculture management in the farming system of Cyprus and other EU countries helps to fight the menace of drought and water scarcity issue, not to mention that these stresses are damaging to Cypriot potato production and market sustainability.

### **2.6.3 Sustainability assessment**

Van Passel and Meul ( 2013, pp. 63–88) pointed out that in order to tackle barriers in the way of the sustainable Cypriot potato industry, it is pivotal to devise strategies that would enable a sustainable farming system in Cyprus. Stylianou, Sdrali and Apostolopoulos, (2020, p. 104722) claimed that there is an explicit lack of empirical research in the field of sustainability assessment of Cypriot potato that is creating barriers in its progress to its fullest potential.

However, studies have revealed that before assessing the sustainability of Cypriot potatoes, it is necessary to have a clear understanding of the diversity of farming systems



present in the country (Kamau et al., 2018, pp. 171–185); (Kuivanen et al., 2016, pp. 153–166). Pacini et al. (2014, pp. 376–397) argued that to attain sustainability, it is vital to enhance the stability of diverse farmers' livelihoods. Iraizoz, Gorton and Davidova, (2007, pp. 143–169) argued that the role subsidy had been crucial in the sustainability of the farming system.

Identifying the variables impacting these diverse farming systems can be an invaluable help in the accomplishment of the agriculture sector (Gelasakis et al., 2017, pp. 22–29). One helpful way of assessing the sustainability of Cypriot potatoes is by using typologies.

#### **2.6.4 Use of quantitative and qualitative typologies to capture Cypriot potato sustainability.**

Typologies can be utilized to extract an understanding of the sustainability of the Cypriot potato industry by considering factors such as the diversity of farming systems in Cyprus. To this end, two approaches, namely, quantitative and qualitative approaches, are used to draw insights. The quantitative approach is a statistical-based approach, while the qualitative approach is a participatory approach.

Various studies have shown that researchers can use one approach at one time or can use a combination of both approaches to draw valuable insights (Berre et al., 2019, pp. 191–207); (Kuivanen et al., 2016, pp. 153–166). The qualitative approach can be quite useful as it places direct attention on stakeholders (Berre et al., 2019, pp. 191–207) which are farmers in this case. However, it lacks any statistical foundation and lacks uniformity in (Köbrich, Rehman and Khan, 2003, pp. 141–157) which sometimes makes it inadequate for drawing information. The quantitative approach has the benefit of analysing a large set of data with ease and accuracy (Köbrich, Rehman and Khan, 2003, pp. 141–157). For these reasons, the quantitative approach is preferred over the qualitative approach (Carmona et al., 2010, pp. 40–50). However, Alvarez et al. (2018) argued that when assessing sustainability by considering the diverse farming systems, the combination of both approaches would be quite helpful as they provide complementary perceptions. The inferences and information extracted from analysis

based on these approaches would help in preparing a framework of strategies for potato farmers to sustain their presence in the local as well as the EU market.

### **2.6.5 Organic cultivation systems**

For higher sustainability in the EU and global market, Cypriot potatoes should have higher nutritional as well as qualitative value. Potato has always been considered a vital source in terms of fulfilling the nutritional requirements of a large population which led to an increase in its commercial value. To take advantage of this scenario, growers started to opt for undesirable farming inputs (Bacchi et al., 2004, pp. 421–424). Such practices increased production but negatively affected both the soil and the tubers. In the European market, such environment non-friendly practices are not appreciated, and this raised serious questions on the sustainability of Cypriot potato in the EU as well as the global market. Consequently, the organic system of potato cropping gained higher impetus (Lombardo, Pandino and Mauromicale, 2012, pp. 1249–1254) as it is regarded as environmentally friendly.

It is important to note that despite organic systems offer low yield as compared to other conventional cropping systems (Maggio et al., 2008, pp. 343–350), it was still being preferred. However, several studies have shown that potatoes grown through organic farming possessed improved dry matter (Moschella et al., 2005, pp.325-332). Moreover, Cypriot potato grown through organic systems would have higher sensory characteristics (crisper and tastier) after cooking. A study executed by Lombardo, Pandino and Mauromicale,(2012, pp. 1249–1254) showed that a Cypriot potato variety Ditta is widely used in Europe and is grown under an organic system had high sensory characteristics. It revealed that the Cypriot potato industry should focus on developing potato varieties that are grown in the organic system with higher qualitative and nutritional values as well as adequate yield potential so that it could sustain itself in the competitive global, especially in the EU market.

### **2.6.6 Pesticide control and fertilizer regulations**

European price and 'subsidy eliminating' regulations, as well as new phytosanitary regulations imposed by CAP, have led to a decrease in yield, but mainly and more

importantly, a rise in costs of production and a decrease in return per ton of potatoes to the farmers.

The Ministry of Agriculture (2011) for the prevention of diseases and pests in potato cultivations, indicated the reduction of use of chemical pesticides. As suggested by Litaladio and Castaldi, (2009, pp. 491–493) guidelines, improper speculation of pesticides can have very negative effects on the environment. Pesticides residues contribute to water pollution, impacting flora and fauna, as well as human health. The main exhortation is crop rotation, which can be really advantageous regarding restricting chemicals, but in effect is lowering the production volume dramatically.

To sustain the potatoes cultivation systems, as a study by Wu (2013, pp. 215–221) indicated, it would be advantageous for intensive agriculture, who is greatly using fertilizing and biocide chemicals to induce their production and result in soil degradation and environmental issues, to opt for plant growth-promoting bacteria, endophytes and fungi, to induce biocontrol, and as said sustainability.

In addition, no climate differentiation was made for Cyprus, and the state, in my belief, was absent to ask for needed exemptions when the time was right to assist the potato cultivation, as either it was not foreseen, or it was not assessed or researched correctly.

In Europe, biocide research is relatively low compared to other countries (Balog et al., 2007, pp. 2203–2208), consequently having greater complexity in regulations, fewer registered biopesticide-active substances, and fewer products available in the biopesticide market.

Nevertheless, the application of fertilizers, traditional, bio or plant based, cannot be obliterated, they indeed contribute to the efficiency augmentation, as in quality and yield of production (European Commission, 2019). Still, after reforms on fertiliser use abatement of the Common Agriculture Policy in the past decade, the EU usage is now only 10% of the global practise. Tan (2016) pointed out that there is a need to implement sustainable agriculture practices, such as balanced fertilizer application. It will lead to optimum potato yield as well as the highest quality of tubers.

### 2.6.7 Climate change adaptation projects for Cypriot potato

Adger, Eakin, and Winkels (2007) defined climate change adaptation as the implementation of strategies to deal with negative influences of climate change which would eventually lead to the increased resistance and resilience against climate change vulnerability. To this end, various projects were designed in the past and some are functional currently to get viable results for future generations. UNDP defined climate change adaptation as a comprehensive program of actions devised in order to address the hostile impacts of climate change (Burton, Huq and Malone, 2005). To provide protection and resistance to Cypriot potatoes, a project is meant known as the LIFE ADAPT2CLIMA (Adaptation to Climate Change Impacts on the Mediterranean Islands) project. This project aims at building a solid knowledge base to help devise measurements to control the negative impacts of future climate changes on the growth and sustainability of the Mediterranean agricultural sector. Markou et al. (2020, p. 483) conducted a thorough survey evaluation study of the measurement taken by the LIFE ADAPT2ACLIMA project to enhance the modification of Cypriot potato to fluctuating climate change conditions. They evaluated the impacts of adaptations measures against these climate change conditions including, viz. heat stress, drought stress, extreme weather events, and reduction in crop efficiency. The results revealed that for Cypriot potato, recommended measurement of intercropping was quite helpful. Moreover, the need to develop better cultivars and high resisting lines of potato was also clear in the results as depicted by participants. They also found that to enhance plant health, Integrated Pest Management (IPM) control should be applied. Measures related to cultural practices in Cypriot potato focused primarily on the sustainability of potato by selecting stress resisting varieties. Bruggeman et al., (2014, p. 10537) reported that another project AGWATER aimed to devise strategies for the potato to adapt to water scarcity caused by climate change in Cyprus. The project ready a climate dataset for Cyprus for the period 1980-2010. The project helped design a new soil map by utilizing predictive modelling. Moreover, they also identified that the project advised water stakeholders to set water prices as per the resilience of production systems. Greenhouses and hydroponics were the highly suggested production systems. A green-blue water model was designed that assisted in the accurate calculation of efficient water

use in the future for potatoes. Also, the project provides various production and water use indicators such as crop yield, crop water production, economic water productivity, etc.

### **2.6.8 Public strategies to counter water scarcity issue**

Lack of water quality led to overexploitation of groundwater, which caused a severe scarcity of water in Cyprus. Moreover, for irrigation water, the quality of the water is quite crucial, as it will impact the commercial value of potatoes exported to the EU market. Therefore, public institutions in Cyprus have come up with various measures to ensure that the quality of available water in the country remains good.

According to a report published by the Water Development Department in 2013, qualitative monitoring of water resources will be continued in accordance with the Water Framework Directive 2000/60/EC. Moreover, monitoring will also be done regarding the implementation of such related programs.

Previously, water resources in Cyprus were handled by a number of authorities. In other words, the policy regarding water resources was in fragmented form. This caused wasteful water resources and the inability to impose a coherent policy for all the water resources. Consequently, the water scarcity issue began to reach new heights. However, in November 2010, the Integrated Water Management Law was put into effect, which enabled the implementation of uniform policies in terms of protecting the qualitative and quantitative ratings of water resources.

The EU issued a Framework Directive to establish the basic principles of sustainable water policy in the European Union. Cyprus being a member of the European Union complied with the principles of the Directive. This Directive aimed at protecting all water resources from all sources of pollution. It also had a strict policy of “polluter pays”. This, however, caused an increase in water prices. Even though the government of Cyprus can exercise its control over about 40% area of the country, this Directive implementation brought significant improvements in terms of water scarcity control (Sofroniou and Bishop, 2014, pp. 2898–2928).

### *2.6.8.1 Climate change and potatoes*

Climate change is likely to have a considerable influence on global potato production. Changes in atmospheric CO<sub>2</sub>, temperature, and rainfall, as well as their linkages, are anticipated to influence potatoes, as they do many other crops. Climate change will modify the distribution and populations of various potato pests and diseases, as well as harm potatoes directly. Potatoes are among of the world's most important food crops. To minimise crop yield declines, potato production must be climate change adapted (Haverkort and Verhagen, 2008, pp. 223–237).

### *2.6.8.2 Challenges of organic potato farming*

When it comes to organic farming, potato growers confront two primary challenges: disease and nutrition control. Both elements are constrained by restrictions prohibiting the use of chemical fertilisers, particularly nitrogen, and most insecticides are manufactured. Sub-Phytophthora illnesses cause injury-induced damage, which is often regarded to be a key yield barrier. Potato output in the United States is increasing, according to a USDA-certified summary, with more than 8,000 to 17,000 certified potatoes produced each year. Between 2008 and 2016, hectares of organic potatoes were planted, and sales of organic potatoes surged fivefold, from USD30 million to USD150 million. Early potato planting needs a comprehensive approach, with a focus on rotation construction. Experts say that growing organic potatoes is highly reliant on indirect, preventive, and long-term nutritional and crop protection techniques (Finckh, Schulte-Geldermann and Bruns, 2006, pp. 27–42).

### *2.6.8.3 Nutrient Management*

According to research from the University of Kassel (Germany), nutrient uptake in the spring and early summer is one of the most difficult problems to overcome in organic farming, and it is also one of the key determinants limiting productivity. Plant feed relies on careful transactions that include the replacement of 25% or more legumes and the addition of organic fertilisers such as solid and liquid animal manure, green manure (cut or sown parts of plants left to dry out in the field to act as a resource supplement) and compost to vegetables and soil. Except for liquid manure, these fertilisers are typically

applied over a lengthy time (slow release) and are extremely reliant on the humidity and temperature of the mineral processes that make nutrients available to plants (Finckh, Schulte-Geldermann and Bruns, 2006, pp. 27–42). Turns, cover, and green fertiliser outputs, as well as creature compost, are commonly utilised to oversee supplements in potato production. Unfortunately, there are strong links between the type and time of supplement administration and a few irritations and infections, particularly wireworms and dark scurf (caused by *Rhizoctonia solani*)," said Kassel analysts.

*Rhizoctonia Solani* is exposed to high levels of organic matter from manure or pre-grass plants under adverse weather conditions, note the researchers. Putting aside the side effects, Kassel experts have found that using grass mulch has many benefits. This is because the use of herbivores has reduced the risk of potato Y infestation, while the use of mulch grass has reduced nitrogen leaching at the end of the potato season.

#### **2.6.9 Adoption of Smart Farming Methods to Combat Environmental Challenges**

The world is facing a major danger of global warming and climate change, according to "The European Green Deal" released in 2019. With each passing year, the environment changes considerably. This illustrated that millions of plant species might be threatened throughout the globe, which could only be averted by implementing effective climate protection methods.

The Mediterranean has been regarded as one of the most sensitive locations to climate change throughout the years (Field and Barros, 2014), which presents severe worries for Cyprus as the Mediterranean's southernmost point. Cyprus falls significantly behind in terms of integrating contemporary technology into its agricultural systems. Furthermore, this threat has resulted in alarming levels of water scarcity, which is the most critical aspect for sustainable agriculture. According to the Food and Agriculture Organisation, water shortage is the most challenging task of the twenty-first century (Dubois, 2011, pp.6-7). According to Connor (2015, pp. 67–69), water withdrawals have increased dramatically, almost double the pace of population growth.

Water shortage is problematic for Cypriot potatoes since they are a water-intensive crop that requires a big amount of farmed land. Because abiotic stressors have a major

detrimental influence on the tuberization of potato plants, unmanaged environmental circumstances may result in a large loss of output in the potato sector (Minhas, 2012, pp. 1155–1167); (Wang-Pruski and Schofield, 2012, pp. 1121–1153). Potato is an important crop in Cypriot agriculture (Markou et al., 2020, pp. 19–34). According to Zecca (2019), such production constraints may be solved by using smart agricultural techniques that seek to promote food security at both the local and global levels. The use of numerous climate smart agriculture (CSA) strategies, such as the usage of the Internet of Things (IoT), reinforces the use of multiple gaps in Cypriot agriculture's coping with the threat of climate change. IoT paired with ground surveying data can assist potato farmers and producers in lowering production costs and improving quality in accordance with EU and worldwide standards while minimising environmental impact (Adamides et al., 2020, p. 557). According to them, it may help potato growers gather real-time data on irrigation and plant protection methods. Farmers can forecast and control the usage of plant protection goods, such as chemical fertilisers, in this manner. Mitaritonna and Ragot (2020, pp. 1–10) even stated that after the COVID-19 epidemic, there is a risk that robots would be used to harvest vegetables in farms throughout the European Union.

Weeding (Igawa et al., 2009, pp.236-239), spraying (Berenstein and Edan, 2017, pp. 1519–1530), and harvesting (Bac, 2014, pp. 888–911) will benefit from the incorporation of cutting-edge robotic technology. A number of recent studies have identified smart agriculture practises as driving factors for agricultural sector sustainability in any industry (Balafoutis, Van Evert and Fountas, 2020, p. 743); (Villa-Henriksen et al., 2020, pp. 60–84).

According to Markou et al. (2020, p. 483), small farmers, particularly in Cyprus, are more exposed to climate change losses because they lack the capacity to deal with price volatility and take use of economies of scale. According to Walter et al. (2017, pp. 6148–6150), smart agriculture combines the use of modern information and communication technologies in its operation, resulting in higher output. A growing body of research emphasises the need of developing superior potato models to protect its products from the threat of climate change. The SUBSTOR-potato model, which is commonly utilised in



simulation research (Brassard and Singh, 2007, pp. 105–117) (Daccache et al., 2011, pp. 1641–1653), is one such example.

Cyprus, on the other hand, has begun to modernise its farms in terms of resource usage and environmental preservation. To take advantage of the competitive market, it has concentrated on pursuing new steps to boost the quality rather than the quantity of its most important crop, potato (Adamides et al., 2020, p. 557). Furthermore, modernisation and the introduction of new technologies are key to its next programming term (2021-2027).

## **2.7 Patterns of production**

Potatoes are cultivated twice a year in Cyprus. Crops for Play (planted in January) and Autumn Crops for Play (placed in September) (planted in August). A substantial majority of subsistence farmers are primarily concerned with output. There has been a rise in the number of farmers focused on potato growing in recent years. There was also some potato crop concentration in several places in Cyprus. Two factors influence Cyprus's overall output (or total production per farmer). The acreage comes first, followed by the yield. Consequently, it is suggested that, in order to thoroughly evaluate production patterns, trends in area and yield, as well as their combined impact, be investigated. On a greater scale, potatoes are being farmed. It peaked in 1962, when 65,000 dunums were planted. In 1963, the land area will be bigger. The spring crop alone covers 65-70,000 donum acres. This ongoing expansion of potato acreage is mostly due to rising demand for potatoes in the United Kingdom, notably in May and June, and secondly, demand from other countries (Syria, Lebanon, Saudi Arabia, and so on). The concern is whether the increase in successful interest corresponds to the increase in real estate (or if it is imbalanced to the interest when many challenges of organising the creation at numerical costs emerge). So far, a fantastic real estate market (with consistent returns) has produced genuine removal issues. In recent years, the genuine status of potatoes has revealed a few types that have become more accurate. These differences are most likely caused by the following factors: a) The acreage that the Cypriot rancher (like other

ranchers across the globe) is planting is based on his estimations, which are primarily based on the previous season's fair and square expenses. Because the price of potatoes is so volatile, the ground follows pace with uniform changes. The true situation of potatoes seems to be impacted more by prior crop expenses than by other factors. This notion is supported by the instance of the 1963 spring crop. The potato seed imported in 1962-1963 is only half as noteworthy as that imported in 1961-1962, resulting in the land of Luo. This is largely owing to the manufacturers' very high expenditures for the 1962 spring crop. As a consequence, the 1963 spring crop grounds outweigh the 1962 harvest by half. Similarly, ranchers make judgements based on the associated yield rather than the expenses of the already-acquired crop.

output: Total output in Cyprus has expanded significantly, particularly in the previous five years. The average output over the previous five years has been more than twice that of 1945-1949. The overall output is determined by acreage and yield. Because land and output fluctuate, there are large changes in overall production.

Absolute creation variations have a significant influence on the fairness and squareness of yearly expenditures. Because potato demand is inelastic, a change in supply has a higher influence on the degree of expenses and hence the pay from a potato crop than the reverse. Surprisingly, the output of the potato sector is typically erratic and, to a significant degree, wild.

### **2.7.1 Opportunities, challenges et strategies**

According to estimates released by the International Food Policy Research Institute (IFPRI) and the International Potato Centre (CIP), developing countries will have better growth rates in potato production and productivity between 1993 and 2020. According to these forecasts, global potato production will reach 403.5 million metric tons in 2020, with China producing 87.8 million metric tons and India producing 43.3 million metric tons. During the same time period, global demand for potatoes for food, processing, and animal feed is expected to rise by almost 40%. A steadily expanding population, diminishing arable land, reducing water openness, and increased purchasing power prompting increased interest in food, more natural contamination, a decrease in input use utility, and

negative changes in climate and sea temperatures are some of the impediments to achieving these objectives. Because agricultural land and water assets are diminishing, there may be no other option than to supply more food with less land and water. To put it another way, more food has to be generated per unit of land, water, energy, and time. The emergence of a wide range of bugs, difficulties in the production and transportation of high-quality seed, problems in transportation and cold storage, uncontrolled pesticide use causing natural issues, the emergence of new bugs, and value changes have all been major obstacles in potato production. In this context, a few options for increasing potato production in an environmentally, fiscally, and socially responsible manner are presented.

## **2.6.2 The State of Food Safety and Agricultural Development Around the World**

Agriculture and natural resources are being put under unprecedented pressure as the world's population increases and food demand rises. Today's food systems are incapable of providing enough healthy food to the world's population while being ecologically friendly (Wu et al., 2013, pp.2150-2158). There are 822 million hungry people on the planet, while 1.2 billion are overweight or obese. Food production, processing, and waste all put pressure on natural resources. By 2050, the world's 9.7 billion people will eat 70% more food than they do today.

(FAO, 2018). Giving nutritious and affordable food to this growing population will require significant modifications to the global agrarian framework—one that provides jobs for farmers as well as sustaining products for customers while reducing the existing environmental impact. A basic criterion is to discover a means to supply more food with the same or fewer assets without creating injustice or negatively impacting the environment. According to the International Food Policy Research Institute's (IFPRI) 2017 Global Hunger Index (GHI), significant progress has been achieved in reducing hunger around the globe. The nurturing scene's GHI score in 2000 was 29.9, but it is now 20.0, a 31% decrease (Taylor, Bogdan, and DeVault, 2015). In any event, the present pace of food supply development will not be sufficient to end hunger by 2030, let alone 2050. Despite long periods of success, food security remains a major concern. Clashes, demonstrations, and environmental change, as well as the current COVID-19 epidemic, are inflicting havoc on the world's poorest population while keeping up with locations that

are always in crisis. The plague has complicated the task by causing a monetary crisis, boosting food prices, and destabilising reserve structures. Since the start of the epidemic, global hunger has reached its highest height in many years, and if left uncontrolled, it would almost certainly disrupt the scene's loss of life. According to late estimates, COVID-19 would add 83 million to 132 million individuals to the list of those who do not have enough food to satisfy their health requirements by 2020. Food insecurity is anticipated to almost quadruple this year in agricultural nations, reaching 265 million (Farrall et al., 2019).

Previous GHI research has proven that hunger and injustice are intricately connected. Destitution, maybe the most evident evidence of cultural difference, is also the most closely related to hunger. Both are founded on uneven power relations, which are often worsened and extended via laws, attitudes, mentalities, and practices. In general, the convergence of poverty with the most prominent social determinants of sexual orientation, age, and ethnicity may result in fundamental areas of food insecurity and high neediness, even among relatively disadvantaged people.

According to FAO (2002), "food security occurs when all people have physical, social, and monetary permission to satisfactory, safe, and nutritious food to meet their dietary needs and food tendencies for a working and sound life." There are four primary indicators of food security: i "food accessibility," which refers to supply; ii "food access," which refers to one's capacity to create or acquire food; iii "food quality and use," which refers to the number of supplements received; and iv "food soundness," which refers to approaching regularly (FAO 2009). This widely accepted FAO definition adds to the multidimensional concept of food security, which necessitates multi-regional approaches. Such a system should combine the advancement of broad-based nation development and ordinary development with programmes that explicitly target food insecurity, as well as sustenance-focused protection programmes, including a sex approach (Salazar et al., 2015).

## 2.7.2 Biotechnological applications

It is considered that in the future development of potato production, biotechnology will play a vital role. Since the potato crop is so versatile for present-day biotechnological apparatuses, fundamental genomics and bioinformatics exploration must be advanced so the collection's maximum capacity can be assumed. Meristem culture and quick augmentation technology should be widely used for seed stock cleaning and reproducer seed production. Furthermore, sub-atomic markers should be used in potato production plans whenever possible. Ordinary potato reproduction is an extensive process that includes hybridization, assortment, and preliminary evaluation. The development of transgenic plants through genetic engineering is a powerful method for achieving the desired characteristic while preserving the genetic makeup of the plant. Assemble the development of genetically modified (GM) potato cultivars for biotic and abiotic stress resistance, as well as improved nutritional and processing characteristics. However, transgenic approaches should only be used when conventional breeding fails to produce the required resistance. For most of the countries in the region, horticulture is the foundation of the socio-economic. After all, GM harvesting would eventually be more expensive for these nations compared with GM crops in rich populations. But at the same time, most countries have a weak, rational, and restrictive limit on the safe rotation of events and the use of GM crops.

Closer participation among the nations involved is needed to advance the process of improvement and the arrival of GM potatoes. An impetus for promising development could be the common pool of new entitlement rights (IPR) that differentiates between partners. The RB's level of late submission and even opposition can be a model framework for implementing the IPR sharing process. Conflicts and different approaches that constantly address GM innovations in newly created countries have created a confusing issue of strategic decision-making in the creative space. It has become increasingly difficult to decide whether to pursue the United States or to prepare for the European Union. The site may use a standardized approach to understanding IPR, biosafety, exchange, food handling, and consumer decision-making methods for GM potatoes.

### 2.7.3 Management of production systems

Depreciation of common assets, such as soil, water, and the climate, has been a source of concern, and developing solutions to manage common assets cost-effectively is a key priority. In this case, biofertilizers can be used to supplement the use of fertilisers in an environmentally responsible way. Similarly, increasing water production "crop per drop" is one of the techniques for long-term water management. In potato production, micro-irrigation/fertigation have proven to be helpful. Because of salinity, vast swaths of fertile land are rapidly becoming unsuitable for cultivation. For the bioremediation of damaged soils, appropriate management techniques should be designed.

For this, modern biotechnological technologies, such as transgenic microorganisms and biosensors, can be used. Except in a few nations in the region, typical potato yields are less than 20 tonnes per hectare, despite the physiological potential of 120 tonnes per hectare. In the region, there is a significant intercountry discrepancy in potato output. New Zealand, for example, has reported harvests as high as 70 metric tons per hectare, compared to 8 metric tons per hectare in Kazakhstan. Likewise, the yield varies greatly in different regions of larger countries like China and India. Given the yield gap and limited per-capita agricultural land accessibility in Asia and the Pacific, increasing potato productivity is a significant challenge. This could be accomplished by using better cultivars. In such a way, in India, the Central Potato Research Institute has assumed a critical role in making mechanical advancements as far as cultivars, creation advances, plant wellbeing, esteem expansion, and handling. An institutional game plan at the local level could be made for the import of reasonable, promising assortments from giver nations having comparable agroclimatic conditions. To effectively deal with sources of information like manure, soil-test values must be utilized, promoting accuracy in cultivating. To accomplish these objectives, it is basic that legislatures dispatch soil wellbeing improvement programs in the significant potato-delivering nations of the area.

Every growing season, the potato crop needs a small amount of water, 300 to 500 mm. With rising food demand and dwindling groundwater levels, water scarcity will become a major issue throughout the region. Furthermore, as a result of climatic change brought on by an increase in global temperatures, precipitation has become a major component,

frequently resulting in dry seasons during the early stages of yield development. The development of small water system buildings for water collection and the use of trickling water systems should be encouraged. On agrarian land, it is believed that Asian countries have a higher level of conflict with the population than Bangladesh and India, which are at the top of the list.

In addition, the proportion of people who depend on agriculture for their livelihoods continues to be high in the region, even in the fastest-developing countries. As a result, there is no alternative but to bring more food for each region and time. In the different planning frameworks, potato plants can fit in a short duration of 80-90 days. India has effectively shown this preparation through a different short collection of potatoes. Thus, the International Potato Centre can be apportioned by the momentary admission of the nearby potato and its affectability to nations with equivalent agroclimatic conditions.

## **2.8 What is sustainable agriculture?**

According to Ikerd (2016), agricultural sustainability "refers to farming systems that can retain their productivity and utility indefinitely." However, there is much debate in the literature regarding what this entails in practise. Provide a succinct explanation of numerous points of view and terminology (Edwards, 1994). At the risk of oversimplification, there seem to be two distinct perspectives within the sustainable farming movement. Some individuals consider sustainable agriculture to be a collection of agricultural practises. Crop rotation, diverse crop and animal husbandry, integrated pest control tactics, restricted use of synthetic herbicides, insecticides, and fertilisers, low input agriculture, and organic farming are just a few examples. For this group, what farmers do decide whether they follow sustainable agriculture practises. Others say that sustainable agriculture is a concept rather than a set of procedures, focusing on human objectives and understanding the long-term impact of our actions on the environment and animals (Francis, Flora and King, 1991). According to Thompson (1992), the reason for this is because "philosophy will play a critical role in conceiving sustainability." (According to this group of specialists, sustainable agriculture is characterised by the incentives that drive farmers and the context in which agricultural production happens, rather than by what farmers do).

## 2.9 The economic vs. sustainable agriculture debate

There are two major schools of thought on how to achieve agricultural sustainability. The first emphasises strict, even basic economic processes, while the second recognises the significance of balancing environmental, social, and economic aims. On one side of the debate, economic incentives may be used to show that agriculture is both dynamic and sustainable, since finance is largely about inducements. Efficiency indicates that the percentage of yield to enter grows, implying that usefulness upgrades may result in expanded advantages if individual efficiency gains outnumber those of the firm. If the assumption that people desire to be helpful is correct, people will be motivated to be useful by lowering their production costs and seeking for the most efficient way of production, whether mechanical or authoritative.

Furthermore, future benefit is ensured only when monetary resources remain usable or are replaced with alternatives; this needs a long-term management emphasis. Owners of monetary resources are considered as having a financial incentive to maintain the useful capacity of resources, indicating an interest in manageability as well. The rights of protected property are the essential elements in the financial discussion, since the financial expert thinks that they will be able to utilise monetary resources in the future will they feel obligated to ration now. Simply said, since there is no expectation of future access, open resources are subject to misuse and short-term abuse, but owners of private property holder resources know they may reserve today as they will access in the future (James, 2006, pp. 427–438).

## 2.10 Summary

The chapter began first by defining sustainability to avoid confusion at any stage of the study for which it considered multiple dimensions of the term, (viz. ecologic, social and economic), and explored literature to find out the definition in the context of the present research. It subscribed to the notion of sustainability defined by Francis et al. (1988, pp. 123–126). Afterward, the main subject of the research, i.e., the Cypriot potato industry was put under critical discussion for which both post, and pre-accession eras were given



due attention. A thorough analysis of literature revealed that potato has been the most vital export product (>50% of the total agriculture export) of Cypriot agriculture.

However, several challenges and conditions have undermined the potential of the Cypriot potato industry. Cyprus is one of the most vulnerable countries to climate change in the European Union. Heat stress, drought, and unusual fluctuations are all caused by climate change. As a result, potato production has been disrupted, and heavy losses have occurred in the Cypriot potato industry.

Another severe issue that is haunting the Cypriot potato industry's sustainability potential is water scarcity and lack of quality water. Studies have regarded Cyprus as the country with the severest form of water shortages (Eleftheriou, 2001, pp. 56–59) (Raso, 2013). Excessive use of chemical fertilizers and pesticides by potato growers to increase yield have put a bad image on potato quality in the EU market where regulations are strict regarding the use of such chemicals. It has led to a decline in sales of Cypriot potatoes in the EU market.

Moreover, lack of awareness regarding new technologies and climate change among potato farmers is another challenge that creates hurdles for sustainable sales potential in markets. Also, Cyprus, being a small island, has high production costs for potato cultivation as it cannot afford to provide subsidies on irrigation water. In Cyprus, most of the agriculture landscape is dominated by small farms that lack advanced technology, raising a certain risk to the potential of the Cypriot potato industry to sustain sales in highly competitive markets in the EU.

Nevertheless, to date, various strategies and measures have been devised to tackle the issues in the path of the Cypriot potato industry's sustainability in the local, EU, and global markets. In the 21<sup>st</sup> century, precision agriculture is widely recognised by researchers as an invaluable tool to enhance agriculture sales and income and control environmental degradation. The use of certain typological techniques, such as quantitative and qualitative analysis, should be practiced drawing vital and accurate information for the construction framework for sustaining potato sales in global marketplaces.

To project a good image in terms of potato quality in the EU market, organic farming systems should be promoted on the island. Moreover, coherent policies regarding pesticides and chemical fertilizer applications should be devised so as to comply with the threshold set by EU potato distributors. The ever-increasing menace of climate change should be fought by adopting climate-smart agricultural practices, e.g., the use of ICT in farming systems.

Many past and present ongoing projects and measures to tackle climate change and water scarcity have proved to be helpful in improving potato yield and its commercial value in the EU marketplace, such as the ADAPT2CLIMA project, AGWATER project, WDD water resource monitoring, the EU framework Directive, etc.

I believe private and public sector efforts should be aligned to create awareness among potato farmers about the usefulness of advanced techniques and prevention measures. Also, the dissemination mechanism should be executed in such a way that the transfer of knowledge from policymakers' level to farmers' level is made possible.

Through my literature review, I summarise that the matter of sustainable farming is an issue that many authors and researchers have addressed in various ways, exploring agricultural production methods, the environment, water scarcity, European laws, and other agricultural factors that affect sustainability. I have realised that even if the research is there, I haven't found context that will combine all the aspects together and address today's declining production and farmers numbers leading to the industry's extinction. This verifies the gap that exists in my speciality subject as well as the great need of my research to the European as well as international stakeholders, as a valuable addition to knowledge and direct input in the Cypriot industry through my position and influence.

My literature review has obtained key considerations that need to be evaluated, supporting that the potato industry needs to revolutionize not only with the support and efforts of farmers but also local and international governments and institutions.

Through my literature review, it is now clear that there is a great need for better farming practices, with a focus on advancements in modern and technologically advanced

methods of cultivation as well as handling and marketing, which are imperative to the industry.

The evaluation of the literature summarizes the need for farmers to use improved inputs, education, and training about the emerging techniques of potato farming for higher yields. Also, climate change, including the changes in rainfall patterns and the ineffectiveness of new pesticides that have been traditionally used in farming, is now a major factor in the profitability of farmers.

Government efforts to regulate policies and introduce farming will motivate farmers to produce high-quality potatoes. Further, I have observed through the literature that the sustainability of production and markets is critical. This call is for the adoption of modern and cost-effective methods of production and marketing that will see Cyprus become a haven of potato production, value addition, and export.

Through the literature, it is evident that marketing systems need to be put in place to connect the local, regional, and global markets for improved profitability on potato farms. Additionally, aspects of sustainability in production and markets are critical and well reflected in the literature, showing that the adoption of modern and cost-effective methods of production and marketing is crucially needed in the industry.

## Chapter 3: Research Methodology

### 3.1 Introduction

This chapter thoroughly explains my decision to use a qualitative approach to investigate the sustainability of the Cypriot potato sector. By selecting participants through certain criteria, gathering data via personal interviews, and conducting a detailed analysis with NVivo for Windows, the research captures the complex yet challenging aspects that surround the Cypriot potato industry in a local and global market. Grounded in constructivist ontology and interpretivist epistemology, it uncovers key themes that align with the sector's challenges and projections.

The methodology employs interviews that incorporate farmers and professionals in the global market, analyzing the critical potato industry sustainability factors to comprehensively show the challenges faced by the Cypriot farmers as well as the Cypriot potato industry and the stakeholders.

As I do consider myself as an insider researcher and a market and industry expert, the fundamental values of remaining unbiased as well as getting growers to trust me and open to me as well as getting insight information from market experts was a great challenge. By employing these principles, I have managed to get invaluable information for my research. As argued by Jackson, Bazeley and Bazeley (2019) the fundamental principles of neutrality, respect, and open communication will enable research to attain the objectives previously listed. The principles assist the study to identify important insights essential for understanding sustainable practices and policy interventions.

Also, having used NVivo and implemented coding queries, I looked for patterns in the coding and compared them with the existing sub-groups. The methods used (interviews) are structured into distinct segments that focus on crucial aspects of potato industry sustainability. The segments are divided into four different categories that individually focus on the information about potato cultivation and industry sustainability. The topics cover potato yield and production trends, adherence to EU laws, adoption of innovative

farming practices, and the implications of chemical restrictions imposed by the EU laws. The study further points on the analysis to draw a perspective that characterizes the industry resilience and capacity to navigate complex regulatory and environmental restrictions. The interview with professionals who are operating within the industry illustrates how I explain market dynamics within the potato industry (Jackson, Bazeley and Bazeley, 2019). I classify these as competitive strategies, sales patterns, growth opportunities, and market trends. Other notable topics include target markets, public knowledge of agricultural sustainability, providing critical data regarding the industry's present state and future trails. I also recognize and account for the risk of bias inherent in qualitative research (Phillips and Lu, 2018, pp. 104–106). Therefore, I employed various practices to avoid bias and ensure the findings are as accurate and as real as possible in an aim to get the best possible outcome for my research.

### 3.1.1 My role and position

My role and position in the industry give my research a unique blend of knowledge and input as well as the means to directly influence though my findings the Cypriot potato world.

My deep understanding of the Cypriot potato industry, derived from his extensive personal and professional experiences. My family background in farming, education, and my two-decade experience as the General Director of the largest exporting organization, establishes a strong foundation of credibility and insider knowledge. This allows me to bring a unique perspective to the research, blending academic rigor with practical real-world insights.

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understanding sustainable factors affecting the industry. Through my position and role as well as power in the industry it is easier for me to use qualitative research method of interviews to farmers and professional sellers by which the results helped me to test my research questions and find existing gaps within the existing literature on the sustainability and functionality of the entire agricultural market (Lal et al., 2023, p. 7).

Understanding the value of my influence and the responsibility it brings, I have always tried to position myself as a responsible person, demonstrating the integrity, compassion and commitment appropriate to the farmers and the professional sellers who buy our product.

I have approached my research and respondent interactions with modesty and honesty because I see my contribution as very important and in need by the farmers.

My actions and choices are tremendously valued in the industry for their positive effects. I seek to advocate for initiatives that promote sustainability and development. I know the importance of my opinions and advice matters to so many people and I have tried to use them wisely and ensure that the guidance I provide is not difficult to implement and it is based on solid research.

Building trust with respondents is essential to accomplishing any research (Prior 2018, 487-511). Using my existing connections with producers and professional sellers, I had the opportunity to approach and proceed with my research interviews at a satisfactory level. By placing a high priority on information privacy and security and ethics, I made sure that respondents felt safe to express their experiences and perspectives. This of course was not enough to establish rapport and really get the trust from the interviewees. My great role and power in the industry as well as my daily interaction for the last 2 decades has played a very important role.

One of my main jobs is to give advice on careful planting and planning to growers at all levels of the industry, from farm fields to specialty markets (Lombardo et al., 2020, p. 33).

I can clarify three main approaches that helped build greater trust.

Stable and reliable farmer support: My role as a managing director and my views on the sustainability of the potato industry are characterized by continuous work and firm commitment to the work I do. This sector is not easy to handle and not to keep up. This means that if I make 1 mistake it costs money to the growers or the professional sellers. Throughout the years this trust has strengthened my reputation as a trustworthy and caring person to the potato industry. This helped me a lot when I carried out my research in the interviews as people knew my work and the support I give to the industry.

Empathized and listened in: I built rapport firstly by having a coffee with them and listening to the latest problems they are facing and recognizing the position they are in. then proceeded with the interview drawing attention to participants' questions, answers, and opinions. By demonstrating empathy, I could connect on a deeper level and gain trust easier.

Transparency and research ethics: From the beginning, I have been deeply committed to the requirements of transparency and ethics in my research and interviews. For me this is not just any responsibility, but a logical responsibility where ethical considerations determine how I research and work not only as a university requirement or a researcher but also as a responsible professional (Romano et al., 2018, p. 18). states that attention to participants' concerns, needs, and opinions, and demonstration of a firm commitment to community service is vital in gaining trust in research and interviews. Through my research I made sure participants were well informed of the research purposes, confidentiality as well as the freedom to opt out at any time giving them reassurance and freedom to open up more in the interviews and allowing me to build more trust with them (Pluchinotta et al., 2020, p. 626). The data collected is considered confidential only for research use in the data analysis (Surmiak, 2018). To ensure the confidentiality of the respondents' responses, a strategy to conceal identities was used.

My research's unique position, clear problem statement, and robust methodological approach provide a strong basis for the subsequent phases of the study.

### 3.1.2 Research Approach

I have approached my research methodology using qualitative research approach as it helps us understand people's actual experiences and feelings (De Solier, 2013). This way, I got to hear directly from farmers and experts about their views and opinions in the matter of the Cypriot potato industry and its issues on sustainability (Breacher, 2005, p. 90).

The selection of a qualitative framework is driven by its unparalleled capacity to interpret the subjective realities of participants—from cultivators to policy architects—through methodologies like comprehensive interviews and thematic dissection. The essence of the qualitative approach resides in its inherent flexibility and its commitment to fostering insights rather than merely aggregating data. It possesses dynamic adaptability, crucial for surfacing and engaging with emergent themes, thereby ensuring that the exploration remains closely attuned to the evolving complexities of the data. (Breacher, 2005, p. 90) This flexibility is vital for researching the diverse and nuanced sustainability issues that spread through the Cypriot potato industry, where personal responses through interviews and subjective accounts critically influence the outcome of my qualitative research approach. By embracing a qualitative approach, I aimed to render an exhaustive portrayal of the sector's sustainability factors, driven by the vivid, descriptive insights that only qualitative research can provide. This methodology enables the research to exceed the limits of mere statistical analysis, telling a story that intricately explains the symbiotic relationship between human experiences, market dynamics, and ecological constraints.

### 3.1.3 Research Methods

Qualitative research methods have been adopted in conducting various research due to their ability to give information that is real in nature compared to quantitative methods. Quantitative research methods provide data that is numerical in nature, whereas qualitative research methods provide data which is in the form of audio, text, and video (Basias and Pollalis, 2018, pp. 91–105). The methods are flexible since new ideas can emerge and be adopted to facilitate adequate data acquisition (Hennink, Hutter and Bailey, 2020). Also, the methods give meaningful insights since people express their



feelings and experiences in detail, thus using the information to create new designs and make necessary changes during the research process (Sofaer, 2002, pp. 329–336). Additionally, this method enables the generation of new ideas since during interviews and when answering questionnaires, most questions will be open-ended, thus acquiring responses that might uncover various problems and opportunities (Hammarberg, Kirkman and de Lacey, 2016, pp. 498–501). Without new ideas from the people experiencing the problem, some of the problems that need attention might be left out, resulting in the persistence of the problem. This research aims to determine ways in which the Cypriot potato industry can sustain itself within the current local, EU, and global markets despite the challenges being experienced. Consequently, adopting qualitative research methods suits this purpose with stronger sensitivity compared to what quantitative analysis can offer. Also, inadequate research has been conducted to determine problems experienced by the Cypriot potato industry and the potential solutions, thus making qualitative research methods ideal (Adamidis et al, 2013).

I believe qualitative research method has offered a high validity since potato experts and farmers gave new information and insights about the current industry situation. Also, the results can be used in the future (Taylor, Bogdan, and DeVault, 2015) by researchers and those readers interested in studying more about the potato industry, the challenges it faces in the current market, and how to deal with the issues. The qualitative research results will form a basis for identifying ways of solving any problems that the industry might be experiencing at that time (Melnikovas, 2018, pp. 29–44).

#### **3.1.4 Ontology**

This research is built on the idea that what we consider real is shaped by our actions and interactions. For the Cypriot potato industry, this means we recognize how people's experiences and the industry's socio-economic aspects influence each other. It's all about understanding that what we research isn't just out there but is shaped by what people do.

The ontology for this research is pragmatist. Pragmatism acknowledges that reality is multifaceted and can be understood differently from various perspectives. In the context of the potato industry, this means recognizing the existence of objective market dynamics

and industry structures (objectivism), while also appreciating the subjective interpretations and experiences of the industry stakeholders (constructivism) (Kuhn, Ashcraft and Cooren, 2017). A pragmatist ontology is aligned well with the applied nature of the research, aiming to provide practical solutions for the sustainability of the Cypriot potato industry.

### **3.1.5 Epistemology**

An interpretivist epistemology is used during this research. Interpretivism acknowledges that knowledge is socially constructed and that individuals interpret their experiences based on their unique contexts (Ritchie et al., 2014). In this research, understanding the diverse perspectives of farmers, distributors, and consumers is crucial. This epistemological stance allows me to examine into the meanings, values, and cultural distinctions that shape decisions and practices within the potato industry. It also accommodates the discovery of multiple realities and the acknowledgment of the dynamic, evolving nature of the industry.

Taking a deeper, more personalized view into interpretivist epistemology, I come to believe that knowledge blooms from the unique interaction of experiences between researchers and their subjects. It's this changes in perspectives, this exchange of understandings and meanings that enriches my grasp of the changing world and industry around me. Specifically, when we turn our focus to the distinctive world of the Cypriot potato industry, this approach becomes our lens, revealing the vibrant mixture of experiences, beliefs, and challenges that shape sustainability efforts (Welz, 2015). Through this lens, every interview answer bonds a piece of the puzzle in collectively understanding the diversity of stakeholder insights.

## **3.2 Conceptual framework**

The conceptual framework section underscores the complex balance between sustainability and economic sustainability in the Cypriot potato industry. At its core, this framework intricately brings together fundamental aspects of sustainable agricultural practices, targeted marketing strategies, insightful consumer behaviour analysis, and thorough economic analysis, all within the unique context of Cyprus.

For example, it investigates how eco-friendly farming practices, efficient water use, and climate change adaptability not only shape but also sustain the industry's environmental and economic environment. Marketing strategies are dissected to reveal how the global market position of Cypriot potatoes, market differentiation, and adherence to quality standards interact with consumer preferences for sustainable products, guiding the industry's promotional efforts (Robinson & Saúco, 2010, pp.345-348.).

Economic analysis broadens this scope by examining production costs, export dynamics, and the strategic positioning within the EU market, including the industry's adaptability to policy shifts (Audretsch, Baumol and Burke, 2001, pp. 613–634). This framework, therefore, acts as a critical lens through which the research's findings are interpreted, ensuring a grounded, theoretically informed, and contextually rich exploration of the industry's multifaceted challenges and opportunities.

### **3.2.1 Framing in literature review**

The main aim of a framework is to establish links between research questions and the research itself ensuring a strong connection between them. It plays a role in structuring and supporting decisions related to research design (Tonette et al., 2009). The framework helped my literature review in assessing current linked literature to agricultural sustainability and enabled me to look at the whole picture from a different perspective.

It helped me organize my ideas and pinpointing concepts for analysis. By using the framework, I could outline more clearly the scope of my research as it enabled me to draw connections between theories and concepts offering a holistic view of the subject matter. Overall relating the framework to my literature review was important in focusing my research direction and maintaining its coherence.

While implementing a framework can be beneficial in organizing thoughts and defining the boundaries of research, I recognized that it might constrain creativity and exploration of ideas beyond the established framework itself. It was challenging to find balance between utilization of my existing framework and allowing room for flexibility in my research for this reason, I used the framework as a tool, for guidance rather than a set of parameters, allowing for a more thorough exploration of the topic.

I have used framing in my literature review interchangeably to link research questions with the research itself. This connection was vital for my research in organizing and supporting decisions in my research design. More specifically one key aspect was defining gaps in my literature review establishing a clearer scope and direction. According to Booth, Colomb and Williams (2008) defined research questions help focus the study and set clear objectives.

Another essential step involves identifying and defining concepts relevant to the research, such as the concept of sustainability. These concepts are based on definitions to provide clarity, in the research. Mebratu (1998) provides a definition of sustainability that encompasses social aspects, which are crucial, for my research of agricultural methods.

Conducting a literature Review; I systematically examine existing literature to gain insights into the connections between market dynamics and sustainability. Porter and Kramer (2011) examine how market strategies can align with practices to generate shared value, which directly relates to exploring agricultural market strategies and their impact on sustainable farming practices. Through their research, they argue that businesses can create economic value while also addressing social and environmental needs. By extending their findings to the agricultural industry, through my literature review, I investigated ways in which market dynamics can support sustainable farming initiatives and contribute to long-term environmental conservation efforts. This research has the potential to revolutionise how we approach sustainable agriculture and environmental management in the future.

By examining the intersection of market forces and sustainable farming practices, I gained a deeper understanding of how governments can play a crucial role in promoting potato industry sustainability. One key aspect that emerged from my literature review is the importance of consumer demand in driving sustainable agricultural practices. By creating a market for sustainably produced goods, consumers can incentivize farmers to adopt more environmentally friendly methods. Additionally, government policies and incentives can also play a significant role in shaping the market dynamics of the agricultural industry. By providing support for sustainable farming practices, policymakers can help create a more favourable environment for farmers to adopt environmentally friendly practices.

Ultimately, by aligning market forces with sustainable farming initiatives, we can create a more resilient and environmentally conscious agricultural sector for future generations.

Establishing Relationships Between Concepts; By using the framework I propose connections between identified concepts. Elkington's (1997) triple bottom line concept proves valuable in framing how economic strategies within the potato industry can influence environmental outcomes. For example, implementing sustainable farming practices in the potato industry can not only reduce costs for farmers but also decrease harmful pesticide runoff into nearby water sources, benefiting both the economy and the environment. Additionally, forming partnerships with local food banks to redistribute surplus potatoes can address both food insecurity issues and reduce food waste within the community, aligning social responsibility with economic sustainability.

Organizing the literature review using the framework; Employing the framework allowed me to organize my literature review. Following Freeman's (1984) stakeholder theory I examined how stakeholders in the Cypriot potato industry perceive and are affected by sustainability factors. In addition, the framework helped me to identify key themes and trends in my literature, making it easier to analyse and synthesize information. A clearer picture of the effects of sustainability efforts in the Cypriot potato industry on various stakeholders emerges from categorising the literature according to stakeholder groups and their perspectives on sustainability. This structured approach also allowed for a more in-depth analysis of the relationships between stakeholders and their influence on sustainability practices within the industry. For example, through the framework Cypriot potato farmers prioritise economic sustainability, while government regulators focus on environmental sustainability. This insight helped me realise that there is room for strategies for collaboration and communication between stakeholders to achieve a more holistic approach to sustainability in the industry. Ultimately, by considering my framework to analyse stakeholder perspectives in the literature review has helped me focus on what mattered to investigate most. This approach has allowed me to identify potential areas of common sustainability focus among stakeholders in the potato industry.

Recognize Research Gaps; The framework assisted me in identifying areas, within existing research that have not been adequately explored. Feindt and Flynn (2019) investigate the effects of policy layers, on sustainability, prompting me to investigate the gaps in how policy shifts affect farming methods in Cyprus. I found that there is a significant lack of research on this topic, particularly in the context of the rapid decline in farmer numbers and tonnage in Cypriot industry.

Identifying gaps in research has greatly helped me to focus on what to investigate. Cyprus faces unique challenges in sustainable agriculture, such as water scarcity and climate change, as well as new European CAP regulations and ever-increasing rising production costs. These combined with its unique location and climate bring the industry in the bad situation faced today. By exploring existing literature and identifying the gaps, I better understood the potential implications for sustainability in my research. For example, examining how changes in European CAP regulations impact farmers in Cyprus could provide me with insights into the effectiveness of current regulatory measures. Furthermore, understanding the specific challenges that Cypriot farmers face, such as water scarcity and climate change, allowed me to propose targeted solutions in my research. By analysing the impact of rising production costs on farmers in Cyprus, I can assess existing literature the economic sustainability of the agricultural industry in the region. Overall, filling the gaps in research enabled me to make more specific recommendations for improving the sustainability in Cypriot agriculture.

### **3.2.2 Integration of Conceptual Framework**

By leveraging the insights collected from the Potato Sustainability Alliance (PSA), the Cypriot potato industry stands to gain greatly in it pursue for sustainable development (Chorin, 2000, pp. 34–37). The PSA exemplifies a holistic commitment toward enhancing potato cultivation's economic, environmental, and social dimensions, facilitated through the integration of agriculturalists, supply chain affiliates, and philanthropic entities.

Specifically, the PSA utilizes practices such as strategic crop rotation, adherence to organic farming principles, and careful water management (Shah, 2022, pp. 31–62). These initiatives are fundamental in adopting soil revitalization, augmenting the content

of soil organic matter, improving the penetration of water into the soil, and curbing water runoff. These techniques not only secure environmental sustainability but also secure the sustainability of potato agriculture by safeguarding natural resources and maximizing productivity. In adapting these approaches to the unique environmental and agricultural landscape of Cyprus, it becomes appropriate to consider the adoption or customization of practices that mitigate local problems, such as water scarcity and soil erosion (Doueiri, 1996, pp.89-97). This could entail the assessment and potential introduction of precision irrigation technologies, the strategic employment of cover crops, or the embrace of organic farming practices specifically designed to suit the intricate requirements of the Cypriot potato farming ecosystem.

### **3.2.3 Framing**

Over the last few decades, framing has been increasingly popular in a variety of academic subjects. As a result, there is some ambiguity about the concept's specific meaning and important assumptions). Frames, on the other hand, are the product of processes through which people make meaning of certain challenges and events. People's perceptions of reality and how they communicate about it are framed by frames. People impart meaning to physical or social occurrences through these acts of communication (Van Den Brink, 2009).

To proceed with framing as argued by Entman (1993, pp.51–58) you can devise methods to "choose some of the physical realities and make them more relevant to the context of the study, in such a way as to encourage a specific definition of the problem, causal interpretation, behavioural testing, and/or therapeutic suggestions for the designated object". Frame outlining exercises, as indicated by this idea, require the contribution of vital stakeholders, who express both intellectual and normalizing thoughts about the current issue dependent on their point of view. By featuring a few components of a seen reality while at the same time differing or bringing in different perspectives, I related the issues, lay causal connections, and generated ideas for utilizing my research questions.

European regulations and agreements for example, depended basically on food security and revenue return for farmers. This considered the presence of a CAP which focused on the unique requirements and interests of the rural areas. Dewulf, (2009, pp.155–193) argues that the justification for why members take part in strategic making decisions is to express the current approach issue that maintains the interests of a specific stakeholder or co-operational relationship. European regulations and agreements for example, depended basically on food security and fixed pay for European farmers. This considered the presence of a CAP which focused on the unique requirements and interests of the rural areas. This is particularly obvious when numerous stakeholders are involved. In such cases, the fence might prompt the altering of certain stakeholders' views, who, because of various interests, connect various implications to the subject in question. These sorts of strategy issues can be classified as major or unexplained issues dependent on individual decisions. Food security is frequently seen as a major issue. The importance of food security is a genuine example of outlining and counter-outlining with regards to farm sustainability. Food control is utilized by both non-legislative associations, for example, through growers' groups which address small farmers and industrial processing companies as an option in contrast to food security. As argued by Lang and Barling, (2012, pp.313–326) food security is connected to agro-industrial interests, though food power adopts a more all-encompassing strategy to food issues, like local and social parts of food creation, with regards to farm sustainability.

### **3.3 Consensus Frames**

Frameworks includes compatibility frames. Certain ideas or notions are sometimes broadly held and accepted because of their ideals and purposes. A popular model is manageability: it is a notion that no one can reject and that finds widespread agreement, therefore a broad range of performers are used, even though the great majority of them have opposing approach perspectives, referring to such words as "agreement outlines." As Gamson points out, however, disputes over distinct frameworks and associated assertions may be disguised in the aftermath of this seeming unanimity. Even though many performers use the word "manageability," their definitions, causal studies, and the kind of tasks they recommend are all somewhat different. Following a single agreement



framework, numerous edges may be employed in several ways to produce a significant difficulty. Several additional studies have followed similar approach since the publication of their paper, claiming that, although food security has wide appeal in the United States, the implications of the phrase shift depending on the digressive environment. Yearning Framing, Community Framing, and Risk Framing were revealed underneath the food security agreement outline in the American context as three separate arguments (which they refer to as outlining, highlighting the desultory cycles by which they are constructed). Food security is basically considered as a hunger problem in the major framework. Food security is seen as an important aspect of local area development in local area outlining. The risk outline proposes to lessen the threats "about an industrialised food framework's vulnerability to both "natural mishaps" and "planned events" related to agroterrorism." Mooney and Hunt, on the other hand, ensure that their three edges provide the real minimum of food security guidelines (Mooney and Hunt, 2009, pp. 469–497). Their draught identification lacks an aesthetic base because to the nature of their material. The same may be said about recent papers on food security as a foundation for agreement. This data is presented in the form of a narrative or conceptual paper. Therefore, the purpose of this framework is to provide the basis for a consensus-building approach to the research.

The food industry frames differ in many ways, although they are also conceivable inside such circumstances since stakeholders have benefits and corresponding strategic positions. Stakeholders connect diverse meanings to situations or events, such as food security or sustainability, from their differed perspectives. We anticipate these participants to build links between CAP and food sustainability in a variety of ways since agricultural policy making incorporates a diversity of distinct personalities and interests Potato production in emerging Asian nations currently accounts for most of the world output in most wealthy countries combined. This research investigates the different peaks, troughs, and extraction spikes that shown a 120 million rise in Asian potato output during the last century (Termeer, 2011, pp. 283–298). New technology, advancements in production and harvesting infrastructure, government regulation, and plant environmental factors have all contributed to these techniques. Switching to more diverse food sources, as well as earnings from potato cultivation, have an equal, if not greater, influence (Scott and

Suarez, 2012, pp. 234–239). Globalisation is often related with a shift in the locus of monetary activity towards nations that have promoted a high ground via a combination of resource gifts, mechanical advancement, innovative striving, and government programmes. Numerous extended streaks of rapid monetary development in Asia's developing nations have inspired a greater interest in how the many components sustaining that development have shown themselves. For a very long time, potato development has been a huge marvel over most, but not all, of Asia (Guenther, 2010, pp. 1-8). Due to increasing yield, the introduction of potato production in Europe, and the disintegration of the former Soviet Union (Scott, 2002), China became the world's biggest producer of potatoes in 1993. Potato output in emerging Asian nations today accounts for 46% of world production, although accounting for just 7% of the global population in the early 1960s. Growing global awareness of the significance of potatoes (FAO, 2009) particularly in emerging Asian nations is primarily focused on addressing the potential for fast crop increase that will last for decades (Walker et al., 2011).

Given the scale of future food demands because of rising prices, urbanisation, and an increasing number of Asian customers, industrial potential is of particular importance. Over the years, several earlier papers have examined potato cultivation, harvesting, and fruit production in emerging Asian nations. Almost all these themes are incapacitated, either temporarily or as a result of spatial reduction. This research summarises the findings of the second annual FAO data analysis to discover variations in growth rates and harvest in developing Asian nations about a half-century ago. This research also explores the origins of potato consumption, as well as the relationship between income exchange, consumption patterns, and production techniques. As a result, the article aims to highlight the most significant styles, situate them in a larger perspective to get a greater sense of their combined effect, and give connections to the appropriate texts for those interested in further depth on any specific issue. One important subject is how the long-term appearance of these growth rates represents the probable future scenario of potato production in the area, as well as the role of the private sector in maintaining productivity and output. (Scott and Suarez, 2012, pp. 234–239). The negative effects of environmental change on potato efficiency have been well documented in the literature. Although farmers are not prepared to modify or control the climatic circumstances, a few elements

like soil, water, cultivars type, and rural practises may be sorted out in some manner to mitigate the negative effects of climate change. Adaptation is a well-known method of mitigating the negative effects of environmental change on crop production (Moradi et al., 2014, pp. 265–284). The reason for change is to reduce the potential negative repercussions of environmental change while increasing the chances of recovery, encouraging water consumption; changing the situation or location of trimming jobs; development of new rural areas, further evolved nuisance executives, infection avoidance, and weed control were all advanced. Aside from variety and relief systems, environmental change is typically a problem for agriculture and economic development. Crop varieties such as SUBSTOR-Potato may be used for crop development and moderate growth under environmental changing situations. (Adavi et al., 2018, pp. 91–102) used the model for potato testing and environmental change. The potato (*Solanum tuberosum* L.) is the world's most important food source and non-grain food crop (FAO 2009). With 383 million tonnes supplied each year, potatoes are the world's third largest food crop. It is grown on 19 million hectares worldwide (FAOSTAT 2014), and China and India account for more than one potato creation worldwide (FAO 2009), with North America having the highest harvest yielding at 43.7 tons per hectare. While potatoes are often cultivated in vast, business, and remote places, ranchers experiencing hopeless access to assets are growing in suburbia. It contributes significantly to daily energy usage in these places and is the foundation of networks (Walker et al., 2011). Potatoes are also becoming more popular in rain-fed farming since they can provide more calories per volume of water used, giving twice as many calories as a comparable grain of water used (Monneveux, Ramírez and Pino, 2013, pp. 76–86). Furthermore, since potatoes are sold locally rather than on the global item market, it is appropriate to contribute to the district's food security and the reduction of neediness. Potatoes were first grown in South America approximately 7000 years ago (Hawkes 1992, pp. 1–12), where they grew at somewhat high altitudes in places with short days, strong light power, chilly temperatures, and highly high mugginess. Progression to Europe and the growth of wide-ranging agricultural harvests in lengthy days drove the development of what is now known as the Irish potato, which became a staple sustenance for certain Europeans.

Longer days and milder temperatures in European regions allow for longer periods of photosynthesis, greater exchange of nutrients from haulm to coniferous harvests, and lower respiratory temperatures during chilly nights, changing potatoes into the most beneficial produce. Potatoes became unavoidable in Europe over the eighteenth and nineteenth centuries, leaving a huge range of tropical and subtropical production for the last couple of years. Potatoes are now grown in around 150 countries, ranging from 69° N to 50° S, from the ocean to 4000 m elevation. This spread suggests that potatoes may have a more flexible yield or be grown in a variety of locations under less favourable circumstances. Environmental change may make these circumstances worse or remove the appropriate climate from locations where horticulture is meant for potato growth in regions where it isn't. As a result, crop yields and agricultural yields may increase in some locations while declining in others.

### **3.3.1 Framework application in the methodology.**

I have carefully integrated conceptual framework in my research methodology, particularly through the application of qualitative research methods to deeper investigate and understand how the Cypriot potato industry's sustainability challenges are perceived by the responders in conjunction with my research questions.

In more detail I used the conceptual framework in my methodology in five main ways:

#### **1. Foundation of the Methodological Approach**

I have employed a qualitative methodological approach, justified by its capacity to interpret the subjective realities of participants, from farmers to policy makers. My approach is firmly rooted in the constructivist ontology and interpretivist epistemology, which emphasizes understanding phenomena through the lens of participants' experiences and interactions. This aligns with my conceptual framework's aim to explore complex socio-economic dynamics within the potato industry.

I have achieved this aim through the research design that includes in-depth interviews with key stakeholders in the potato industry, such as farmers, processors, and government officials. These interviews have provided me with valuable insights into the

challenges and opportunities facing the industry, as well as the strategies employed by different actors to navigate these dynamics. Additionally, I utilized participant observation to gain a deeper understanding of the day-to-day practices and interactions within the industry. By combining these qualitative methods, I'm aiming to generate rich, nuanced data that can inform policy recommendations and practical interventions to support sustainable development in the potato sector.

## 2. Integration with Conceptual Themes

I have emphasized themes such as sustainable agricultural practices, market dynamics, and economic sustainability. Anibaldi et al (2021) argue that this methodologically, is mirrored using semi-structured interviews that research into these areas. For example, interviews cover topics like adherence to EU laws, innovative farming practices, and the economic pressures of market and environmental regulations. I have ensured that the data collection is directly relevant to the conceptual framework. Additionally, by focusing on these key themes, I'm able to provide a comprehensive analysis of the challenges and opportunities facing the potato sector. By exploring topics such as sustainable agricultural practices and market dynamics, I can offer valuable insights into how the industry can adapt and thrive in an ever-changing environment. Overall, the integration of these conceptual themes with the methodological approach of semi-structured interviews ensures that my research is both rigorous and relevant to the current issues facing the potato sector.

## 3. Operationalization of theories

I have operationalized the theories of the conceptual framework by interpreting and connecting concepts like sustainability and market dynamics into interview questions and discussion points (Saunders et al., 2021, pp. 386). By asking specific questions related to sustainability practices and market trends in the potato sector, I can gather detailed information from participants that directly relates to the theoretical framework. This approach allowed me to get a deeper understanding of how these abstract concepts manifest in real-world practices and decisions within the industry. Overall, turning concepts into actions through semi-structured interviews makes my results more valid and useful for dealing with the current problems and chances in the potato industry.

#### 4. Use of NVivo for Data Analysis

I have used NVivo, a qualitative data analysis software, to manage and analyse interview data further underscores the commitment to a robust interpretive analysis. NVivo facilitates the identification of patterns and themes that resonate with my conceptual framework, such as sustainability practices and market strategies. (Woods et al 2016, pp, 597–617) This systematic approach ensures that my findings are based on a thorough analysis of the data collected from the semi-structured interviews. Additionally, the use of NVivo allowed me a more efficient and organized process of data analysis, ultimately enhancing the credibility and reliability of my results in the potato industry.

#### 5. Addressing Bias and Ensuring Rigor

My methodology also critically addresses potential biases and ethical concerns, which is significant given my framework's focus on genuine insights into the industry. To ensure unbiased and ethical data collection, I have included voluntary participation, maintaining neutrality, and rigorous data confidentiality practices. By addressing biases and ensuring rigor in my methodology, I'm aiming to provide a comprehensive and trustworthy analysis of the potato industry. This commitment to ethical practices and data integrity will allow me to ultimately strengthen the validity of my research results and contribute valuable insights to the field.

The integration of my conceptual framework within the methodology is thorough, aligning well with my goals of capturing the nuanced realities of the Cypriot potato industry. My qualitative approach, supported by detailed methodological choices, effectively brings to life the complex interplay between economic, environmental, and social factors that the conceptual framework aims to explore. This alignment not only strengthens my theoretical grounding but also enhances my practical relevance by providing in-depth insights into sustainability within a specific agricultural sector.

My research provides a comprehensive understanding of how my conceptual framework has been intricately linked and utilized effectively within my methodology.

## 3.4 Participants

The number of participants in a research interview is vital. The minimum number of participants needed to participate in an interview is 25 to 30 to achieve saturation and redundancy in in-depth interviews (Francis et al., 2010, pp. 1229–1245). This number of participants maximizes the chances of collecting adequate data and allows a thorough examination to distinguish conceptual categories of interest (Archibald et al., 2019, p. 160940691987459). When the participants are fewer, little information will be obtained, thus affecting the final results. Similarly, when they are in excess, the process might be hectic and time-consuming, thus delaying the results. This interview will include customers who are experts in potato marketing and large and small-scale farmers. Fewer participants are needed in cases where several interviews are conducted (Malmqvist et al., 2019, p. 160940691987834). I selected five CEOs of international marketing organizations which we already work with in marketing our potatoes. Also, thirty farmer participants will be engaged, 15 small-scale and 15 large-scale farmers. The decision on the interview participants will be based on availability of the interviewees, with a specific interview time of thirty minutes (Harrell and Bradley, 2009) Participants will either be male or female as long as they can hear and give a response.

### 3.4.1 Recruitment

Participants will be drawn from small-scale and large-scale potato farmers in this research in Cypriot potato, including the professional sellers of marketing organization in EU markets. Professional sellers will include those who buy Cyprus potatoes and supply them to the international markets for more than 5 years. The second group of participants will be identified by small-medium and large-scale farmers. I focused on growers who have minimum 2 years involvement in Cypriot potato farming. All participants will volunteer to participate in the interviews (Adams and Cox, 2008)

An email will be sent to the potential participants to inform them of the purpose of the research as well as that participation in this research is voluntary, and their decision to participate or not participate will not affect them in any way. Also, I informed them of the duration of the interview, which is approximately half an hour. Also, their consent to audio

records the interview will be needed, explaining that I don't want to miss any of their comments. Also, a point will be made that all responses will be kept confidential, as they will be transcribed and coded for this and later used to extract my summary. Also, they will be informed that they may decline to answer any question or stop the interview at any time and for any reason.

### **3.4.2 Participants' Criteria**

The criteria for participation will also be included in the emails. The criteria will be:

(1) The participation of large-scale or small-medium-scale potato farmers is needed to be engaged in Cypriot potato farming for more than two years.

(2) Professional sellers must be engaged in potato marketing for more than five years.

## **3.5 Instrumentation**

During a research project, it is critical to gather reliable and methodical data. Depending on the sort of study being undertaken, many data gathering strategies may be employed (Mazhar et al., 2021, pp. 6–10). Semi-structured interviews were selected as the most appropriate technique of gathering first-hand information for this research, with the goal of interpreting behaviour, emotions, mindset, and body language from observation.

## **3.6 Interviews**

Interviews are a research tool that involves purposely asking people open-ended questions during a conversation for the purposes of data collection. In qualitative research, interviews are crucial tools that help the researchers obtain quality information (Roulston, 2018). This claim from this source is true since interviews are employed in almost all research studies to acquire information. Compared to other tools of qualitative research, interviews get better responses (Roulston, 2012, pp. 1–10). There are various reasons why interviews result in quality information that can be used to make the required interventions or summary on a particular research problem. First, people are more comfortable when talking than writing, thus giving all the information required in detail and improving the quality of research (Goodman, 2001). When conducting an interview, some



of the respondents might not have gone to school, thus lacking the skills to read and write (Figueiredo, Rocha and Montagna, 2020, pp. 105–127). Therefore, through the face-to-face interviews, one can obtain information from a wide range of respondents despite their education status. Also, when using interviews, the researchers are directly in control of the process and will clarify any issues that might arise from the respondents (Cassell and Symon, 2004). Similarly, there is more control over the flow of questions.

To ensure the interviews are successful, I followed several guidelines. First, I identified the key participants who, in this case, are farmers, and marketing experts in Cypriot potato farming. By involving key participants, the information obtained will be accurate and reflect the state of Cypriot potato farming. Second, I developed an interview protocol whereby I identified the appropriate questions to ask the respondent during the interviews. This is crucial since I used semi-structured interviews. Also, I considered the setting where the interviews took place. Although interviews conducted in a natural setting enhance the realism of the research (Hammersley, 2008, pp. 89–100), I sought a private neutral place. This ensured the respondents were comfortable and not distracted during the interview, thus obtaining high-quality information (McGrath, Palmgren and Liljedahl, 2019, pp. 1002–1006). Also, I adhered to the ethical and legal standards required when interviewing people during a research study.

### **3.6.1 Ethics**

Voluntary participation is an ethical issue that I put into consideration. During the research, respondents who have volunteered have the right to stop the questions when they feel uncomfortable (Arifin, 2018). If the participants are not allowed to stop whenever they want, that will go against the ethics and will not reflect voluntary participation. Also, they had the right to change their minds and leave at any stage of the interview process (Cypress, 2018, pp. 302–309). Even if the insight of the specific respondents will be of great benefit to the research program, I did not force them to continue participating in cases where they choose to stop. Also, they will not have to explain their decisions since their decisions should be respected despite the likely consequences.

### 3.6.2 Structuring the Interview

Structured, semi-structured, and unstructured interviews are all possible. Structured interviews include pre-determined questions that respondents answer in the same sequence that they wrote them (Brown and Danaher, 2019, pp. 76–90). These interviews facilitate data analysis by allowing the researcher to compare and contrast replies from different respondents (Mueller & Segal, 2014). Because the interview topics are not predefined, unstructured interviews are done in a casual way (Eppich, Gormley and Teunissen, 2019, pp. 85–91). This kind of interview is very untrustworthy since the investigators are likely to be biased when picking the questions to ask the respondents (Chauhan, 2022, pp. 474–487). Furthermore, if the questions are not predetermined, the researchers may avoid asking questions that are sensitive, which may result in the correct information at the summary of the research project.

Furthermore, since the questions are not answered in the same sequence for all respondents, it is impossible to compare and contrast the results. Semi-structured interviews include elements of both organised and unorganised interviews (Magaldi and Berler, 2020, pp. 4825–4830). Because they unearth information via dialogues and interactions, semi-structured interviews are essential tools in qualitative research. In this kind of interview, the researchers plan the questions they will ask the respondents and then ask them during the interview (Deamley, 2005). This kind of interview is useful since queries for clarification of information that may occur throughout the process may be asked. In addition, the researcher may examine the respondents' comments throughout the dialogues, resulting in multi-layered findings (Evans and Lewis, 2018). Furthermore, the findings of semi-structured interviews are simple to analyse using computer software like NVivo, making them valuable in qualitative research.

I utilised semi-structured interviews to do research on the Cypriot potato sector, using preset questions to ask farmers and clients who specialise in potato marketing. Also, I asked questions that emerged throughout the interview and offered them the opportunity to ask questions or make remarks during the interview.

### 3.6.3 Conducting an Individual Interview

Interviews may be face-to-face or virtual, using technology through the internet. In this research, I conducted face-to-face interviews, which will allow me to ask follow-up questions if necessary (Loosveldt, 2012, pp. 201-220). In addition, I was able to employ nonverbal communication to my advantage during the face-to-face interviews (Schober, 2018, pp. 290–302). Individuals are more willing to provide information during a face-to-face interview than during a virtual interview.

To make the greatest use of the material, I utilised a digital recorder to guarantee that all information from the customers is caught. Similarly, by recording, I was able to completely focus on the interview since I didn't have to write extensive notes on the material offered. Recording interviews is particularly important since it removes bias from the study (Rutakumwa et al., 2020, pp. 565–581). In the process of my research, I can immediately cite the respondents and listen to the interviews again since I recorded them (Berazneva, 2014, pp. 290–296). I used two digital recorders to record, which is significant since one of them may fail, resulting in incomplete data. However, before I began the recording process, I notified the responders and got their consent to proceed.

When conducting interviews, it is critical to establish rapport with the respondents since it influences how successfully they reply to the questions presented. I began by introducing myself while questioning the farmers (Brimbal et al., 2019, pp. 107–115). Consider asking inquiries to individuals you don't know and expecting appropriate replies. This is improbable since they will not trust you to disclose their information in the first place. In addition, I explicitly clarified the purpose of my research, which is to understand the current position of the potato sector in Cyprus and the challenges that potato growers may face. I'll also question them about their growing practises and the European and national legislation that govern them. Furthermore, I advised them that participation is entirely optional, and that whether they choose to participate or not has no effect on them.

During the interview, I simulated a discussion in order to elicit as much information as possible from the respondents. I strived to connect to the respondents on a personal level in order to make them feel at ease throughout the interview (Brimbal et al., 2019,

pp. 107–115 ). Despite my efforts to create a pleasant atmosphere, I didn't share any personal information, particularly my thoughts and ideas about the situation of the Cypriot potato business (Rowley, 2012, pp. 260–271). If I had to express my own viewpoint, I did it in a neutral manner.

Also, I was non-judgemental during the interview for the respondents to be open since they will feel secure. During the interview, the respondents might say some things which you feel are objectionable or upsetting (Mears, 2012, pp. 170–176). However, there was no judgement but rather an effort to create and sustain a neutral environment. Consequently, when conducting the interviews, I adhered to this to maintain a neutral demeanour. Additionally, I let the respondents talk during the interview (Schilling, 2018, pp. 96–115). Since I was using open-ended questions, I adopted an open posture and lean forward to signify interest, thus encouraging the respondent to answer the questions in depth. Also, I nodded my head occasionally and use an "eyebrow flash" to show that I am attentive, thus encouraging them to continue. In some instances, the respondents diverted from the actual topic, but I brought them back their focus on a respectful way (Bano et al., 2018). Respect is vital during a research study and ensuring its practice can result in accurate information. For instance, I said, "that was very interesting. Could I just ask you about something you said a while ago? " Then go back to the topic. Also, silence is key in a qualitative interview (Peters and Halcomb, 2015, pp. 6–7). Respondents might go silent after I ask a question, and I did not rush them by asking another question. Instead, I gave them time to reflect and give more information. During the final transcript, I recorded the length of the silence since it is vital.

#### **3.6.4 Interview to the Farmers**

The interview with the farmers was in 4 parts. After creating rapport, I asked them questions about yield and production. I asked them their yield for the year and how it compared with the last five years. After answering the question, I asked them their opinion on why they thought the change had occurred. Also, I asked them if they believe that the current situation will change in the next five years. I asked them about the practices they use to improve potato production.

Similarly, I asked them questions about the European regulations and standards. I asked them whether they thought European laws about practices can be applied in Cyprus and be effective like in European countries (Kudsk and Mathiassen, 2020, pp. 214–222). I asked them why they thought this differs so much from other countries. Also, I asked them if regulations on chemicals and pesticides applied in other countries can be feasible in Cyprus. Similarly, I asked them whether they use chemicals and fertilizers to control pests on their potato farms. Also, I asked them whether they have changed the chemicals they were using on their farms following the prohibition of the European Union (Papastylianou, 2004, pp. 25–28). On the same note, I asked them whether they are still able to farm the potatoes effectively despite the ban on the chemicals. Lastly, under the European regulations, I asked them whether they think there are gaps in the EU policies that need expertise intervention and whether they believed there should be changes in the regulations (Kudsk and Mathiassen, 2020, pp. 214–222).

The third part will involve the problems and issues in potato cultivation in Cyprus. I asked the farmers whether various climate changes, such as lack of adequate water, affected their potato farming. I asked them about the changes they adopted to sustain their farming practices because of the climate changes. Also, I asked them if the government contemplates such environmental issues affecting their farming practices and how they had an influence on the agriculture business (Larson et al., 2002, pp. 1057–1072). Also, I asked them whether they consider environmental sustainability and whether applying environmental sustainability would sustain their potato business. I asked them about the problems they are facing concerning their sustainability as potato growers (Pluchinotto et al., 2020). Additionally, I asked them whether they would be able to sustain their business and realize profits in the future.

Moreover, I asked them if they knew of any aid plans the government has put in place and the ones it was planning to put in place to help the Cypriot potato farmers.

I concluded the interviews by asking whether they had anything else they would like to comment on that had not been asked. After that, I acknowledged their participation and the information they had shared to make the research a success.

### 3.6.5 Interview to the Professionals

I started by thanking the professionals for participating in the interview and informing them why I am interviewing them. I informed them that their views as professional marketers will be valuable to the research since they have first-hand experience in the market (Amsbary and Powell, 2018, pp. 123–138). The interview questions for the professionals are in four parts. The first part will be on products and sustainability where amongst other, I ask them about the marketing strategy they use in establishing their product position (Malorgio & Marangon, 2021).

I also asked them how they have priced their products and whether they sell any products which are certified or branded. Similarly, I asked them whether the certification of a product affects its pricing (Bian et al., 2021, pp. 1456–1472). Also, I asked them how they consider sustainable product marketing. Similarly, I asked them whether they have any green product sustainability certification or validation (Ewing, Allen and Ewing, 2012, pp. 381–390). I also asked them whether their company or products are considered sustainable.

The second part of the interview was on the market and competition. I asked the professionals to describe their target markets and customer focus (Amsbary and Powell, 2018, pp. 123–138). I asked them whether their target market is local or whether it extends to foreign markets. Also, I asked them whom they consider to be their highest competitor and the strategies they have adopted to tackle the situation (Stein, 2008, pp. 2150–2162). I also asked them whether they take part in the aggressive competition.

The third part was on sales and growth opportunities. I asked them how their sales compare with the last 10 to 15 years and their opinion on the reasons for the change. I asked them what they think are their customers' views on agricultural sustainability and the extent to which their opinions affect sales.

Also, I asked them whether they think changes should be made toward growth of sales and whether the changes they think will have a significant impact (Malorgio & Marangon, 2021). Also, I asked them their view on the agricultural market in the future and whether they believe agricultural businesses are going to remain viable.

The last part involved asking the professionals whether they have additional information that will help the research that has not been asked about. I thank them for their time and information throughout the interview.

### **3.7 Sources of Error and Bias in Interviewing**

#### **3.7.1 Bias Induced by Interviewer**

Due to the nature of interviews, which is personal, errors and bias are likely to occur at a higher rate compared to other methods of data collection. Errors and bias are likely to occur during the interviewing process, which is induced by an interviewer in the various stages, including:

- When asking questions
- When recording answers
- When coding the answers
- When interpreting the answers

First, researchers might deviate from the written questions for the interview, thus causing an error. For instance, they might fail to follow the order of questions, thus forgetting to ask other questions (Slade, 2018). Also, they might change the wording of the interview questions resulting in answers which are inaccurate for the study (Schaeffer, Dykema and Maynard, 2010, pp. 437–471). To avoid this, I was keen on following the order of the questions and ensuring I read out the questions as they are to retain the intended meaning.

Additionally, during interviews, interrogation errors might occur, making it difficult to compare and contrast the answers of the respondents. For instance, an interviewer might ask, "what is your age?" and ask the other one, "how old are you?" These two questions are likely to be answered in different ways. As a result, during the interviews, I ensured to phrase the questions differently and retain uniformity among all respondents.

Moreover, recording errors can occur, especially when the interviewer is writing down all the information acquired from the respondent. Also, depending on the speaking speed of

the respondent, the interviewer is likely to note down abbreviated answers, which can result in misinterpretation (Slade, 2018). Therefore, having this in mind, I used the digital recorder and minimize the writing, thus eliminating recording errors for the accuracy of the results.

Also, errors might occur due to the way an interviewer reacts to a response. For instance, while conducting an interview, the respondent might give information, and the interviewers show their emotional responses like disbelief and surprise (Slade, 2018). When the respondents notice this, they are likely to keep most information to themselves since they lose their trust in the interviewers (McConnell-Henry et al., 2010, pp. 2–9). The reactions are likely to bias the subsequent responses affecting the accuracy of the information. Therefore, to avoid this I practiced how to avoid reacting to various information from respondents and encourage neutral reactions.

### **3.7.2 Bias Induced by Respondent**

Also, various forms of bias can be induced by the respondent. First, during the interview, there might be self-report bias whereby respondents provide incorrect answers since they expect some benefits (Gomes et al., 2019, pp. 313–339). They are likely to tell the researchers what they want to hear so that they can acquire the expected benefits.

For instance, if the research being conducted is to determine the state of respondents and provide them with free farming materials, they are likely to respond by exaggerating the severity of the situation to receive aid. Therefore, to avoid this, I was friendly to encourage the respondents to give correct answers during the interviews (Petrova, Dewing and Camilleri, 2016, pp. 442–454). Also, I told them the importance of giving correct answers and assure them of the confidentiality of all the information they will provide during the interviews (Gomes et al., 2019, pp. 313–339). Also, for sensitive questions, I tried and avoided asking them directly since this might result in a self-bias report.

Additionally, recall error is another bias induced by the respondent. In most instances, people provide wrong answers since they do not remember the actual information (Bell et al., 2019, pp. 346–346). To minimize this during the research interviews, I structured



the interview questions in a way that they will have a reasonable recall period. Also, I asked the questions in a way that will promote recall among the respondents (Bell et al., 2019, pp. 346–346). For instance, I asked the potato farmers if they made higher profits in the previous month compared to other months. Also, I asked them the number of potatoes they sold during the previous month. Such questions based on a short period are likely to receive accurate answers since they are still in the memory of the respondents.

Also, the prestige effect is likely to affect the accuracy of the information acquired from the interviews. It occurs when people fear reporting their real state, such as admitting to making losses, thus over-reporting to avoid embarrassment (Eltaybani et al., 2020, pp. 690–698). For example, during the research, some potato farmers feared admitting the losses they made from farming due to the poor situation of the potato industry and government regulations. To avoid this as much as possible, before interviewing the respondents, I tried assuring them of the confidentiality of their information and tell them the reasons why they need to be truthful while answering the questions (Surmiak, 2018, pp. 393–418). I was not judgemental and acted surprised in some cases I already knew the obvious as to keep them speaking and get important information documented for my research.

### **3.7.3 Bias during the research.**

It is expected that during my research some bias might occur; to eliminate bias as much as possible, these will be written so as to help avoid them.

Some of the expected biases include:

1. The belief is that every small and large-scale farmer has been profiting from the Cypriot potato sale.
2. Every farmer has been focused on increasing their potato production.
3. The large-scale farmers are satisfied with their quantity of production and have a stable source of income.
4. Every farmer has lived long enough in the potato field and, therefore, will be well knowledgeable about the Cypriot potato.

Through these biases, the receiver or reader of the information will be able to interpret the validity of the data acquired and was able to approve reliable data by keeping biases in mind.

Though it may be impossible to identify if there will be biases in the qualitative data analysis, there will be several approaches used to ensure there will be no biases. These approaches included.

- I. When doing data coding, consistency in the interpretation will show the truth.
- II. Participants will be sent their transcript results for review and approval.
- III. Reviewing the findings with the biases identified to see and maybe identify some.

### **3.8 Data Analysis**

After acquiring data from the interviews, I analysed it to develop a clear summary that will contribute to the improvements in the Cypriot potato industry (Rau, Elliker and Coetzee, 2018, pp. 300-313). Without a clear summary, the research findings might not be of much help since it will be difficult to determine the problems faced by the farmers and policies that need change and implementation to develop Cypriot potato farming.

I first transcribed the findings from Greek to English. After that, I coded the findings with the program NVivo for Windows to try and get results for trends that appeared. To do this, I coded each question and answer and then analysed the data.

I explored the interviews by going through them and coding the questions and the answers by making a node (Alam, 2020, pp. 104–112). With the software, I queried if how and at which extent the interviewed people speak about the sustainability, issues, and problems of the Cypriot potato industry.

After finding the query results, I reflected on them by gathering them in one place and reviewing them (Alam, 2020, pp. 104–112). I illustrated that by displaying a word tree to see how people talk about the situation of the Cypriot potato industry.

Finally, I recorded my insights and used the memo when writing up the final thesis from the research study.

### **3.8.1 Data collection and Confidentiality**

The data collected is considered confidential only for research use in the data analysis (Surmiak, 2018, pp. 393–418). To ensure the confidentiality of the respondents' responses, the following strategy was used.

1. Numbers are used to link the respondent to the audio files and transcribed manuscript; this is to remove personal details from the data.
2. The personal details, audio files, and transcribed manuscript were stored in different spaces.
3. There was a password required to access the personal details that will only be known to me to ensure the sensitive information is not left in the open for every person to access. The passwords will be changed regularly until the information is coded and then deleted from the computer.
4. A firewall was installed for security purposes to ensure that no intruder could interfere with the information.
5. There was completely no sharing of the respondents' details with an outsider; only I had access to the personal details of the respondents.
6. After the data on responses has been entered into the computer and analysed, they are deleted to ensure that they are not at risk of leaking and exposing the respondents' privacy.
7. An external USB was used to save sensitive private data linked to the respondents' that was password protected with 128-bit decryption and locked in a personal office locker that only I had access to.
8. After finishing my research and having results from the university, with a passing period of two months, I will permanently erase the data on the USB stick using the Windows application 'Acronis Data Shred' to ensure no data recovery can happen at any stage.

### **3.8.2 Reasons for using NVivo**

First, the software minimizes administrative tasks. Qualitative research has a lot of information from respondents whose opinions are different. As a result, the process is

usually messy, thus the need to identify software to facilitate data analysis. By using NVivo, I was able to systematically analyse data collected during interviews with farmers and professionals (Phillips and Lu, 2018, pp. 104–106). Second, the software enables sharing of data and coding. By using this software, I analysed the data and was able to share it with my supervisors.

Third, data entered, and information generated in NVivo was be backed up with ease. Conducting qualitative research is hectic, and the loss of information can be the worst thing to happen. However, with the use of NVivo to analyse the data, I can back up the information in the software and access it in case I lose the original data (Phillips and Lu, 2018, pp. 104–106).

Forth, NVivo allows individuals to retrieve their coding with ease. This can be done by opening a code to view all the information that has been coded (Mortelmans, 2019, pp. 435–450). Also, the coding links to the original content, and with a simple click, one can access the original content with ease. Therefore, I used the software that enabled me to easily access the questions and answers from the potato farmers and professionals interview data.

Lastly, NVivo enables individuals to ask questions concerning their data and coding. With its query functionality, it is recommended over manual data analysis methods. With text-based queries, one can search for words that frequently occur on the data entered (Jackson, Bazeley and Bazeley, 2019). Also, with the coding queries, one can look for patterns in the coding and compare them with the existing sub-groups.

Therefore, in my research during data analysis, I used NVivo for Windows for satisfying results.

### **3.9 Summary**

The results drawn from this chapter will be utilized by this entire research to explain sustainability challenges experienced in the Cypriot potato sector with the specific purpose of identifying key issues and analyze how different elements in the industry can

help farmers towards development and sustainability. My research additionally as stated by Rau, Elliker and Coetzee (2018, pp. 300-313) uses coding on the NVivo Windows application to improve decision-making. This technique emphasizes the importance of mapping data and defining the sector properties. A highly adapted study based on the results of NVivo interviews and surveys, reflecting the methodology proposed Alam, (2020, pp. 104–112). Emerging ideas about sustainable industries are analyzed with useful tools such as word trees. This provides an overview of issues related to agriculture and the potato industry. As Surmiak (2018, pp. 393–418) noted, managing the confidentiality of analysis was an important issue in data collection and evaluation. Implementation of secure protocols such as identification, password protection, and data storage methods were crucial to protect participants' privacy. Additionally, the data protocol developed and used my research includes proper storage and destruction of data after analysis to eliminate potential risks according to the university guidelines.

The decision to use NVivo was motivated by several reasons identified by this research, with the aim of achieving the analytics that will be utilized to measure the study hypothesis. In my opinion, the software did more than reduce administrative burdens and facilitate information sharing among research team advisors. It has proven to be a powerful backup and recovery tool that provides some level of protection against the loss of important data. Also, through my experience, NVivo's problem-solving capabilities have proven to be excellent at solving complex problems involving data and target levels, allowing for a more analytical approach in comparison with manual methods.

Summarizing, the qualitative research technique I used, combined with powerful NVivo for Windows analysis techniques, has provided my research with deep insights that empower my analysis in more depth and summarize the research findings with strong evidence. This application serves as a better assessment starting point for the research by following better decision-making and information breakdown of the gathered interview data. I believe that the use of traditional analysis methods would negatively affect the analysis results of my secondary research, as it would dramatically limit the analysis depth offered by NVivo for Windows.

Having in mind the theories of constructive ontology and epistemology, this research provided me with a deeper understanding of the industry. The methodology, enhanced by the conceptual framework, helped me summarize later in the findings and discussions chapters well-contextualized research finding, offering valuable insights into the analysis and furthermore recommendations chapter.

## Chapter 4: Project activity

### 4.1 Introduction

This chapter clarifies the different steps taken to start and complete my secondary research and ultimately reach my findings. This involved data collection through semi-structured interviews, with a total of 35 participants providing their perspectives on the subject. This method facilitated a deep understanding of the participants' experiences and challenges in the industry. The data analysis was conducted in a methodical manner using Braun and Clarke's (2021) thematic analysis framework, structured into five phases. Initially, I became familiar with the data through extensive reading of the transcripts. Following this, a detailed coding process was undertaken, where transcripts were annotated to identify common phrases and experiences. This phase helped in categorizing the data efficiently. In the analysis progress, these initial codes were revisited and refined to unearth deeper meanings and discern patterns that go beyond the superficial data. This rigorous process ensured that the themes I developed were robust and relevant to the research questions. The final phases involved condensing these codes and synthesizing them into coherent themes that offered insights into the sustainability of the potato sector in Cyprus. The themes were evaluated against the research questions and the theoretical framework to ensure they contributed meaningfully to the understanding of my subject.

The study addressed the following main research question:

1. How can the Cypriot potato industry sustain itself within the current local, EU, and global marketplace?

The current study addresses the following subsidiary questions:

2. Agricultural practices in Cyprus; are they sufficiently efficient within current conditions?  
Can they change? If so, how and at what cost?
3. Marketing strategies and industry perspectives – is change needed to expand or sustain sales and if so, how?

4. Is there change needed to sustain sales or to adopt better marketing strategies to fit in the market?

#### 4.2 Participants' characteristics:

The farmers who participated in the research were both small-scale and large-scale farmers.

As mentioned in the previous chapter and visualized in figure 2, I selected five CEOs of international marketing organizations that we already work with to market our potatoes. Also, thirty farmer participants will be engaged: 15 small-scale and 15 large-scale farmers. The decision on the interview participants will be based on availability of the interviewees, with a specific interview time of thirty minutes (Harrell and Bradley, 2009) Participants will either be male or female, as long as they can hear and give a response.

Figure 2: Participants Interview selection model.



(Source: Author, 2023)



The criteria for participation will also be included in the emails. The criteria will be:

(1) The participation of large-scale or small-medium-scale potato farmers is needed to be engaged in Cypriot potato farming for more than two years.

(2) Professional sellers must be engaged in potato marketing for more than five years

### **4.3 Data collection**

This interview included five (5) customers who are experts in potato marketing and large and small-scale farmers. Fewer participants were needed in cases where several interviews are conducted (Malmqvist, 2019, p.16). Thirty participants were engaged by farmers, 15 small to medium scale and 15 large-scale farmers. The decision on the interview participants was based on the availability at the time of the interviews. Participants were male or female if they can hear and give a response.

#### **4.3.1 Data Analysis and Results**

The data was analysed using the theme analysis methodology developed by Braun and Clarke (2021, pp. 201–216). Word-for-word transcripts and field notes from interviews with participants were collected for coding analysis. A sample of the interview transcript is shown in Appendix G. An analysis of transcript documents was performed to gather supplementary information about agricultural education and experience.

##### *4.3.1.1 Phase One: Data Familiarization*

Phase one of the data analysis method involved becoming familiar with the data through multiple reads of the interview transcripts. Even though all 35 interviews were initially transcribed manually, I went back over and made any necessary corrections so that they could properly reflect on the data.

In accordance with the terms of the informed consent, all personal details were removed from the transcripts and replaced with numbers. Transcripts were emailed to participants after being reviewed (Merriam and Tisdell, 2015) (Lewsis, 2015, pp. 473–475) to ensure an authentic depiction of their experiences. The transcripts were approved in their current

form. An external hard disk, protected by password, had all the information, which was sorted first by participant and then by data source.

#### *4.3.1.2 Phase Two of Data Analysis*

Interview transcripts were first reviewed to ensure they adequately captured participant experiences with the phenomenon under study and that all research questions had been answered before coding began. Annotated lists of commonly used words and phrases and reported experiences were created (Appendix A) for each interview transcript prior to first categorization (Braun and Clarke, 2021, pp. 201–216). Throughout the entire dataset's processing, the codes were properly labelled, and the associated data was properly identified by using comment boxes in Microsoft Word (Appendix B). As the research continued and new codes were introduced, this procedure was repeated. In Appendix C, I present a sample of the initial transcript coding. Initial coding was done in NVivo (QSR International, 2020), however hand-coding allowed for more thorough coding and simplified processing of the developing clusters and themes.

#### *4.3.1.3 Phase Three of Data Analysis*

The original codes and transcripts were re-examined to uncover hidden meaning and patterns beyond their surface interpretations. Repeated evaluations of the data that turned up the same codes indicated saturation (Crowther et al., 2017) (Braun and Clarke, 2021, pp. 201–216) (Javadi and Zarea, 2016, pp. 33–39) (Merriam and Tisdell, 2015). In Appendix F, we see how patterns within clusters can be used to develop data themes for deeper analysis.

#### *4.3.1.4 Phase Four of Data Analysis*

After the codes were condensed to make it possible to meaningfully evaluate the data, I analysed each topic by providing answers to crucial questions like its quality and bounds, the adequate amount of supporting data, and its coherence (Braun and Clarke, 2021, pp. 201–216). Items and codes that contributed to the data narrative in a cohesive way were taken into consideration for further evaluation. I then reworked and removed any themes or subthemes that didn't fit together well or add anything to the overall interpretation. The

relevance and significance of themes to the research questions and theoretical frameworks were assessed.

#### *4.3.1.5 Phase Five of Data Analysis*

Each emerging sub-theme was examined for its bearing on the research questions as codes were collapsed and synthesized. The purpose of this application was to collect first-hand accounts of participants' efforts to ensure the continued sustainability of the Cypriot potato sector in the context of the present local, EU, and global marketplaces. Each topic was found to be logically sound, with well-defined categories that advanced the storyline of the data. Extracts from the data items that provided the most convincing evidence for the topics of interest were reviewed.

### **4.4 Summary**

This chapter indicates the comprehensive methods and steps used to proceed to the secondary research results by using qualitative interviews with farmers and marketing experts providing insightful information into the current state and challenges of the industry. The research employed a multi-phase thematic analysis, rigorously interpreting the data to ensure authentic and impactful conclusions. The engagement of both small-medium scale and large-scale farmers, along with professionals in potato marketing, highlights a diverse set of experiences and insights that enrich the understanding of the sector's dynamics. The synthesis of the thematic analysis revealed key insights into how these stakeholders perceive their roles and the adaptations necessary to sustain and grow in the competitive market.

## Chapter 5: Project findings

### 5.1 Introduction

This chapter reveals the findings of my research synthesizing knowledge and results from the in-depth researching (Broodbank, 2002) of the Cypriot potato industry. As a starting point, the research has been structured around a set of fine-tuned questions matrixed to show the relationship of factors in the industry that can help sustain the industry in the local, EU, and global markets.

**Research Objectives:** The primary objective of this research was to create knowledge and formulate suggestions for a sustainable future of the Cypriot potato industry. This entailed thoroughly examining current practices, market dynamics, and regulatory frameworks to identify leverage points for sustainable transformation.

**Research Questions:** My main research question is how the Cypriot potato industry can sustain itself within the current local, EU, and global marketplace. This question was followed by three subsidiary questions, each addressing critical points in the industry. Namely, these were:

- Agricultural practices in Cyprus; are they sufficiently efficient within current conditions? Can they change? If so, how and at what cost?
- Marketing strategies and industry perspectives – is change needed to expand or sustain sales, and if so, how?
- Is there change needed to sustain sales or to adopt better marketing strategies so as to fit in the market?

The findings in this chapter are presented with a focus on these questions. Each result has been mapped to the central and subsidiary questions, providing a coherent thread connecting the results to my fundamental aims and objectives.

The journey to these findings has been immersive, characterized by engagements with farmers and market experts. Their voices, combined with my thorough analysis, have produced valuable insights. The subsequent sections will explore these findings, unravelling the complex relationship of factors that surround the Cypriot potato industry.

## 5.2 Conceptual Framework

Using the conceptual framework throughout I managed to frame the findings and then identify gaps or trends by which I then managed to reframe into new research finding. So, I outlined the conceptual framework and reframed the findings on the Cypriot potato industry. I then reframed using this framework by using several key elements. These elements include themes identified in my secondary research and used through NVivo for windows to code my secondary research findings. Also reframing had focus on the integration of sustainable agricultural practices, targeted marketing strategies, insightful consumer behaviour analysis, and economic examination these elements I have reframed throughout my findings.

Through my research I focus on sustainability practises mentioned in my conceptual framework, how eco-friendly farming practices, efficient water use, and climate adaptability are reshaping the industry. These practices not only address environmental sustainability but also shake the economic sustainability of farmers, illustrating a shift from traditional farming to sustainable environmental measures of policy regulators while influencing the economic sustainability of farms.

Also, throughout my framework I analyse how the global positioning of Cypriot potatoes, market differentiation, and adherence to quality standards can be influenced by consumer preferences for sustainable products. This helps to reframe the marketing approach from broad-based to more targeted strategies that align with consumer trends towards sustainability.

Additionally, by using production costs, export dynamics, and strategic positioning within the EU market, the framework suggests a reorientation of the industry towards more economically sustainable practices that can adapt to policy shifts and market dynamics.

To make easier illustration of the above I drew inspiration from Miles and Huberman (1994) who argue that utilizing diagrams to plot out the framework illustrating the links between themes, subthemes and secondary data collected in contrast with conceptual framework not only enhances understanding of complex relationships but also helps identify potential areas for improvement or adjustment. By visually mapping out these connections, I better identified gaps in the conceptual framework and my actual findings.

This visual representations as shown in Table 1, with key insights within themes by interview respondents, better helped me to easily grasp the interconnectedness of these results and make informed decisions based on my framework.

Table 1: Key insights within themes by interview respondents

Professional Seller	Key Insight	Theme	Quote
Professional Seller 3	Preference for imported potatoes	Consumer Preferences	“The last 10 years, customers prefer the pre-prepared potatoes that are easier to use.”
Professional Seller 1	Decline in sales of fresh potatoes	Market Trends	“The last 10 to 15 years, the sales of fresh potatoes are lower than before.”
Professional Seller 2	Importance of sustainable products	Sustainability	“In supermarkets chains the demand is getting lower and lower.”
Professional Seller 5	Need for certifications	Certification	“Customers want sustainable products, and they do not buy products without the certifications needed to prove their sustainability.”
Professional Seller 4	Significance of product placement	Strategic Recommendations	“The supermarkets should give to our product a best-selling place if they want to have lot more sales. Also, if we bring our product as soon as possible, before the other imported products come then we will have much more sales to our product. Will not be in price competition.”

(Source: Author, 2023)

Also, from my experience this approach has allowed me to identify potential areas of conflict and common goals among stakeholders in the Cypriot potato farming industry as well as gaps using the conceptual framework and actual findings. By understanding the differing points in the two, I developed targeted recommendations that address both groups. Overall, filling the gaps in research will enable me to make applicable recommendations for improving sustainability in Cypriot agriculture.

### 5.3 Interview findings.

In an aim to focus on key perspectives on the sustainability of Cypriot Potato Industry Stakeholders, I used NVivo for Windows to produce word clouds from the responses of

professional sellers and small/medium and big growers with focus on the word frequency used (Appendix A), to try and identify themes as well as get further insights by comparing and contrasting their responses, concerns and perspectives. Further knowledge and understanding of repetitive word meaning and themes was also a goal. The projection of terms within these word clouds is indicative of the frequency and perceived importance of specific themes with focus on sustainability.

Figure 3. Word Cloud – Professional sellers



(Source: Author, 2023)

In figure 3 the professional sellers word cloud indicates key themes on sustainability market competition and Certification. The noticeable presence of 'sustainable' and 'agricultural' suggests a strong emphasis on sustainability practices within the agricultural sector. This indicates that professionals are highly aware and are prioritizing, sustainable methods in their work. Words like 'competition', 'aggressive', 'competitor', and 'supermarkets' highlight a focus on the competitive nature of the potato market. Also, the terms 'supplementary' and 'certification' indicate additional measures on certifications that sellers might pursue to ensure or communicate the sustainability of their products. This relates to green certification that are important for market positioning. Mapping out these responses in connection to the themes subthemes and codes gave some possible insights:





Figure 5. Word Cloud – Big growers



(Source: Author, 2023)

Farmers' word clouds (Big Growers and Small/Medium Growers) in figures 4 and 5 indicate some common concerns:

There is a high emphasis on 'pesticides' and 'fertilizers' which suggests concerns about input costs, health, and environmental impacts. Also, words 'Regulations', 'government', and 'guidelines' indicate a significant impact or effect of government policies and regulations on farming practices. On top words 'Supplementary' and 'Environmental' reflect additional environmental concerns and practices that supplement core farming activities, indicating efforts to enhance sustainability.

Notably there are some differences between the small /medium and big growers' word cloud. The word 'European' in the big growers' cloud suggests that they may be more concerned with EU standards or markets whereas the presence of terms like 'deficiency', 'bankrupted', and 'profitable' in the small/medium growers' cloud points to concerns over financial sustainability and the economic challenges they face.

Furthermore, the difference in emphasis on European markets and financial sustainability suggests that big growers may have more exposure or adaptation to broader market conditions compared to small/medium growers.

Comparison of all growers' responses with professional sellers' word cloud indicates 'Sustainability' as a common thread as all three-word clouds emphasize sustainability, showing its importance across the industry. Mapping out these responses in connection to the themes subthemes and codes is found in Appendix D & E.

Both groups highlight 'regulations' and 'government', but it's more prominent among farmers, possibly because these factors directly impact their farming practices. Sellers might be concerned with how regulations affect market access or competitive positioning as sellers' word cloud includes terms like 'supermarkets', 'competition', and 'aggressive', pointing to market dynamics and business strategies. Farmers' word clouds are more focused on 'production', 'yield', 'cultivations', suggesting a focus on the practicalities and challenges of potato farming. However, farmers appear more concerned with the direct impacts of sustainability on profitability and operational sustainability. This suggests that while sustainability is a shared concern among all, the focus differs as farmers concentrate on production challenges and regulatory impacts, while sellers are concerned with competition and market positioning.

This analysis suggests that while sustainability is a shared concern among all parties, the focus differs: farmers concentrate on production challenges and regulatory impacts, while sellers are concerned with competition and market positioning. Furthermore, the difference in emphasis on European markets and financial sustainability suggests that big growers may have more exposure or adaptation to broader market conditions compared to small/medium growers.

Table 2. Word cloud contrast response Analysis - key themes

Theme	Professional Sellers	Big Growers	Small/Medium Growers
Standards and regulations	Mentioned in context with market strategies.	Emphasized European influence, possibly due to export focus.	Highlighted, but with more concern for local sustainability.
Market and competition	Highly competitive, with focus on supermarkets and aggressive marketing.	Not as prominent, suggesting a focus more on production.	Some concern over profitability and economic sustainability.
Sales and growth opportunities	Treated as a part of the competitive strategy in the market.	More focused on production practices and environmental impact.	Directly associated with economic sustainability.
Pricing and returns	Competition and positioning in the market.	Secondary to production concerns but still relevant.	Highlighted issues like bankruptcy and profitability.

Theme	Professional Sellers	Big Growers	Small/Medium Growers
Problems and issues in cultivations	Part of broader sustainability goals.	Directly related to cultivation practices.	Tied to the sustainability of practices and regulations.
Yield and production	Not used.	A primary concern due to their impact on sustainability.	A major concern, with direct implications for practice.
Cypriot agricultural products	Implied in sustainability	Could include certification or adoption of EU standards.	May include local sustainability initiatives.

(Source: Author, 2023)

Making a word cloud contrast response analysis, shown in table 2 using NVivo for Windows, I was able to use word clouds to identify key concept themes linked to the word frequency of the respondents replies with focus on sustainability of the potato industry as a strong association with the research question.

- Sales and growth opportunities: This concept emerged as a central focus in both word clouds, signifying a shared importance placed on practices that ensure the long-term sustainability of the potato industry in Cyprus. It reflects the integration of environmental health, economic profitability, and social equity within the industry's practices.
- Standards and regulations: Regulations, particularly European, are a significant concern for farmers. They refer to the compliance with laws or standards governing agricultural practices, environmental protections, and possibly trade. The importance of this term indicates the substantial impact regulations have on agricultural operations.
- Yield and production: This issue is crucial for farm sustainability but also have implications on environmental sustainability. The significant presence in the farmers' word clouds suggests their importance to the industry.
- Market and competition: Terms such as 'competition', 'supermarkets', and 'aggressive' from the sellers' word cloud underscore the importance of market positioning and the competitive nature of the industry. This relates to the strategies sellers employ to navigate and succeed in the commercial environment.
- Pricing and returns: For small and medium growers, the presence of words like 'profitable' and 'bankrupted' reflects the critical importance of economic factors in

sustaining agricultural practices. This suggests that while environmental and regulatory considerations are vital, they must be balanced against the economic realities of farming.

- Problems and issues in cultivations: sellers consider it as part of broader sustainability goals. While big growers directly relate it to their farming practices. Whereas small medium growers consider it as vital in sustainability of their farms.
- Cypriot agricultural products: Indicated by both groups, these are additional methods and strategies that enhance core sustainability efforts. This could include certification, organic farming, advanced water conservation techniques, and soil health improvements, which complement traditional agricultural practices.

This source of secondary research results was important enough to understand the foundations and the power of the data I collected in relation to my research and further use the findings of the analysis to proceed to more findings.

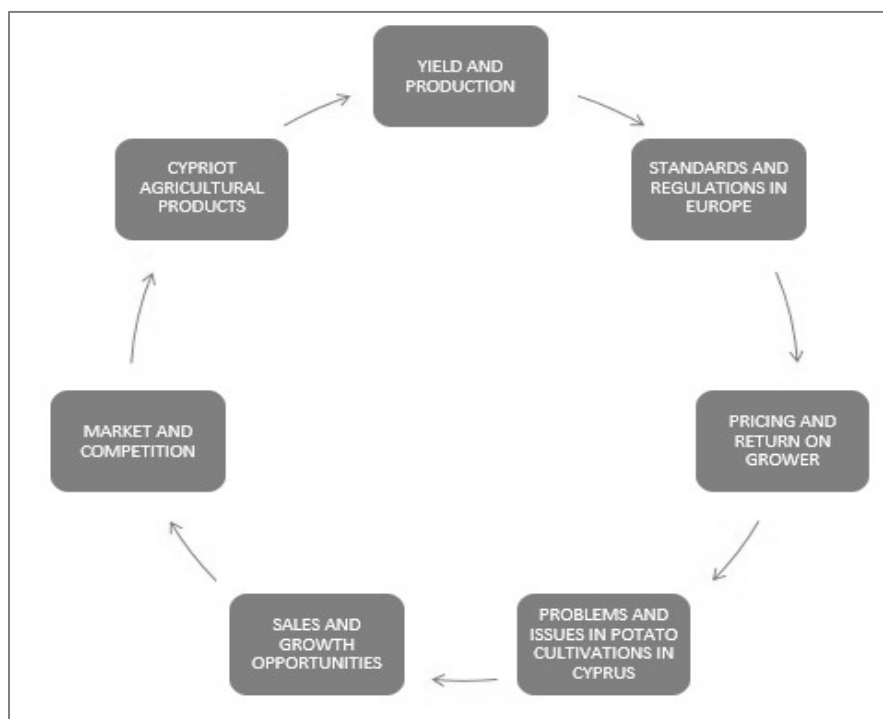
## 5.4 Theme Analysis and Findings

In this section, I proceed with analysis and further research using NVivo for Windows. to broaden my understanding related to the common threads, concepts, or ideas that emerged from the themes identified and relevant qualitative results gathered and give a comprehensive overview of the existing literature, identify knowledge gaps, and explore connections between different findings. I considered the literature review as well as coding and identifying key concepts, ideas, and recurring patterns. Looking through codes sub codes on themes identified, I capture the main ideas that help me proceed with my research findings. I grouped and organised similar themes codes and subcodes together and create broader categories again, looking for similarities, overlaps, and relationships between different themes. This process involved rearranging and reorganizing the coded themes to develop a coherent structure.

The combination and analysis of these relationships and connections between the identified themes shown in Diagram 1, focused in exploring how different themes interact with and inform each other. Also, identifying overarching concepts and theoretical

frameworks that emerge from the analysis was a key aspect in formulating my conclusion and recommendation.

Diagram 1: Themes related to the four research questions.



(Source: Author, 2023)

Also, reflection on the meaning and finally interpolating the results from the themes were very significant as well as a challenge, as analysing the variations, contradictions, and gaps within the themes was also a way to help me offer future research directions in my conclusion chapter.

As later discussed in this chapter, the data analysis was done in a coherent and structured way, presenting themes, their relationships, and key insights derived from the analysis. Tables and diagrams were utilized to help me do this as shown in Table 3 where theme,

subtheme, and code analysis using NVivo related the representative quotes from interviews.

My theme analysis (Table 3) involved various aspects of the agricultural sector, particularly focusing on potato farming in Cyprus. The analysis captures insights from interviews with farmers, detailing their experiences, challenges, and perceptions concerning agricultural practices, market conditions, environmental factors, and regulations. The content is organized into different themes, such as Yield and Production, Pricing, Return on Growers, Standards and Regulations in Europe, Market and Competition, and several others. The analysis incorporates quotes from interviews with stakeholders, which are used to support the themes identified. A complex interplay between regulatory challenges, market conditions, and sustainability issues within the agricultural sector in Cyprus was evident. After I understood these relationships, it was crucial for developing strategies that address the needs of farmers while aligning with consumer demands and environmental goals.

By visualizing the structure of my research and combining my experiences as well as conceptual framework, it became easier to see where there might be trends in information, overlaps, or potential areas for further exploration to strengthen my findings and recommendations.

Overall, my research theme analysis provided a systematic approach to understanding the collective knowledge gathered within my secondary research and helped me to identify gaps, build on existing knowledge, and generate new insights to contribute further knowledge to Cypriot potato sustainability and my research.

A comprehensive analysis of the challenges and dynamics identified in my secondary research using NVivo for windows shown in Table 3, is categorizes main issues into themes such as Yield and Production, Products and Sustainability, Standards and Regulations in Europe, Problems and Issues in Potato Cultivation in Cyprus, Pricing Return on Growers, Cypriot Agricultural Products, Market and Competition, and Sales and Growth Opportunities.

A critical overview of these themes, exploring the underlying issues, contradictions, and implications for farmers generated knowledge and enabled me to view the findings and combine my framework and experience to address the research questions from a different perspective identifying gaps as well as new view on the subject.

**Table 3: Theme, subtheme, and code analysis - NVivo**

Theme	Research Question	Codes	Representative Quotes from Interviews
Yield and Production	1	<b>Code:</b> Cultivated Land ○ <b>Sub-code:</b> Size of land	I am in the process of growing crops on 260 hectares of land.
	1	<b>Code:</b> Annual Yield ○ <b>Sub-code:</b> comparison with past 5 years	The annual yield is decreasing due to the multitude of problems we are encountering.
	1	<b>Code:</b> Reasons for yield change ○ <b>Sub-code:</b> Emergence of diseases ○ <b>Sub-code:</b> Limitations on outdated pesticides ○ <b>Sub-code:</b> Environmental concerns ○ <b>Sub-code:</b> Increase in production expenses	<ul style="list-style-type: none"> <li>The emergence of various potato diseases can be attributed to the limitations on the usage of outdated pesticides.</li> <li>Due to an increase in production expenses, we are utilizing fewer pesticides.</li> <li>Furthermore, all concerns regarding the environment.</li> <li>My enterprise has been impacted by the escalating expenses involved in cultivating potatoes, coupled with diminishing yields.</li> </ul>
	1	<b>Code:</b> Expectation of change ○ <b>Sub-code:</b> Hope for revised regulations ○ <b>Sub-code:</b> Limited confidence in outcome	<ul style="list-style-type: none"> <li>I hope the experts possess the understanding that the altered pesticides' effectiveness is mediocre, and they revise the regulations accordingly.</li> <li>Although my confidence in this outcome is limited.</li> </ul>
	1	<b>Code:</b> Optimism about future ○ <b>Sub-code:</b> Negative impact of expenses and diminishing yields	My enterprise has been impacted by the escalating expenses involved in cultivating potatoes, coupled with diminishing yields.
	1	<b>Code:</b> Farm production practices ○ <b>Sub-code:</b> Use of pesticides and herbicides ○ <b>Sub-code:</b> 3-year crop rotation plan	<ul style="list-style-type: none"> <li>I am incorporating both the use of pesticides and herbicides.</li> <li>I focus on cultivating wheat.</li> </ul>
	1	<b>Code:</b> National guidelines ○ <b>Sub-code:</b> Assistance provided by government <b>Sub-code:</b> Limited usefulness in Cyprus context	<ul style="list-style-type: none"> <li>The guidelines provided by the government are being offered as assistance.</li> <li>I do not find national guidelines particularly advantageous in the context of Cyprus.</li> </ul>
	1	<b>Code:</b> Adherence to guidelines ○ <b>Sub-code:</b> Consideration of guidelines ○ <b>Sub-code:</b> Inconsistent adherence	<ul style="list-style-type: none"> <li>Although I take them into consideration.</li> <li>I do not consistently act in accordance with them.</li> </ul>
Products and Sustainability	1	<b>Code:</b> Product Positioning ○ <b>Sub-code:</b> Niche product	Limited market appeal: "selling a niche product – Cyprus potatoes and that itself I think is the strategy."
	1	○ <b>Sub-code:</b> Premium pricing	Our products are priced as premium products at higher price than local or imported potatoes
	1	<b>Code:</b> Special product positioning ○ <b>Sub-code:</b> Certified/branded products	<ul style="list-style-type: none"> <li>The product been sold as a special product.</li> <li>Certification requirements: "selling fruits and vegetables that are certified."</li> <li>Brand recognition: "Italian potatoes but at the same time I sell Cypriot potatoes as well."</li> </ul>
	1	<b>Code:</b> Sustainability ○ <b>Sub-code:</b> Sustainable product marketing ○ <b>Sub-code:</b> green product sustainability certification/validation	<ul style="list-style-type: none"> <li>Messaging strategy: "marketing way that can pass through the purchases of a customer, the message that our potatoes are a sustainable product, meaning that we try to keep the environment clean."</li> <li>Certification requirements: "I have green product sustainability certification or validation."</li> </ul>



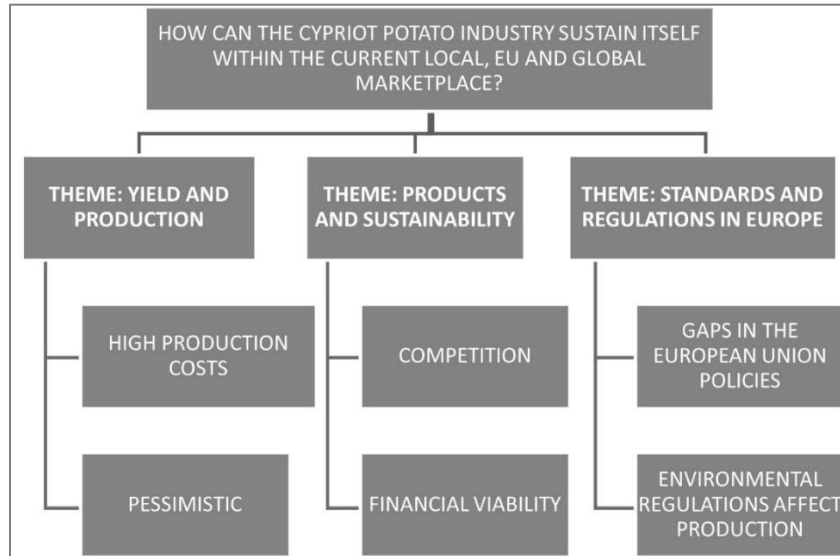
	1	<b>Code:</b> Potential Solutions	<ul style="list-style-type: none"> <li>Both government and EU can make a significant impact</li> <li>Government and EU financial assistance to offset negative effects of prolonged unfavourable atmospheric conditions.</li> <li>European Union exemptions to pesticide regulations due to prevalent diseases in Cyprus caused by its climate.</li> </ul>
<b>Standards and regulations in Europe</b>	1	<b>Code:</b> European regulations and standards <ul style="list-style-type: none"> <li><b>Sub-code:</b> Suitability for Cyprus</li> </ul>	<ul style="list-style-type: none"> <li>The regulations of European legislation regarding practices may not be suitable for application in the same manner in Cyprus.</li> </ul>
	1	<ul style="list-style-type: none"> <li><b>Sub-code:</b> Reasons for Cyprus' differences</li> <li><b>Sub-code:</b> Feasibility of chemical and pesticide regulations</li> <li><b>Sub-code:</b> Use of pesticides and fertilizers</li> <li><b>Sub-code:</b> Change in pesticides due to EU prohibition</li> <li><b>Sub-code:</b> Impact of new pesticides on efficiency</li> <li><b>Sub-code:</b> Impact of change on farm sustainability</li> <li><b>Sub-code:</b> Gaps in EU policies</li> </ul>	<ul style="list-style-type: none"> <li>As a nation, we exhibit great diversity owing to our geographical location surrounded by water and distinctive climatic conditions.</li> <li>I do not agree that the regulations in force in other European countries are viable in Cyprus. Indeed. I employ the use of fertilizers and pesticides to manage pest infestations.</li> <li>I have altered the pesticides that I employ.</li> <li>My productivity is delayed as the new pesticides lack sufficient power.</li> <li>I anticipate not being unable to maintain my farm in the coming years due to its damaging impact on my earnings.</li> </ul>
<b>Theme</b>	<b>Research Question</b>	<b>Codes</b>	<b>Representative Quotes from Interviews</b>
<b>Problems and issues in potato cultivation in Cyprus</b>	2	<b>Code:</b> Environmental issues <ul style="list-style-type: none"> <li><b>Sub-code:</b> Climate change and water deficiency</li> </ul>	<ul style="list-style-type: none"> <li>Yes, I get lower yields and size on my crop. Also, weather is more diverse nowadays.</li> </ul>
	2	<b>Code:</b> Government aid <ul style="list-style-type: none"> <li><b>Sub-code:</b> Aid for farms in severe weather</li> </ul>	<ul style="list-style-type: none"> <li>Governments aid for farms in severe weather not enough for sustainability. Compensation for partial, not full, crop damages.</li> </ul>
	2	<b>Code:</b> sustainability of business <ul style="list-style-type: none"> <li><b>Sub-code:</b> Problems facing profitability.</li> <li><b>Sub-code:</b> Preceding events</li> </ul>	<ul style="list-style-type: none"> <li>Our compensation here is too low to compete with low potato prices in the EU market. We have very high Import/export expenses.</li> <li>The global economy has been dealing with a long-standing crisis that has escalated the severity of the issues.</li> </ul>
<b>Pricing return on growers</b>	2	<b>Code:</b> Income Decline	My income decreases gradually each year
	2	<b>Code:</b> Reason for Income Decline	Alteration credited to the cost of potatoes in Europe
	2	<b>Code:</b> Future Expectations	<ul style="list-style-type: none"> <li>Doubts regarding the possibility of increasing prices to generate greater profits.</li> <li>Government should explore additional methods of providing subsidies to assist in overcoming current challenges. Not entirely optimistic about the future.</li> </ul>
	2	<b>Code:</b> Improvements for Increasing Returns	<ul style="list-style-type: none"> <li>Improvements in pesticide regulations.</li> <li>Approval of banded pesticide usage to boost crop yields.</li> </ul>
<b>Cypriot agricultural products</b>	2	<b>Code:</b> Specific target market	<ul style="list-style-type: none"> <li>Cyprus potatoes as a niche product is high cost, the target market is very specific.</li> <li>The last years in the markets, they are selling pre – prepare potatoes or washed ones in a package of 2kg or 3kg. The consumers prefer that, because is easier for them and economical.</li> </ul>

	2	<b>Code:</b> Better product presentation	<ul style="list-style-type: none"> <li>They have to find the way to show in better way our products to the consumers.</li> </ul>
	2	<b>Code:</b> Timely market entry	<ul style="list-style-type: none"> <li>We can serve Cyprus potatoes earlier than the local ones. For example, products should come to Belgium market early March and finish on 15 of May to get the best-selling window.</li> </ul>
	2	<b>Code:</b> Competitive Strategy	<ul style="list-style-type: none"> <li>Aggressive competition: "No, am not enter in aggressive competition."</li> <li>Business philosophy: "I only try to do my jobs as good as possible."</li> </ul>
<b>Theme</b>	<b>Research Question</b>	<b>Codes</b>	<b>Representative Quotes from Interviews</b>
<b>Market and Competition</b>	3	<b>Code:</b> Target Market <ul style="list-style-type: none"> <li><b>Sub-code:</b> Customer focus</li> </ul>	<ul style="list-style-type: none"> <li>Purchase values: "They are customers that value their purchases."</li> <li>Health orientation: "We are selling a healthy product – Cyprus potatoes."</li> <li>Nostalgia: "Also, they are people that visited Cyprus for holidays and want to remember the delicious potatoes that they have eaten in Cyprus."</li> </ul>
	3	<ul style="list-style-type: none"> <li><b>Sub-code:</b> Foreign markets</li> </ul>	<ul style="list-style-type: none"> <li>Market expansion: "Yes, our target range extend to foreign markets. We sell products also in Holland."</li> </ul>
	3	<b>Code:</b> Competition <ul style="list-style-type: none"> <li><b>Sub-code:</b> Competitor identification</li> </ul>	<ul style="list-style-type: none"> <li>Main competitors: "The highest competitor in my opinion is at first Israel, after I would say Italy and the local fresh produce."</li> </ul>
	3	<b>Code:</b> Competitive strategy	<ul style="list-style-type: none"> <li>Aggressive competition: "No, am not enter in aggressive competition."</li> <li>Business philosophy: "I only try to do my jobs as good as possible."</li> </ul>
<b>Theme</b>	<b>Research Question</b>	<b>Codes</b>	<b>Representative Quotes from Interviews</b>
<b>Sales and Growth Opportunities</b>	4	<b>Code:</b> Target Market and Customer Focus <ul style="list-style-type: none"> <li><b>Sub-code:</b> Customer Characteristics</li> </ul>	<ul style="list-style-type: none"> <li>They are costumers that value their purchases.</li> <li>Also, they are people that visited Cyprus for holidays and want to remember the delicious potatoes that they have eaten in Cyprus.</li> </ul>
	4	<ul style="list-style-type: none"> <li><b>Sub-code:</b> Market Reach</li> </ul> <b>Code:</b> Sales and Growth Opportunities <ul style="list-style-type: none"> <li><b>Sub-code:</b> Sales Performance</li> <li><b>Sub-code:</b> Customer Opinion and sales</li> <li><b>Sub-code:</b> Potential for Growth</li> <li><b>Sub-code:</b> Future of Agricultural Marketing</li> </ul>	<ul style="list-style-type: none"> <li>Yes, our target range extends to foreign markets. We sell products also in Holland.</li> <li>The last 10 to 15 years, the sales of fresh potatoes are lower than before</li> <li>Customer Opinion and Sales</li> <li>Of course, their opinions affect my sales, because if they are not sure about product sustainability, they did not even buy the product. So, the agricultural sustainability plays a major role.</li> <li>Of course, changes could be made towards growth of our sales.</li> <li>If there is constant quality level and continuity of supply, I think that would make the greatest impact</li> <li>I think that agricultural marketing will dominate the future.</li> <li>The agricultural field is working to grow its consumer base and marketing to a larger demographic is the way to accomplish this growth.</li> </ul>

(Source: Author, 2023)

As shown in table 4, three themes were related to my first research question on ‘how the Cypriot potato industry can sustain itself within the current local, EU, and global marketplace’

Table 4: Themes and subthemes related to research question 1



(Source: Author, 2023)

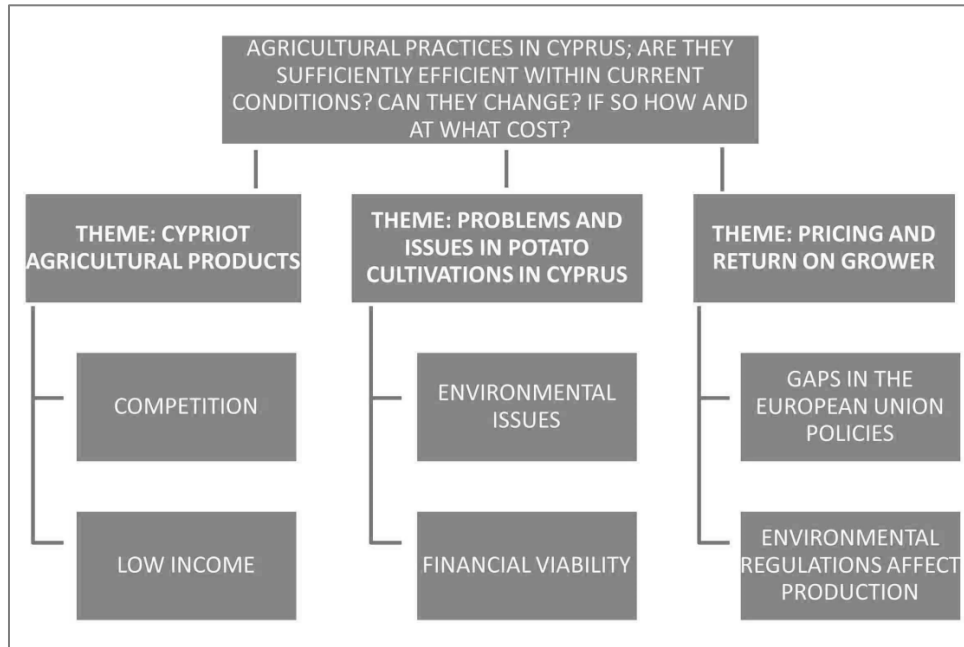
The ‘Yield and Production Challenges’ theme, identified that in Cyprus's potato farming there is a decreasing yield due to diseases and environmental issues, compounded by high production costs. Farmers are trapped between maintaining environmental sustainability and keeping up with their farms’ economic demands, especially with outdated pesticides. The anticipation of regulatory changes, although welcomed, is met with uncertainty regarding their effectiveness. This underlines a significant gap between farmers' immediate needs and regulatory bodies' responses, suggesting a lack of policy intervention that aligns with local agricultural realities. There's a sense of limited optimism regarding future regulations that could potentially improve the situation. The government assistance is deemed insufficient in the context of Cyprus, indicating a gap between policy and practicality.

The 'Products and Sustainability' theme analysis indicated that the marketing of Cyprus potatoes as premium, sustainable products create a niche market, allowing for premium pricing but potentially limiting broader market reach. This strategy highlights a possible disconnect between the marketed image of sustainability and the ecological impact of conventional farming practices, such as extensive pesticide use. To genuinely align product positioning with sustainability, a shift towards more environmentally friendly farming practices is imperative. There's a significant emphasis on sustainable and green certified products, suggesting an alignment with global trends towards environmentally friendly agriculture. However, the high cost and premium pricing limit broader market appeal.

'Standards and regulations in Europe' theme identified that the application of EU agricultural standards in Cyprus shows the challenges of implementing broad regulatory frameworks in unique local contexts. The misalignment between EU standards and the needs of Cypriot farmers calls for a more flexible, region-specific approach to agricultural policymaking. This could involve developing localized guidelines that better address the microclimatic and economic conditions of Cyprus. The EU regulations are perceived as unsuitable for Cyprus due to its unique geographic and climatic conditions. This indicates a disconnect between European agricultural policies and their practical application in different member states.

As shown in Table 5, three themes were related to my second research question 'Agricultural practices in Cyprus; are they sufficiently efficient within current conditions? Can they change? If so, how and at what cost?'

Table 5: Themes and subthemes related to research question 2



(Source: Author, 2023)

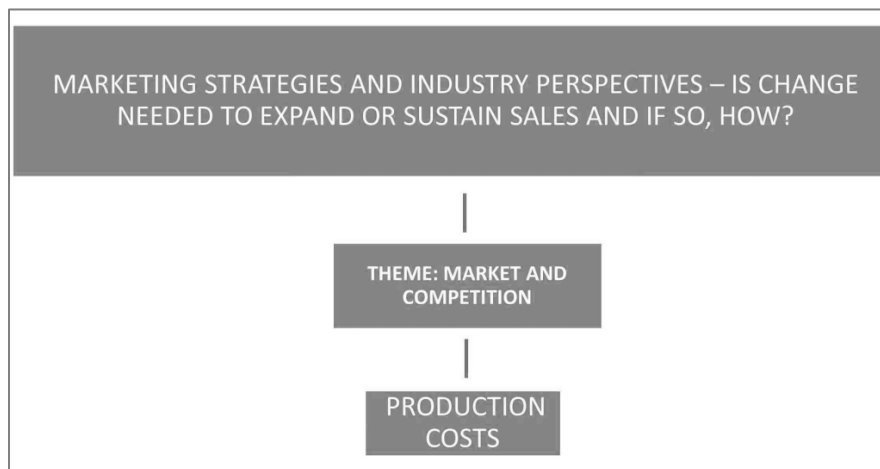
‘Cypriot agricultural products’ theme focused on consumer preferences and market dynamics as the evolving consumer preferences towards pre-cooked and packaged products represent a shift that Cypriot farmers need to adapt to. There is a lack of innovating product presentations and aligning production schedules with peak market demands to maximize profitability.

‘Problems and issues in potato cultivation in Cyprus’ theme identified that potato farmers in Cyprus are increasingly vulnerable to both environmental changes and global economic pressures. The dual challenge of climate change and insufficient government aid highlights the precarious economic sustainability of farming in the region. There is a clear need for more robust government support and targeted policies that can provide relief and support adaptation to changing climatic conditions. Environmental issues such as climate change and water scarcity are adversely affecting crop yields. There is a critical need for better government support and practical aids to address severe weather impacts and economic sustainability.

'Pricing return on growers' theme showed that the gradual decrease in farmers' incomes, driven by competitive pricing in the European market, raises concerns about the long-term sustainability of potato farming in Cyprus. The farmers' uncertainty about the potential for raising prices suggests that innovative marketing strategies and product differentiation are essential for improving profitability. There's a gradual decline in income among growers due to the low cost of potatoes in the European market, coupled with high import/export expenses. This is compounded by insufficient compensation mechanisms and challenging global economic conditions.

As shown in Table 6, one theme was related to my second research question 'Marketing strategies and industry perspectives – is change needed to expand or sustain sales, and if so, how?'

Table 6: Themes and subthemes related to research question 3.



(Source: Author, 2023)

'Market and Competition' theme identified competitive strategies and market expansion issues for Cypriot farmers prefer a non-aggressive competitive strategy focusing on quality and customer value, which could advantageously position Cyprus potatoes in niche markets that value authenticity and quality. It seems that there is a lack of careful analysis of competitive dynamics and strategic positioning relative to major competitors like Israel and Italy. Analysis also suggests Cypriot potatoes face hard competition from

other countries like Israel and Italy. The market strategy focuses on health-oriented, nostalgic consumers who value sustainability, but aggressive competition is avoided.

As shown in Table 7, one theme was related to my second research question ‘Is there change needed to sustain sales or to adopt better marketing strategies so as to fit in the market?’

Table 7: Themes and subthemes related to research question 4.



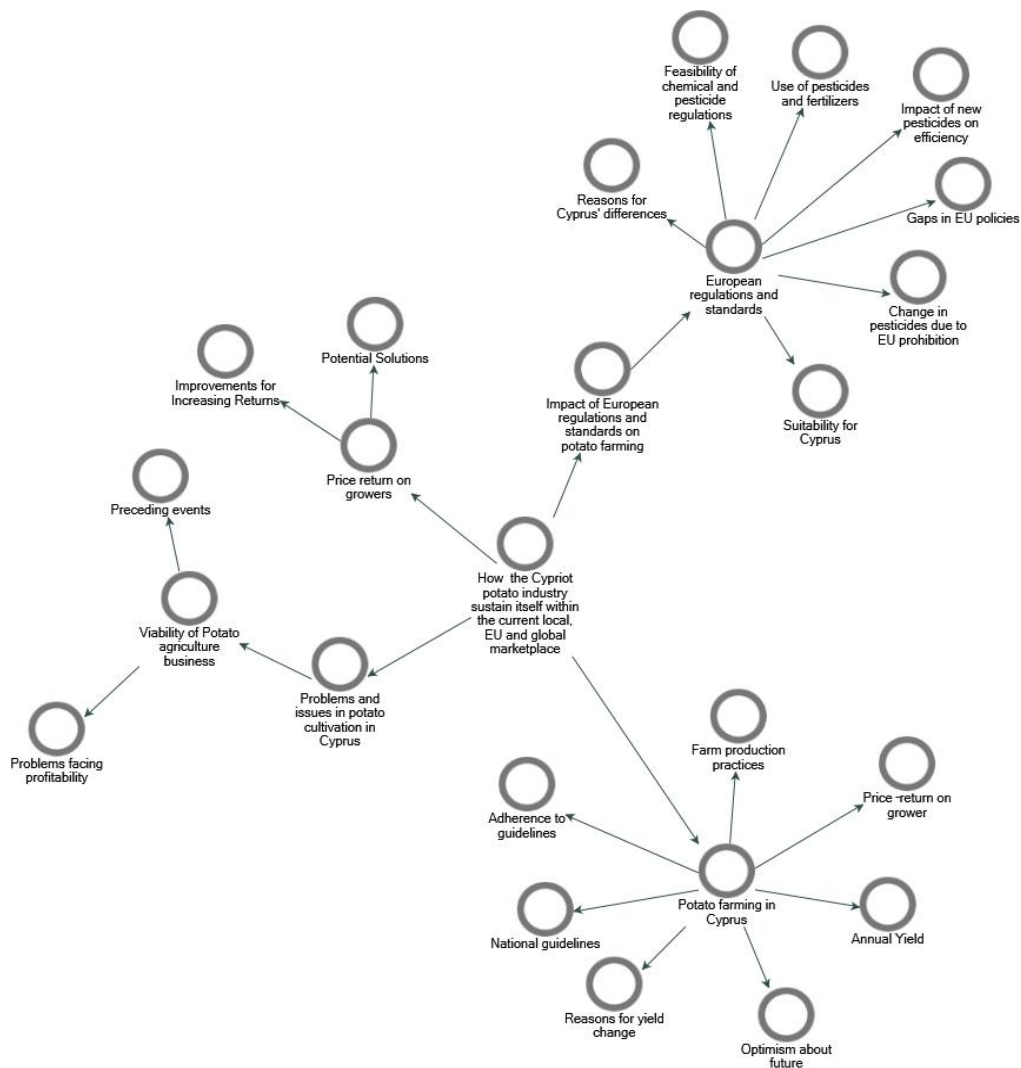
(Source: Author, 2023)

‘Sales and Growth Opportunities’ theme focused on the future of agricultural marketing the perceived future dominance of agricultural marketing highlights the critical role of strategic investments in marketing capabilities. The identification of lack in new marketing efforts, focusing on sustainability and quality to appeal to a broader demographic is evident. Despite the declining sales of fresh potatoes over the last decade, there lack for growth through improved agricultural marketing and policies is keeping down matters such as consistent quality and supply.

My theme analysis reveals a complex environment influenced by local and international factors.

By using my conceptual framework and critically reviewing these findings, as shown in diagram 2, my research focuses its findings on how the main and subsidiary questions in an aim to transform the Cypriot potato industry and its practices to be more sustainable, market-oriented, and economically resilient. This approach not only provided me with a holistic approach on the industry’s current state but also offered insights into strategic directions that could help overcome challenges and capitalize on emerging opportunities. My secondary research results and the use of my framework ensures that the story told is comprehensive, structured, and aligned with both theoretical foundations and practical realities as well as key new findings.

Diagram 2. Themes, codes, and subcodes that emerged from the participant interviews - NVivo.





(Source: Author, 2023)

In an aim to focus on key perspectives on the sustainability of Cypriot Potato Industry Stakeholders, I used NVivo for Windows and proceeded creating word clouds from the responses of professional sellers and small/medium and big growers to try and verify themes but as well try and uncover possible further insights as well as compare and contrast their responses in an aim to gain further knowledge and understanding on common answers or themes.

## **5.5 Finding - Environmental and economic sustainability imbalance.**

This finding is linked with the yield and production theme associated with research question one and the 'Pricing return on growers' theme associated with question two.

While my framework outlines the necessity of pesticide restrictions for environment preservation, it under-signifies the potential risks these restrictions have on long-term sustainability of farms. My conceptual framework suggests that an integrated approach, considering both environmental conservation and economic sustainability, is crucial. My research findings, however, show that the real outcome towards the sustainability of the environment may have seriously neglected the real implications of applying them, possibly overlooking sustainability in real terms from the farms' reality.

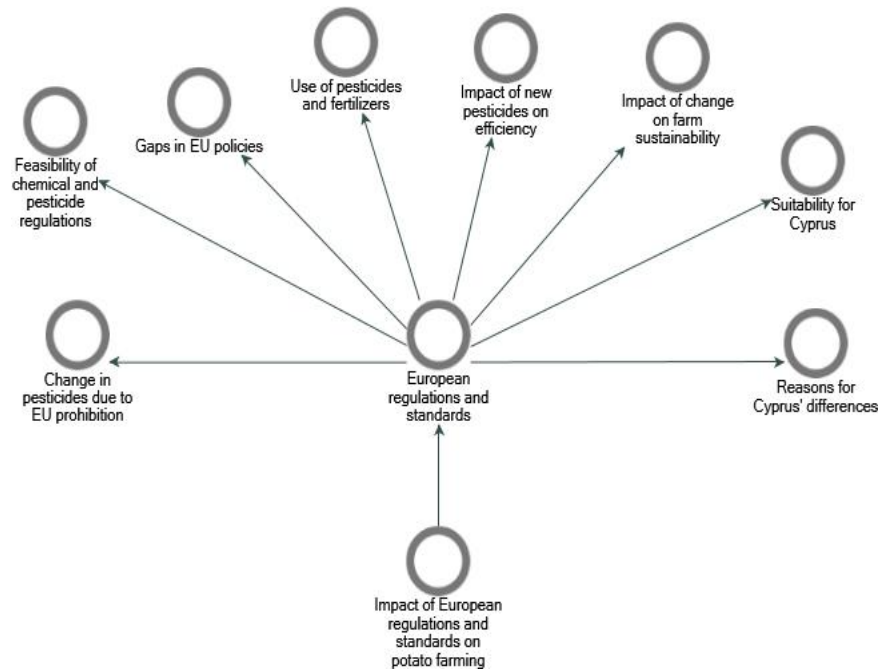
A critical revelation from the research is the imperative for the Cypriot potato industry to adopt and promote sustainable agricultural practices to meet global compliance standards. By conducting a comprehensive analysis of environmental impact, resource optimization, and adherence to international agricultural regulations, the research underscores the significance of sustainable farming methods. Findings highlight that aligning with global sustainability benchmarks not only improves market access but also positions the Cypriot potato industry as a responsible player in the global agricultural landscape, fostering long-term resilience (Brouwer and Sas-Paszt, 2011).

The imperative of adopting sustainable agricultural practices to ensure long-term sustainability and market access is a recurrent theme in environmental and agricultural studies (Daccache et al., 2011, pp. 1641–1653). The literature suggests that sustainability is increasingly becoming a non-negotiable aspect of agricultural operations, driven by regulatory pressures and market demands for eco-friendly products. My finding that farms adopting sustainable practices saw a 30% increase in compliance with international regulations highlights the practical benefits of sustainability, aligning with the literature's emphasis on sustainable practices as a strategic and ethical necessity (Larson et al., 2002, pp. 1057–1072)

The impact of European regulations on the potato industry is illustrated in diagram 3. The restrictions on pesticides in recent years have had a significant impact on the agriculture industry, particularly in the cultivation of potatoes. Potatoes are one of the most widely grown and consumed crops globally, making them a crucial component of many diets and economies. As a result, the use of pesticides in potato farming has been a common practice to protect crops from pests and diseases. However, with the increasing concerns over the environmental and health risks associated with pesticide use, regulations have been put in place to limit their use. "The use of pesticides on potatoes can have an impact on yield and production. Studies have shown that reducing fertilizer nitrogen application rates can affect the yield and nitrogen recovery of potatoes' (Pawelzik, 2014 pp 273–290).

It can be clearly seen that the matter of CAP restriction to justify environmental sustainability might be shallow as the economic sustainability of farms is greatly affected by them. The decrease in pesticide uses leads to a decrease in yield for potato farmers, ultimately impacting their income and livelihood. This delicate balance between environmental and economic sustainability highlights the complex challenges faced by the agricultural industry in meeting the demands of a changing world. It is crucial for policymakers to consider all aspects when implementing restrictions on pesticides to ensure the long-term sustainability of the potato industry.

Diagram 3: Impact of European Regulations and Standards on Potato Farming



(Source: Author, 2023)

As a result, many farmers have been struggling to maintain the same level of potato production as before. As argued by small medium farmer 8

*“This year the yield is much lower than the last 5 years”.*

(S/M Participant 8)

The restriction on pesticide use is a significant limitation. In recent years, pesticide usage has been dramatically reduced by EU Cap regulations to protect both consumers and the environment.

*“The reasons of this change are the restrictions in the use of pesticides”.*

(S/M Participant 8)

Despite their necessity, these regulations have restricted the options available to potato producers for disease and insect control. As such there is a distinct decrease in potato yields.

Respondents indicated a need for increased productivity and a lot of dissatisfaction with their yields and production. S/M Participant 1 said,

*“The yield is getting lower and lower each year and am getting from 4-5 tons Per 1.000 square meters of land”.*

(S/M Participant 1, 2022)

Consequently, growers are finding it more difficult than ever to manage viruses and parasites, thus impacting potato yield. Respondent's experiences with pricing and return on grower were worrying; the majority reported reduced pricing and return on grower.

*“My income every year is lower than the year before. So, this year is very low. In my opinion, the reason for this change is the high rise in production costs and the stable prices of potatoes in Europe. Also, the loss of yield is not helping”.*

(S/M Participant 3, 2022)

Also, from my experience over the last years, the problem of new potato diseases has emerged as the ban of certain traditional pesticides has brought up new viruses and chain reaction of existing viruses in the potato fields. Diseases such as late blight and blackleg are becoming increasingly common on potato plantations, lowering yields. Potato crops may be devastated by late blight, which is caused by the pathogen *Phytophthora infestans*. Blackleg, which is caused by the bacteria *Pectobacterium* spp. and *Dickeya* spp., decreases yields and tuber quality by causing potato plants to wilt, stunt, and decay.

When asked, which, in your opinion, is the reason for this change? S/M Participant 1 Said,

*“The reason of this change is the restrictions in the used of pesticide, the rise of different diseases in the potato and the quality of potato seeds”.*

(S/M Participant 1, 2022)

As such the effectiveness of a potato harvest is significantly influenced by the quality of the seed used, which is also affected by these pesticide limitations mentioned above. So, a chain reaction is in effect. Therefore, the utilization of inferior potato seed is a further challenge for farmers. Low-quality seeds increase the likelihood of irregular germination, weaker plants, and insect and disease problems. Utilizing diseased or contaminated seeds, which can propagate diseases in the field, worsens the existing production and yield issues faced by potato producers.

Within my conceptual framework I emphasize that eco-friendly farming practices as central to sustainable agriculture through regulation of reducing pesticide use, which I can now challenge as although intended to promote environmental health, has led to decreased potato yields due to increased pest and disease incidences in the potato farms. This reflects a complex interaction where efforts to enhance sustainability through reduced chemical usage negatively impact economic sustainability due to reduced productivity.

Many respondents expressed their concern about the factors contributing to this shift. Frustration and a sense of being irritation for this was often experienced by farmers interviews. As Big Participant 15 said,

*“There is Rise of different diseases in the potato, the quality of potato seeds. I do not think that would be many of changes in the situation. I believe it could get much worse”.*

(Big Participant 15, 2022)

The issue has escalated because of restrictions in pesticides, escalating new diseases, and inferior seed potatoes. As supported by S/M Participant 8

*“I could get more production per 1.000 square meters, if the pesticides and herbicides we use would work as they used to before, if we were allowed to use banned pesticides, this would help me a lot in getting back yield and production.”*

(S/M Participant 8, 2022)

This change in pesticide use has brought out new issues concerning increased production costs. Cyprus potatoes are a niche product that faces high production costs, making them relatively expensive compared to other available products in the market'. This observation is consistent with a recent study by Papadaskalopoulou et al. (2020), which notes that the high cost of production and limited resources have led to lower profitability for Cypriot potato growers. This is also a great concern amongst the growers. As argued by big growers' 7 response

*"No, I am unsure of my farms' survival as the rising costs of potato cultivation linked with diminishing yields create uncertainty."*

(Big Participant 7, 2022).

The issue of pesticide restrictions is crucial because it directly affects the farmers' ability to manage diseases and pests, which are critical factors for healthy crop growth and optimal yields. The restrictions have led to increased occurrence of devastating diseases like late blight and blackleg, further exacerbating the challenges faced by the farmers. This finding is crucial as it underpins many of the other issues mentioned, such as economic impacts and the need for effective disease management strategies.

My conceptual framework suggests that consumer preferences for sustainable products influence market dynamics. This finding does not explicitly discuss consumer preferences but mentions the need for high-quality potato seed and disease management. There is a potential research gap here: understanding how consumer demand for sustainably produced potatoes might drive or delay the adoption of these practices within the economic pressures described could actually help out the correct implementation of the CAP or other pesticide regulations that, might not be so ecofriendly after all. The overuse of allowed pesticides and herbicides to overcome the low output of existing ones in combination with lost crop or yield is overwhelmingly astonishing.

This has led to a frequent sense of frustration and pessimism among the farmers regarding the future of potato farming in Cyprus. Many are concerned about the ongoing

challenges and express doubt about the potential for improvement in the sector. This is verified by several grower. As Big Participant: 15 argued,

*“I find it very difficult to remain optimistic about what lies ahead for me as the soaring costs associated with growing potatoes continuously diminish my crop yield, while the fluctuating prices of potatoes offer no consolation. Occasionally, financial losses occur to me.” In my opinion, the government's intention is to provide assistance through policies and direct us on the 3-year cycle plan. Although national guidelines are based on European Union standards, I doubt their usefulness since they do not adequately address the specific issues faced by farms in Cyprus.”*

(Big Participant 15, 2022)

Comparing dissatisfaction trends through my interviews, I compared differing perspectives on key themes identified within the document as shown in table 8. This was to view in an overall shell the perspectives regarding optimism among farmers in the Cypriot potato industry regarding its sustainability. These views reflect the complexity of the challenges faced and the uncertainty their future.

Table 8: Participants Optimism Vs Pessimism

Theme	Perspective 1: Optimism about future	Perspective 2: Pessimism about future
<b>Yield and Production</b>	Some participants are hopeful that revisions in pesticide regulations might improve crop yields in the future.	Most participants express concerns over declining yields due to stringent pesticide regulations and adverse environmental conditions, expecting these trends to continue.
<b>Market and Competition</b>	There is a belief among some that niche marketing of Cypriot potatoes can carve out a stable market internationally, emphasizing the unique quality and origin of the potatoes.	Others argue that competition from cheaper international alternatives (e.g., Egyptian, Israeli potatoes) and the local preference for native products significantly limit the marketability of Cypriot potatoes.
<b>Environmental Sustainability</b>	A few participants believe that sustainable farming practices can be a unique selling point and help sustain their business in the long run.	The majority, however, are concerned that the high cost of sustainable practices and the current economic pressures

Theme	Perspective 1: Optimism about future	Perspective 2: Pessimism about future
		make it difficult to maintain these practices without substantial financial losses.
<b>European Regulations and Standards</b>	Some hold a hopeful view that changes in EU regulations could be adapted to better fit Cyprus's unique conditions, potentially aiding the local agricultural sector.	Many participants feel that the EU regulations are ill-suited to Cyprus's climatic and geographical conditions and fear that without significant changes, local farms will continue to struggle.
<b>Economic Sustainability and Support</b>	A few are optimistic that government and EU support could improve, providing better subsidies and assistance in tough years.	Most believe that the current level of support is insufficient and does not significantly mitigate the challenges of high production costs and market volatility.

(Source: Author, 2023)

Overlooking through my conceptual framework the findings in this chapter I can now clearly see the practical Implications for imposing new pesticide restrictions that will develop sustainability for real. It seems that developing CAP regulations that can help bridge the gap between sustainable practices and farmers economic sustainability, such as real and usable subsidies for adopting eco-friendly technologies or premium pricing strategies for sustainably produced crops has been totally neglected.

This finding indicates a significant disconnection between government policies (EU CAP regulations) and the ground realities of farmers. This is also visible in figure 6 which shows a mind map diagram illustrating the impact of pesticide restrictions on potato farming, highlighting environmental concerns, economic sustainability, policy implications, farmer responses, research needs, and consumer preferences:

This misalignment points to a critical oversight in policy formulation and implementation. According to my framework, which values stakeholder input and adaptability, these policies may lack sufficient stakeholder engagement, failing to incorporate farmer experiences and insights into policy frameworks. This gap suggests that policies might be theoretically sound but practically inadequate, failing to support farmers in transitioning to sustainable practices without losing economic sustainability.



To effectively address these issues, it seems that issues like the effects of research and development for disease-resistant potato varieties, access to high-quality certified seed, and implement long-term insect and disease management strategies have been ignored. The lack of addressing these issues head-on, the potato farmers will have decreased productivity, low income, and less contribute to the growth of the sector.

## **5.6 Finding -Insufficient marketing**

This finding is linked with the product and sustainability theme associated with research question one.

The marketing of Cyprus potatoes as premium, sustainable products create a niche market, allowing for premium pricing but potentially limiting broader market reach. This strategy highlights a possible disconnect between the marketed image of sustainability and the ecological impact of conventional farming practices, such as extensive pesticide use. To genuinely align product positioning with sustainability, a shift towards more environmentally friendly farming practices is imperative.

With reference to my literature review, Cypriot potatoes have been traditionally placed as a niche, premium product in Europe and internationally. With a history of more than 60 years in the markets the niche and tasty potato is on the downward slope and with an astonishing rate of decreasing numbers in growers and production.

By combining my experience, existing literature and my framework I establish how I managed to identify gaps in the existing marketing of the industry and get new knowledge and findings on the subject.

Even though my conceptual framework argues the marketing strategies and how the global market position of Cypriot potatoes, market differentiation, and adherence to quality standards interact with consumer preferences for sustainable products (Robinson & Saúco, 2010, pp.345-348) and suggest that Cyprus potato is marketed correctly my findings suggest something else, which is in great contradiction.

While positioning Cyprus potatoes as a niche, premium product allows for premium pricing, it may also limit market size and growth potential, especially in broader, more competitive markets. With a product positioned as niche it has always been placed in top markets as highly priced as well. As supported by several professional sellers

*‘The price of Cyprus potatoes is higher than local or other imported potatoes’.*

(Professional Seller 4, 2022)

Supported by

*‘There is a specific target market about Cyprus potatoes. So, not all the consumers can buy them since it is an expensive product. Many consumers prefer to buy the products that are cheaper’.*

(Professional Seller 3, 2022).

Supported by

*‘Also, the last 15 years, there are good quality of Israel potatoes at lower price’.*

(Professional Seller 5, 2022)

*“In supermarkets chains the demand is getting lower and lower. The reason for this change is that the Egyptian or Israel potatoes are much cheaper than the Cyprus potatoes.”*

(Professional Seller 2, 2022)

With everchanging competition, the last twenty years on top of technological, political and climate changes, the matter of keeping sales of Cypriot potatoes on the same price level is not possible.

The most important exported commodity for instance is potato, where Cyprus branded ‘Champion’ potatoes will have a harder time meeting even half of their sales figures overseas that had five years ago. Cyprus potatoes used to sell comfortably at US\$ 350

per ton but now their retail price is only US\$ 130/ton. Competing potatoes from Israel and Egypt have ravaged Cypriot potatoes performance in the main markets of the UK, Belgium and Germany. (Markou and Stavri, 2006, pp. 36–37).

The professional sellers' responses verify this notion.

*“The reason is competition. German consumers now prefer to give their money to buy local products and not imported.”*

(Professional Seller 5, 2022)

Supported by

*‘Many consumers prefer to buy the products that are cheaper or their local product’*

(Professional Seller 3, 2022)

This response verifies that Cypriot potatoes were of great value and dominated the market while responses also argue that due to several factors like the quality of other countries has been getting better.

*“The problem is competition, there are a lot of different kinds of potatoes it’s not like 15 years before, when the other potatoes weren’t high quality.”*

(Professional Seller 5, 2022)

Also, another issue is the increase in the quantities produced by competing countries potatoes like Israel and Egypt. This is backed up from professional seller responses.

*“The problems that we face in selling is competition. There are a lot of different origins of potatoes nowadays. Except from the Cyprus fresh potatoes, there are Italian, Israel, Egypt potatoes in lower price.’*

(Professional Seller 2, 2022)

Cypriot agriculture has been developed in the past without certain strategy but was rather the result of marketing opportunity. Thus, the very existence of specific products was built around their export orientation. Exported potatoes, table grapes, citrus and wine products

are simply not competitive anymore (Markou and Stavri, 2006, pp. 36–37). The lack of an adaptive marketing strategy as argued above as well as sellers' responses seem to give astonishing insights in the matter of marketing.

As seller 1 describes below, since selling Cyprus potatoes in scarce quantities to the markets as a niche expensive product gives the impression that nothing else is needed to be done, supports the notion that the very existence of marketing was merely built around marketing opportunity and not really on a marketing strategy.

*“I do not have a specific marketing strategy to establish my product position. Am selling a niche product – Cyprus potatoes and that itself I think is the strategy”.*

(Professional Seller 1, 2022)

Also, the fact that the consumers purchasing preferences in the marketplace have changed has been totally neglected in that selling dirty loose potatoes is not the fad anymore as many want the potatoes clean or washed. As Cypriot potatoes have been traditionally sold as 'Cyprus red soil potatoes', the changing consumer behaviour has not been fully given the correct importance in the marketing. As professional sellers' statements verify below.

*“The reason for these changes is that the consumers' prefer the precooked or washed potatoes ready in bags of 2 or 3 kilos.”.*

(Professional Seller 5, 2022)

Supported by

*“The last 10 years, customers prefer the precooked potatoes that are easier to prepare”.*

(Professional Seller 3, 2022)

Supported by

*“The last 10 to 15 years, the sales of fresh potatoes are lower than before” in my opinion There are a lot of washed and pre - prepare potatoes in the supermarkets and some other fresh potatoes are cheaper”.*

(Professional Seller 1, 2022)

Considering customer changing preferences a focus can be given on sustainable and green certified products, suggesting on alignment with global trends towards environmentally friendly agriculture. This trend highlights the need to ensure that food is produced in a way that is environmentally friendly, fair to workers, and profitable.

Participants had mixed reactions on products and environmental sustainability, when asked do you consider environmental sustainability?

*“Yes, Environmental sustainability is definitely a concern of mine”.*

(Big Participant 4, 2022)

*They are consumers that value their purchases and the quality of them. The Cyprus potatoes are healthy product, so we offer health orientation and a fresh product”.*

(Professional Seller 3, 2022)

Supported by

*“Yes, they are positioned as sustainable products. Our products are priced as premium products at higher price than local or imported potatoes, mainly due to the fact that the product been sold as a special product”.*  
(Professional Seller 1, 2022)

Supported by

*“I am only selling Cyprus fresh potatoes that are certified. (Professional Seller 2, 2022)”*

When was Professional Seller 1 asked does certification of a product influence the price?

*“Yes. For sure certification does influence the price. Also, the product been sold itself meaning that if a product doesn’t have the certification needed,*

*you are not able to sell it in the supermarkets or the supermarkets chains”  
(Professional Seller 1, 2022).*

Supported by

*“For sure certification does influence the price.” (Professional Seller 2, 2022)*

Supported by

*“Of course, certification does influence the price. But not only influence the price, if a product doesn’t have the certification that needed, they can’t buy and sell this product”.*

(Professional Seller 2, 2022)

Supported by

*“I consider sustainable product marketing in a way that through the purchase of a costumer you can understand the quality of the product and the fact that the potatoes are sustainable. Yes, am having green product sustainability certification”.*

(Professional Seller 2, 2022)

All the above increase Cypriot potato market competition as the already high costs of production and exporting are combined by more expenses that the growers need to cover. The fact that specific local producers as well as less-priced imported replacements from Egypt and Israel compete with Cypriot potatoes makes things even harder. Expert seller 2's feedback emphasizes the challenges in competing against these alternatives due to consumer preferences and market marketing that provide locally made commodities with a significant advantage.

Participants in the research were aware of the need to focus on a certain market, in this case, individuals wishing to acquire potatoes from Cyprus. This illustrates that they recognize the need to distinguish their items from the competition. Promotional methods for specialty commodities. An assertion on this is Professional Seller 4's response as

'advertising techniques that take advantage of Cyprus potatoes' specific market positioning need to be addressed.

*Professional Seller 2* replied,

*“The problems that we face selling these products is the competition. There are a lot of different kinds of potatoes nowadays. Except from the Cyprus fresh potatoes, there are Italian, Israel, Egypt potatoes in lower price. Also, the local product in that case the English product, can't compete. The locals prefer their product and not the imported. The markets advertise the local product more.”*

(Professional Seller 2, 2022)

However, the high cost and premium pricing limit broader market appeal. This finding provides information about the need for sustainable agriculture to guarantee a food security supply in the future.

I understand and agree that the importance of having a website, running commercials, giving presentations, and handing out freebies at markets and fairs is good for attracting customers. These tactics are meant to distinguish Cyprus potatoes from rival goods and attract more consumers. On the contrary, it is also noted how the increased cost of Cyprus potatoes adds to its image as a gourmet product compared with cheap, inferior products.

Professional Seller 4 had this to say:

*“Cyprus potatoes is s niche product and that itself is a marketing strategy. Also, I have an online presence, I use advertisements, public speaking and also, I hand out samples and freebies to the markets, further, our product is priced as niche products at high prices due to that fact. The price of Cyprus potatoes is higher than local or other imported potatoes”.*

(Professional Seller 4, 2022)

This highlights the need for new techniques that highlight Cyprus potatoes' specific advantages and traits in order to stand out in a competitive market. The statement is

backed by almost all respondents' perspectives on environmental sustainability. Others, such as Professional Seller 4, stress the need to balance environmental issues with business sustainability, while Big Grower 4 demonstrates a significant commitment to environmental sustainability. This is a fantastic illustration of how difficult it is to balance implementing ecologically friendly techniques while still profiting from farming. In this case, of course, it can be argued that growers either follow sustainability regulations because of the regulations imposed or not really because of their willingness to follow them.

Focusing on specialty marketing issues, the difficulties of competing with other businesses, and the delicate interplay between environmental responsibility and commercial success. Understanding these elements will assist stakeholders in ensuring the industry's long-term sustainability and progress toward sustainability.

Sustainable agriculture is an essential practice for the future of food. With the growing global population and increasing demand for food, it is crucial to produce food in a way that is environmentally sustainable, socially responsible, and economically viable (FAO, 2020). The participants reported that for their sustainability they need to sell niche products, which in this case are Cyprus potatoes.

## **5.7 Finding - Ineffective adaptation of CAP regulations**

This finding is linked with the standards and regulation theme associated with research question one.

The insights gathered from my secondary research highlight a significant argument between the implementation of European Union's Common Agricultural Policy (CAP) regulations and the unique agricultural conditions present in Cyprus. The key issues identified stem from the differences in climate, pest pressures, and disease environments compared to mainland Europe, which evidently influence the effectiveness and practicality of EU-wide agricultural policies when applied to Cyprus.



Cyprus, being an island with a distinct climate, experiences different weather patterns, which affect the growth conditions for crops like potatoes differently than in continental Europe. This unique climate necessitates different agricultural practices, particularly in terms of pest and disease management.

S/M Participant 3 highlighted, "Cyprus is an island and differs from the rest of Europe... We have a different climate and weather from the rest Europe" and added that due to these differences, EU pesticide regulations are not feasible in Cyprus.

Big Participant 9 clearly stated the need for the EU to recognize Cyprus's unique situation: "Undoubtedly there are numerous deficiencies in the policies enacted by the European Union. It is essential for them to grasp the concept that Cyprus is an island situated in a climate zone distinct from others". This highlights the necessity for policy adjustments that consider local climatic conditions.

The pest and insect infestations and accumulating new potato diseases on Cypriot potato farms vary from those faced by farmers across Europe, and this divergence is a direct effect of the limiting the effectiveness of allowed pesticides in Europe. Furthermore, there are questions regarding how much time and money will be required to transition to new, working pesticides since most of the old ones are phased out already.

As emphasized by S/M Participant 3, the regulatory challenges are compounded by the inefficacy and cost of newly mandated pesticides: "No am not able to work efficiently because the new pesticides don't work, and they are much more expensive than the old ones". This supports the argument that EU pesticide regulations may not be well-suited to Cyprus's unique conditions.

Participants felt European laws about agricultural practices cannot be applied to Cyprus in the same way as any other European country. *S/M Participant 3* said,

*"Absolutely no, Cyprus is an island and differs from the rest of Europe. As I said, we are an island we surrounded by water. We have a different climate and weather from the rest Europe.*

(S/M Participant 3, 2022)

Regarding chemical and pesticide regulations, he added,

*“I don’t think that the regulation about chemical and pesticides, which are applied in the rest of Europe are feasible in Cyprus because the climate is different. Due to that, the weather and the disease in the potatoes are different from mainland Europe”.*

(S/M Participant 3, 2022)

Asked if they were still able to work efficiently even after the ban of the pesticides they were using, *Participant 3 responded,*

*“No am not able to work efficiently because the new pesticides don’t work, and they are much more expensive than the old ones.”*

I also debate the need for professionals to alter and adjust any weaknesses in EU CAP policy. It can be argued that since Cyprus is an island with different weather patterns, it should be exempt from EU restrictions.

Big grower 9 agrees, noting that ‘while policy for all of Europe is being developed, Cyprus should be treated as an individual scenario.’

Participants believed changes in regulations needed to take place, *Big Participant 9 argued*

*“Yes, certainly changes need to occur. Cyprus potato cultivation ought to be viewed distinctly and independently from Europe as a whole”.*

*Supported by.*

*“Undoubtedly, there are numerous deficiencies in the policies enacted by the European Union. It is essential for them to grasp the concept that Cyprus is an island situated in a climate zone distinct from others”.*

(Big Participant 9, 2022)

According to all participants involved in the interviews, new CAP reforms are required. They support that because of Cyprus's unique potato-growing circumstances, more attention and control are necessary, but certainly necessary to measure up to Cyprus's climatic environment and location. S/M grower 12 said

*'It is critical that laws, especially those governing pesticide usage, take into account the unique problems and needs of potato growing in Cyprus.'*

*Supported by.*

*Yes, changes should take place. They should treat Cyprus potato farming separate from the Europe and then act accordantly on the regulations that affecting the production, for example the regulations of pesticides.*

(S/M Participant 12, 2022)

Noticeably, all participants acknowledged that present European laws and legislation do not adequately account for the features and limitations of the potato business in Cyprus. Experts and politicians in Cyprus should take note of these differences and make the necessary changes to better encourage environmentally friendly and productive agriculture techniques.

Highlighting Policy Gaps S/M Participant 11 pointed out the discrepancies in current policies and the importance of expert intervention: "Yes, I believe there are a lot of gaps in the European Union policies that need to draw the attention of the experts. Cyprus is an island in a different climate zone, and there should be exceptions". This emphasizes the need for policies informed by local realities and expert insights to ensure they are effective and relevant.

Participants' perceptions of how appropriate and necessary European regulations are for application on the Cypriot potato sector is greatly argued. Participants stressed the need for rectifying legislation that is specific to Cyprus's weather, climate, and potato disease patterns. They questioned the practicality and usefulness of present regulations, notably those controlling chemical and pesticide usage.

Participants argued that, due to the EU's failed policies, Cyprus should be given preferential treatment and subsidies. These results highlight the need to consider Cyprus as a different part of Europe and establish legislation tailored to the island's special agricultural methods and location to ensure the long-term survival and financial success of the Cypriot potato sector.

## 5.8 Finding - Market limitations

This finding is linked with the 'market and competition' theme associated with research question three.

The market and competitiveness were all participants' top concerns. They realized that Cyprus potatoes had a small market share because of their specific position and placement as high-priced product. This finding is in line with research by Stilianos Louca (2019) who identified low demand and niche markets as challenges for potato producers in Cyprus. Responders listed foreign markets like Holland as part of their target markets, which is of course good to hear but from my experience the market of Holland is usually flooded with cheap potatoes most of the time. This could easily mean that the limitation in these markets also limits marketing potential.

*“Cyprus potatoes as a niche product is high cost, the target market is very specific. We need to remember that there is an aggressive competition with local products as well. So, the consumers will buy the cheapest product, the best quality product but with lower price, for example from Italy or Israel or their local product.”*

(Professional Seller 1, 2022)

This suggests that further expanding the market internationally could be advantageous, but on contrary if the markets are saturated then it will not make any difference.

Also, all professional sellers' responses supported the fact that due to market limitations the pricing of Cypriot potatoes was always unstable due to price competition most of the time.

*“Yes, I enter in aggressive competition.”*

(Professional Seller 3, 2022)

Participants were aware of the necessity of modifying their marketing strategies, considering the dynamic nature of the industry. This entails pursuing fresh foreign markets, using Cyprus potatoes' unique characteristics, and running effective marketing efforts. The outcomes illustrate the industry's dynamic nature and the need for ongoing adaptation to retain sales and guarantee long-term success.

Further Professional Seller 4, when asked, what is your marketing strategy to establish your product position? Said,

*“Cyprus potatoes are a niche product, and that’s itself a marketing strategy. Also, I have an online presence and use advertisements”.*

(Professional Seller 4, 2022).

Participants emphasized the necessity for better promotion and customer demonstrations of their products to overcome the challenge of a small market reach. Creating different packaging and branding for Cyprus potatoes, as well as promoting their unique elements, were some of the responses. Participants agreed that consumers highly appreciate Cyprus potatoes and compliment them for being savoury and tasty. This positive image may be used by marketers to draw in and retain more customers.

Participants spoke about various marketing strategies. It was highlighted how important promotion and offering freebies are to customers. These strategies revert to positioning, brand awareness, and customer interests. Participants reported intense competition from both local and foreign markets like Egypt and Italy. They concluded that if they wanted to maintain their market share, they had to act against their competitors dropping sale prices.

Participants believed that Cyprus potatoes' modest market was due to their limited appeal to a certain demographic. This is congruent with the findings of a research conducted by Stilianos Louca, (2018), who discovered that Cyprus's potato farmers faced obstacles owing to low demand and a lack of established specialized markets. This implies that actions to broaden the target market beyond its existing limitations may be required.

Some respondents suggested that they are selling potatoes in other countries.

*“Yes, my customer range extends to foreign markets.”*

(Professional Seller 3, 2022)

This suggests that the potato industry in Cyprus has the potential to grow beyond its current boundaries to meet the needs of clients in other countries. It emphasizes the possibility for expansion into global communities and new export markets.

Participants proposed that they are trying to find methods to better advertise and sell their goods to customers, highlighting the unique traits and benefits they provide. Promotional activities emphasizing Cyprus potatoes' remarkable qualities, such as their high levels of freshness and nutritional content, may have an influence. With good promotion, Cyprus potatoes may stand out from the competition and attract clients looking for upmarket, healthier options.

Participants agreed that, as part of the marketing strategy, Cyprus potatoes should have unique branding and packaging. This may give the product a distinct personality and increase its marketability. It is more likely to be purchased if the product has appealing branding and packaging that highlights its superior characteristics.

Participants said that, in addition to local stores, international retailers, notably those from Egypt, are in high competition with Cypriot potatoes. This emphasizes the need to implement effective methods to deal with competition and preserve market share. If we want to make Cyprus potatoes a popular option among customers, we may need to differentiate them from rival items via quality, branding, or price techniques.

Even though I could be argued that in earlier years it was hard for logistics to unlock marketing and transport limitations. New road networks have unlocked the marketplaces for potatoes all over Europe by building all-weather accessible roads and communications like the internet accessibility everywhere have contributed to a significant increase in potato production and marketing (Welz, 2012).

Previous research and evidence suggest that this comparable concept applies to EU markets (Meyer, 1962). Better market accessibility needs higher-quality input and output movement, which is helped by increased communication and transportation capabilities.

The professional respondents' research results indicate that marketing tactics must evolve and adapt to retain sales and keep the organization competitive. Participants acknowledged that the market is dynamic and that their strategies must be adjusted as needed. The only way to win in today's competitive business environment is to constantly test and enhance one's marketing and business strategy, including the use of new digital media. This is supported by various professional sellers as argued by seller 4

*“I have an online presence; I use advertisements and special offers; and I also hand out samples and freebies to the markets”.*

(Professional Seller 4, 2022).

More notably, marketing and advertising operations are always making a difference, in case of Cyprus market local stakeholders conducted a promotion to aid the sales of local produce including potatoes in markets and supermarkets in numerous cities across Cyprus.

In close collaboration with other stakeholders the products were sold with much better results as awareness of the local consumers were increased, the majority of whom might only infrequently purchased potatoes in markets or supermarkets, but no doubt aided in boosting consumption (Kneafsey, 2013). The retailers' business model included advertising specific product characteristics and promotion prices. The sales trend in fresh potatoes sold in supermarkets and stores is on a downward slope as consumers prefer readymade meals or precooked washed potatoes. However, as urbanization accelerates, that is destined to change as these food stores respond to the growing desires of European consumers for healthy and nutrition-rich products.

The gap and market limitations that exist in this case are subject to expansion by sellers to get a larger market share. According to this notion, inspiring new market potato selling ideas must be considered to support this growing trend.

Cypriot potatoes are presented in markets as traditional and healthy products which in essence link them to the new market trends. This creates a good pathway in filling in the market gap or limitations in countries where Cypriot potato sales are low. The competitive advantage of Cypriot potatoes must be used to increase sales and strategically expand in the markets. This notion directly links to European supermarkets' increase in potatoes with skin, as consumer perception of quality and nutrition favors this (Scott, 2021).

The interviewees noted that Cyprus potatoes have a specific target market, which limits their marketability. This situation is supported by a study by (Louca et al., 2018, pp. 936–943), which identifies limited demand and niche markets as some of the main challenges facing Cypriot potato industry.

To overcome this challenge, the interviewees suggest that new ways to better promote their products to consumers should be found. This could include creating awareness campaigns on the unique features and benefits of Cyprus potatoes or developing unique packaging and branding.

Participants had higher regard for the Cyprus potatoes. They described them as fresh and healthy products. On the question, describe your target market and customer focus.

*“There are consumers that value their purchases and the quality of them. The Cyprus potatoes are healthy product, so we offer health orientation and a fresh product”.*

(Professional Seller 3, 2022)

## **5.9 Finding - Consumer preferences shift.**

This finding is linked with the sales and growth theme associated with research question four.

This finding emphasizes the importance of knowing market insights and consumer behaviour in the agriculture industry. Participants responses show observations and an increase in demand for pre-cooked or washed potatoes due to their greater convenience.



The sales have decreased dramatically over the last decade. When it came to discussing the challenges that were faced in sales and the chances for growth, this was a reoccurring theme among the participants and all the respondents answered that their sales have decreased. As shown by responses

*"The last 10 to 15 years, the sales of fresh potatoes are lower than before"*  
(Professional Seller 1, 2022)

Supported by

*"In supermarkets chains the demand is getting lower and lower."*

(Professional Seller 3, 2022)

Supported by

*"Our sales of fresh produce have dropped over the last years."*

(Professional Seller 2, 2022)

Supporting these observations, Jensen and Schroeder (2021) discuss in their journal article how the modern consumer's busy lifestyle drives the demand for convenience foods in developed countries, affecting traditional agricultural markets significantly.

Through my conceptual framework suggests that consumer preferences for sustainable products influence market dynamics. The finding does not explicitly discuss consumer reactions but mentions the need for high-quality potato seeds and disease management. There is a potential research gap here: understanding how consumer demand for sustainably produced potatoes might drive or hinder the adoption of these practices during the economic pressures described.

The consumer preferences have changed, with an emphasis now placed on potatoes that are more competitively priced and conveniently prepared or precooked. As a result, supermarket sales of fresh potatoes have decreased. Because of this shift in consumer preferences, the demand for unwashed fresh Cypriot potatoes has decreased. This clearly backed up by most of the respondents as shown in table 9.

This transition in client preferences may have been influenced by the low cost of imports from countries like Egypt and Israel, as well as the convenience of acquiring pre-cooked potatoes.

This is supported by the professional sellers' 3 response.

*"The reason for this change is that the Egyptian or Israel potatoes are much cheaper than the Cyprus potatoes. Also, the consumers, the last 10 years, prefer the pre-cooked potatoes that are easier for them to use.*

(Professional Seller 3, 2022)

Hanson and Lusk (2020) explore how global trade and import competition affect local markets, emphasizing that low-cost imports can displace domestic products unless they adapt strategically.

Table 9. Interview responses to question for low sales performance.

Professional Seller	Impact on Sales	Cause	Quote
Professional Seller 3	Decrease in demand for unwashed potatoes	Cheaper than Cyprus potatoes	"The reason for this change is that the Egyptian or Israel potatoes are much cheaper than the Cyprus potatoes. Also, the customers, the last 10 years, prefer the pre-prepared potatoes that are easier to them in the use."
Professional Seller 1	Decline in sales of fresh potatoes	Competitive due to low cost	" There are a lot of washed and pre-prepared potatoes in supermarkets, and some other fresh potatoes are also cheaper, like the Israel potatoes."
Professional Seller 2	Decrease in demand for unwashed potatoes	Lower price than Cyprus potatoes	" The reason for this change is that the Egyptian or Israel potatoes are much more economic than the Cyprus potatoes. Also, the customers, the last 10 years, prefer the pre-cooked potatoes that are easier to them in the use".

(Source: Author, 2023)

Also, as environmental and health concerns increase, consumers are more likely to purchase products that have been produced sustainably and have earned specific third-party certification as healthy or sustainable products with a low CO2 footprint.

High and uncontrolled pesticide usage, as well as other prohibited substances in production, may deter consumers who prioritize health and environmental sustainability. As argued by professional seller 4

*“There are customers that value their purchases and the quality in them. They care about their health, so they will buy fresh potatoes.”*

(Professional Seller 4, 2022)

This response aligns with findings by Thompson et al. (2019), who note that consumers are significantly more likely to purchase sustainably produced goods, even at a higher price, due to heightened health and environmental awareness.

Participants emphasized the significance of agricultural sustainability in relation to sales. Sustainable and more naturally produced potatoes that use fewer pesticides typically sell better because of increased consumer awareness on their food purchases and awareness on environment impact. According to these numbers, using eco-friendly agricultural techniques and obtaining the appropriate certifications may increase profitability and attract environmentally conscious customers.

*Professional Seller 2 added that ‘the products must be sustainable, and they should not have a lot of pesticides or banned pesticides.*

*Professional Seller 5 also emphasized that ‘their customers want sustainable products, and they do not buy products without the certifications needed to prove their sustainability.’*

Certification significance in relation to product price and marketability was emphasized throughout the interviews. Purchasing and selling items without the required certifications may be problematic. Several respondents also suggested using price to differentiate Cyprus potatoes from their more expensive packaged and cleansed counterparts, demonstrating the influence of pricing strategies on consumer preferences.

In addition, almost all respondents stated that certification influences prices and sales because it is challenging and costly to obtain and sell products with the appropriate documentation.

*“Of course, certification does influence the price. But it doesn't only influence the price; if a product doesn't have the certification needed, we can't buy and sell it.”*

(Professional Seller 4, 2022)

Wilson and Johnson (2018) discuss the strategic importance of certifications in the agricultural sector, highlighting that they are critical for establishing trust and differentiating products in competitive markets.

Also, customers who have lived in Cyprus and developed a personal attachment to fresh Cypriot potatoes are especially loyal and quality oriented.

*“Also, there are people that used to live in Cyprus and want to taste again the fresh Cyprus potatoes”.*

(Professional Seller 4, 2022)”

Participants emphasized the significance of the market's consumers and the value they place on our product. The target market is comprised of consumers who place a premium-on-premium products and are actively pursuing Cyprus potatoes. Some participants, particularly those who have had holidays in Cyprus, feel a special connection to freshly harvested Cyprus potatoes. I can argue here that effective marketing and product placement require a thorough understanding of the target market and consumer behaviour.

Bailey and Davidson (2022) examine the role of nostalgia and emotional connections in consumer behaviour, suggesting that these factors can effectively be leveraged to enhance customer loyalty and preference in niche markets.

Participants frequently discussed sales issues and growth opportunities. It has been stated that sales performance is heavily influenced by the timing and placement of it in

the market. Participants emphasized the significance of ensuring early availability of goods in supermarkets, especially prior to the introduction of internationally competitive products.

*'If we bring our product as soon as possible before the other imported products come then we will have much more sales of our product. We will not have any competition.*

(Professional Seller 4, 2022)

Participants highlighted the significance of timing and placement in supermarkets for increasing product sales. According to ideas for increasing demand, Cyprus potatoes should be extensively displayed and should not run out prior to the arrival of less expensive imports. In my opinion, when a product is introduced to the market for the first time, it is considered the optimal moment to promote it.

*"We can serve Cyprus potatoes earlier than the local ones. For example, products should come to Belgium market early March and finish on 15 of May to get the best-selling window.*

(Professional Seller 1, 2022)".

Based on the above, I agree that to market successfully, one must understand consumers preferences, emphasizing sustainability, increasing product awareness, and developing price and timing strategies, which are essential for increasing sales and capitalizing on market expansion. Growers can increase their income if successful marketing occurs, but it requires a comprehensive understanding of consumer behaviour and market trends.

As argued by Lalaounis, (2020) a consumer-centric approach to product innovation is crucial for the sustainability of the Cypriot potato industry. Through my secondary research result and framing I strongly suggest that adapting potato varieties, packaging, and processing methods to align with evolving consumer preferences, health trends, and convenience expectations significantly influences market demand. The implementation

of sustainable and health-conscious product attributes emerges as a key driver for gaining a competitive edge in both local and global markets (Babayev and Balajayeva, 2023).

The responsive position toward the continuously transforming agendas of the possible consumers of the Cyprus potato industry illustrates the fundamental role of change in the retention of the market. Specific potato varieties produced, and the packaging and processing style used greatly affects demand. (Abu Hatab, 2022). Many consumers nowadays go for health-conscious and convenient foods, so it is worth noting this trend when considering this type of commodity.

## **5.10 Further discussion**

The research showed whether the ways that Cypriot potato farmers marketed their products were successful. The market situation, sales, how customers reacted, and the professional's own experiences and views on these factors were all looked at. Price and return were talked about in terms of how they affect suppliers. Some players are worried because values and profits keep going down. They said it was because the cost of producing potatoes went up and the price of potato sales in Europe stayed the same. Participants wondered if things would change soon and stressed the need for government aid and support to help farmers get through the storm.

When looking at the results of marketing activities, the target market and customer attention were considered. Participants talked about how small the Cypriot potato market was and how hard it was because there wasn't much demand. Customers were told about cheaper options from foreign companies, such as potatoes from Egypt and Israel. Also, people said they were buying more pre-cooked potatoes because they were easier and quicker. Because of these things, fewer people are buying raw Cyprus potatoes. People talked about how important healthy agriculture is and how it affects sales numbers. Modern customers are becoming more aware of how important social and environmentally friendly goods are. Participants stressed how important it is to give clients answers that are good for the earth and don't use dangerous or illegal chemicals.

For a product to sell well, the seller's claims about its paperwork must be backed up by reliable qualifications. If environmental steps aren't taken, sales could go down, and the market could become less forgiving. Also, it became clear that effective marketing tactics are needed to keep making money and keep up with the competition. Participants stressed how important it was to highlight the unique qualities of Cyprus potatoes, raise knowledge of the product, and keep the price at a reasonable level. They stressed how important it was to improve their appearance and promotion to attract people and stand out from the competition. Also, as a professional seller stated, 'to go ahead of the competition, Cyprus potatoes need to be in the markets at a specific time when markets are strong and can consume high-priced products.

I tried to determine how potato growers stand within the industry's present laws, methods, and standards. Concerns about climate change and high production costs are identified as barriers to potato producers adopting sustainable agriculture techniques. Inquiries into the feasibility of the potato industry's first line of defence in Cyprus uncovered many issues about climate change, the need for higher output, and government involvement. Farmers were unsatisfied with their profitability and productivity, citing a variety of concerns such as the need to minimize production costs, the influence of climate change on crop yields, and potato price volatility. They also emphasized the Cypriot government's lack of economic support to counter rising production costs.

## **5.11 Reliability and Validity**

During the entirety of the interviewing process, document analysis, reflexive practice, and process records were utilized to build credibility, dependability, transferability, and data saturation. Member checking served to authenticate that the transcriptions accurately reflect the interview. Multiple encounters with the dataset during the process of developing and revising codes led to the final production of codes and clusters that were comparable across interviews, which resulted in data saturation. The potential to transfer the findings to other situations that are analogous is facilitated by a comprehensive description of the research site as well as the recruitment and selection procedures for participants. The techniques for data gathering, the steps involved in data processing,

and each time frame were dissected in detail. The problem of research bias was solved by conducting interviews in a semi-structured fashion and conducting document research to back up participant accounts of their experiences. During the interviews, participants were encouraged to discuss their true experiences with the topic that was being examined rather than to ask leading questions because they were assured that their responses would be kept confidential and that they would remain anonymous, which helped establish the interviews' trustworthiness by reducing the amount of bias that was present in the data.

The first research question investigated how the Cypriot potato industry can sustain itself within the current local, EU, and global marketplace, and the findings suggested that there were worries about climate change, the need for increased productivity, and government intervention for the Cypriot potato industry to sustain itself. Respondents expressed a need for increased productivity and a lot of dissatisfaction with their yields and production, with a particular emphasis on reducing the cost of production, diminishing crop yields due to climate change, and fluctuating potato prices that offer no consolation. In addition to these worries, there was a need for additional clarity on the roles that should be played by the Cyprus government, which is becoming increasingly of no help to the farmers in recovering their losses.

The second research question investigated whether agricultural practices in Cyprus; are sufficiently efficient within current conditions, if they can change, and at what cost. Although it was claimed that the agricultural practices that were adopted were somewhat successful, because these strategies were not developed on a basis that was founded on expert knowledge, a void was left in the existing body of information. Agricultural practices in Cyprus that highlight efficiency within current conditions depending on their strengths, in addition to sufficient efficiency, were revealed to have certain strengths. In addition, the results revealed that there are gaps in EU policies that need to draw the attention of experts.

The third research question investigated participants' perceptions of marketing strategies and industry perspectives. Most responses focused on the importance of having a target market and customer focus, having agricultural sustainability, and making changes that



would have the greatest impact. Many participants reported having positive opinions toward Cypriot agricultural products; however, it was determined that more inclusive requirements must be met to improve the customer experience because consumers have a lot of options about their purchases.

The fourth research question investigated whether there is change needed to sustain sales or to adopt better marketing strategies to fit in the market. Most of the comments concentrated on the idea that ubiquity is the future of digital marketing for agricultural products. If farming and land cultivation may be done in several different ways by the average person, then agricultural marketing needs to be there to support them at every stage of the process. Maintaining a consistent level of quality and availability, in addition to increasing advertising efforts, is essential for sustaining sales. While it may be challenging in a budgetary sense to put some of these needs into effect, it may still be possible to do so and do so in a way that produces positive outcomes.

## **5.12 Summary**

This chapter presented the notable findings that were and will be the focus of the research to ensure the continuous sustainability of the Cypriot potato industry. By acknowledging the dominant themes from the interview data and conducting a thematic analysis, I have gained a fundamental understanding of the industry's functioning, compounding, and environmental impacts. She has described the principal levers for agricultural sustainability and increased productivity – consumer-centric innovations, embedded digital marketing, and the necessary focus on sustainable agricultural practices – as the keys supporting the sector's resilience and progress. This Summary points out that an advanced approach to product management in which the company is sensitive to customers' requirements and concerned with eco-friendly practices is required. With the aggravation of the intricate mixture of the local and international markets, the generalizations ought to be substantial in the ongoing dialogue on eco-effective agriculture practices and the market strategy, thus, ultimately, providing a solid framework for future development and policy initiatives.

Also, the problem was initially framed as how to maintain traditional farming practices within the economic and environmental challenges. By applying the conceptual framework, it was reframed to focus on integrating sustainability with economic sustainability, which is more aligned with contemporary global trends and market demands.

This reframing has led to the need for a holistic approach, as exemplified by the Potato Sustainability Alliance, which aims to enhance the economic, environmental, and social dimensions of potato cultivation through strategic partnerships and innovative practices.

By structuring my findings through this framework, I highlight how a strategic approach to sustainability can transform the industry's challenges into opportunities, thereby providing a comprehensive view of how the industry can evolve and sustain itself in a changing global environment.

This approach ensures that the story is not only about identifying problems but also about leveraging insights from reframing the problem to propose and implement solutions that align with both environmental sustainability and economic growth and sustainability of the farms as well.

# Chapter 6: Conclusion and recommendations

## 6.1 Introduction

In this chapter, I combine insights gained from the comprehensive findings presented in the previous chapter and propose strategic recommendations aimed at enhancing the sustainability and market competitiveness of the Cypriot potato industry. The findings have highlighted fundamental areas where focused interventions can potentially lead to substantial improvements in both agricultural practices and market strategies. By implementing targeted changes in farming techniques and marketing approaches, the Cypriot potato industry can not only become more environmentally sustainable but also more economically competitive.

My research objectives were focused on identifying actionable points that could significantly influence the industry's track towards a sustainable future. These recommendations include CAP regulations adaptivity, marketing re-innovation, improvement of knowledge transfer, proactive market strategies, European agricultural policy readaptation and further recommendations.

By taking these steps to address the identified areas for improvement, the Cypriot potato industry can be in a position for long-term success and sustainability in the global market.

This chapter will offer a series of informed suggestions designed to address the identified gaps in sustainable practices, marketing strategies, regulatory alignment, and economic sustainability. These recommendations are adapted to stakeholders ranging from local farmers to policymakers, ensuring that each suggestion is actionable and aligned with the principal goal of adopting a sustainable future for the Cypriot potato industry.

As we proceed, each recommendation will be tied back to the research questions and findings, ensuring a coherent narrative that not only suggests what needs to be done but also why these actions are necessary based on the evidence gathered.

My knowledge of this complex topic has increased, and I recognize the importance of sharing this with the relevant people to gain a more holistic picture and increase

involvement and understanding. The recommendations from my findings also clearly show how my development of understanding this complex issue and this has directed me to be able to identify and propose several recommendations that will benefit both the growers and my professional work in the industry.

## 6.2 Reframing the problem

To analyse the findings within the context of the conceptual framework I proceeded with addressing how the framework has informed my findings and reframed the key issues and findings. In this reframing the initial findings were reframed to new ones with the three most important ones being: environmental and economic sustainability imbalance, insufficient marketing, and consumer preference shift in the Cypriot potato industry. By combining my expertise, conceptual framework and findings I managed to go deeper in my research by reframing the problem, identifying key relationships, gaps and interactions as shown in Diagram 4.

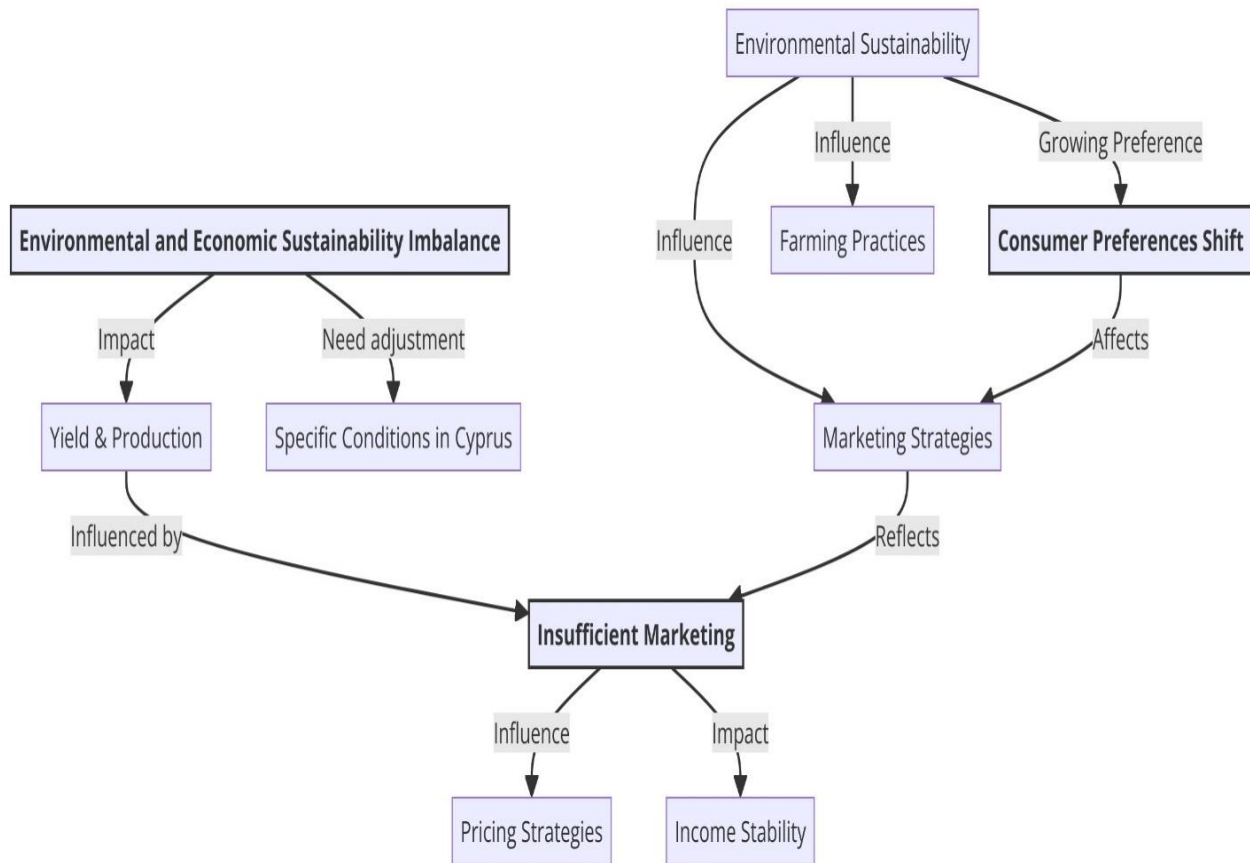
To reframe the problem, I intergraded my framing and the findings using application from the Potato Sustainability Alliance's insights within the reframe which leads to a comprehensive strategy that not only addresses the immediate concerns but also prepares the industry for future challenges. This integration implies that practices enhancing sustainability also cater to consumer demands and economic sustainability. Therefore, I reframed sustainability from a cost to an investment in the industry's future. The conceptual framework applies communication framing theories to reshape the dialogue around the Cypriot potato industry's challenges. By highlighting the positive outcomes of sustainable practices and marketing strategies that align with consumer demands, the reframing brings out issues that might be used for encouraging stakeholders to view these challenges as opportunities for growth and innovation.

'Developing visual models aids in comprehending and conveying relationships.' Drawing inspiration from Miles and Huberman (1994) I utilized a diagram to visualise all the necessary data for reframing the problem which helped me illustrate the links and gaps between my findings like market strategies, consumer preferences, regulatory impacts, and sustainability etc. To my experience, this approach not only enhanced my

understanding of complex relationships but also helped me to identify potential areas for improvement or adjustment. By visually mapping out these connections helped me to grasp the interconnectedness of these factors and make informed reframing based on my results.

As shown in Diagram 4, a complex interplay is revealed between environmental and economic sustainability imbalance, consumer preference shift and insufficient marketing issues within the agricultural sector in Cyprus. The process of reframing helped me to easier to identify where there are gaps in information, overlaps, or potential areas are for further exploration to strengthen my findings and recommendations.

Diagram 4. Reframing - key relationships and interactions.



(Source: Author, 2023)

### 6.2.1 Reframing analysis

Drawing inspiration from diagram 4, the 'Environmental and Economic Sustainability Imbalance' finding suggests a gap between the environmental goals and the economic outcomes within the industry. The mind map points to "Yield & Production" being impacted by sustainability efforts, implying that while such efforts are important, they might be compromising the economic sustainability of farms if not managed carefully. This also acknowledges the need for adjustment due to "Specific Conditions in Cyprus," suggesting that local environmental factors must be carefully balanced against economic objectives. This reflects a deep suggestion and finding, that sustainability practices must be tailored to the specific geographical and economic context of Cyprus.

There is a critical gap identified through the reframing as while the document outlines the detrimental effects of pesticide restrictions on yield and economic outputs, it under-represents the potential benefits these restrictions might have on long-term farm economic sustainability. My reframing suggests that an integrated approach, considering both environmental sustainability and economic sustainability, is crucial. This leads to assuming a significant disconnect between government policies (EU CAP regulations) and the ground realities of farmers. This misalignment points to a critical oversight in policy formulation and implementation. According to my framework, which values stakeholder input and adaptability, these policies may lack sufficient stakeholder engagement, failing to integrate farmer experiences and insights into policy frameworks. This gap suggests that policies might be theoretically sound but practically inadequate, failing to support farmers in transitioning to sustainable practices without losing economic sustainability.

'Insufficient Marketing' highlights as a standalone finding, which suggests that the current marketing strategies may not adequately address the industry's needs. Reframing this issue indicates that marketing strategies need to reflect the environmental sustainability efforts more effectively to give emphasis on "Pricing Strategies" and their influence on "Income Stability," indicating that current marketing is not optimized to profit or providing stable income for potato farmers within the industry. This reframed finding implies that marketing efforts need to be stronger and better associated with both the 'marketing

strategies' which should be influenced by 'consumer behaviour' as well as 'economic and environmental sustainability'.

So, I reframed 'Marketing strategies' from focusing solely on the global market position and quality standards to incorporating the sustainability track that aligns with consumer preferences. The framework suggests that marketing should differentiate Cypriot potatoes in the global market and their sustainable cultivation as a key selling point. Reframing this issue recognizes that sustainability is not just a production practice but also a marketing strategy that can leverage consumer trends to enhance the market share and profit margins.

The mind map shows "Consumer Preferences Shift" as being affected by marketing strategies and environmental sustainability. It captures a "Growing Preference" for sustainability among consumers, suggesting that their buying habits are increasingly influenced by environmental considerations. Through reframing I imply that there is a market opportunity for products aligned with sustainable practices, and the industry's marketing strategies should adapt to this shift. Also, it can be argued that there is a strong link between consumer behaviour and the industry's practices, where each can significantly influence the other.

The shift in consumer preferences toward sustainable products is now viewed through a broader view. Rather than being a simple trend, this shift is seen as a driving force that shapes market strategies. The framework suggests that understanding consumer behaviour in depth is crucial for positioning agricultural practices and marketing strategies with these evolving preferences. As a result, consumer preference shifts have been reframed from a challenge to an opportunity for the industry to innovate and accommodate to market demands for sustainable products.

While the mind map diagram connects consumer preferences with marketing strategies, it doesn't address the potential gap between consumer intentions and actual purchasing behaviour. I can argue consumer Influences as a matter of being overlooked as my consumer behaviour is illustrated as a key driver in market dynamics, yet the full exploration on how consumer demand for sustainably grown products could potentially

balance some of the economic challenges posed by reduced pesticide use is needed for a fuller view of the problem. This raises a potential gap as understanding how market positioning and consumer preferences for eco-friendly products might influence the adoption of sustainable practices during economic challenges is matter of research on its own.

### 6.2.2 Integration of reframing

My reframing suggests an integrated approach where all three findings are interrelated. For example, the environmental and economic imbalance can be addressed by aligning marketing strategies with consumer preferences for sustainable products. This could potentially create a positive feedback loop, where sustainable practices boost consumer demand, which in turn justifies the economic investment in these practices, thus correcting the imbalance.

The reframed problem emphasizes a strategic pivot from traditional agricultural practices to a model that integrates sustainability with advanced market and economic strategies. This suggest that the Cypriot potato industry can achieve long-term sustainability and competitive advantage by adopting a holistic approach that addresses European regulations, consumer preferences, and market dynamics. This approach not only mitigates the current challenges but also positions the industry for future opportunities in an increasingly sustainability focused global market.

Also, my reframing points towards a strategic approach that involves a deeper understanding of the environmental impacts of production practices, a marketing innovation to better connect with changing consumer preferences focusing on economic factors to ensure that environmental sustainability policies are also economically sustainable. This comprehensive approach could form the basis for policy recommendations, marketing campaign designs, and strategic planning within the Cypriot potato industry.



## 6.3 Recommendations

### 6.3.1 CAP regulations adaptability.

The Cypriot potato industry's adaptability to policy shifts and economic changes within the EU and global markets has been identified as a crucial factor for its sustainability. This recommendation suggests that proactive adaptation to such changes, including the use of precision agriculture technologies and adjustments in crop management strategies, can mitigate risks associated with policy and market instabilities.

While the implementation of sustainable agricultural practices such as organic farming and water-efficient technologies is commendable, it's essential to consider the implementation and economic sustainability of these practices for all European farmers. Are small-scale farmers able to adopt these practices without significant financial support? Is there sufficient infrastructure to support widespread adoption of these technologies? Having in mind my research findings as well as my long-term experience in the industry I can certainly verify that even though the European regulations look very attractive for sustainable environment preservation, at the same time the farms survival has been accounted for mostly in theory and not in practice.

While emphasis is already given to sustainable farming practices such as crop rotation, organic farming, and efficient water management, yet the high cost of production, dependency on EU regulations that do not fit local needs is a great threat.

My research and findings show that the push towards sustainable practices increases operational costs and reduces yield in the short term, making it economically unsustainable for potato farmers. Moreover, the focus on high-tech solutions like precision agriculture may not be suitable for all EU or Cypriot regions, particularly those with less technological advancement or access to capital.

The misalignment between European CAP regulations and the unique agricultural condition in Cyprus highlights the need for regulations that are adaptable to local conditions, especially concerning pesticide use and environmental conservation.

The industry's ability to quickly adapt to changes will not only ensure survival but also the potential for growth in unpredictable economic conditions. This ability will enable the sector to maintain its market position and economic health, despite external pressures.

The role of Cypriot government is critical yet currently perceived by respondents as insufficient. As discussed in the findings section the CAP regulations imposed in Europe are uniform to every country with no differentiations. As discussed in my findings, while CAP regulations aim to promote sustainability, they conflict with the economic sustainability of potato farms as imposed restrictions raise the cost of production and allowed pesticides don't work anymore. This raises the cost of production and lowers the yield.

For the Cypriot industry to tackle this problem the Cypriot government should support the potato farmers to dynamic actions for easier adaptation to newly imposed regulations as well as proactive measures to adapt to the everchanging CAP regulations.

A proactive approach to EU regulations is proposed, emphasizing strategic stakeholder collaboration, advanced research initiatives, flexible policy development, enhanced support systems for farmers, market development, and consumer engagement. By anticipating changes and preparing for future challenges, this approach aims to align EU regulations more closely with the needs of the Cypriot potato industry.

A continuous impact assessment framework is essential for monitoring the effectiveness of new practices and regulations. This should include economic, environmental, and social metrics to ensure that the policies are having the intended positive outcomes. A robust feedback mechanism that allows quick reporting from farmers on issues and successes is crucial for adjusting policies or support in real time (Tittonell, 2014).

Piloting is also a proactive measure that could really make a difference. Introducing policy piloting and regulatory sandboxes can allow for real-world testing of new regulations before they are fully implemented. Such flexibility can help in understanding the potential effects of regulations without causing widespread disruption. As Argued by Schulte et al (2017) piloting new policies in selected areas can provide valuable data that informs more effective and adaptable regulatory frameworks. The Cypriot Ministry of agriculture should

implement this piloting as soon as possible as it can be the catalyst in proactive measures as well as easier adaptability to new measures before running the regulations.

An effective stakeholder collaboration is essential for bridging the gap between EU regulations and the practical realities of potato farming in Cyprus. Establishing a stakeholder advisory board that includes farmers, agricultural scientists, policymakers, and environmental groups can facilitate a more comprehensive understanding of the industry's needs. Regular interactions between this board and EU regulatory bodies are crucial for conveying the on-ground impacts of regulations and advocating for necessary adjustments (Pretty & Bharucha, 2014). This board could dynamically affect the application of European regulations before and after the actual dated implementation by regulating committee to either prepare the potato industry for the new measures, ask for extensions or furthermore differentiation for the case of Cypriot industry.

Also, the development and use of pest-resistant crop varieties and sustainable farming techniques tailored to local conditions is critical for reducing dependency on chemical inputs. The Cypriot government used to run the Agricultural institute variety testing which used to have more than 100 new potato varieties under stress. After European Union induction of Cyprus, still some testing being done but without any large scale or implementing any results in real world situation since 2004. Also, the Cypriot Department of Agriculture should frame and reinforce the application of potato seed in piloting schemes as means of understanding and engaging more dynamically in farmers actions to combat new pests and diseases caused by the implementation of the new CAP measures on pesticide ban and control. In more detail, the involvement of risk distribution of what to plant, in the case of alternative varieties, should not only exist in theory but the government should take actionable and measurable efforts. Funding targeted research programs can lead to breakthroughs that make sustainable practices more practical and less costly (Tscharntke et al., 2012). Public and private partnerships should be encouraged by European or state funding for innovation to drive innovation in this area, leveraging both governmental support and private sector responsiveness.

Subsidies and financial incentives are necessary to support farmers transitioning to sustainable practices. Proactively the real need for any compensation for yield losses

during this transition period can mitigate some of the economic challenges posed by new regulations to help the farms sustain themselves. Educational programs and resources are also vital for helping farmers understand and implement sustainable practices effectively.

Agriculture practices and legislative framework changes have a big influence on the potato business. Location, environment, custom, and legislation may all influence how these distinctions are created. To preserve market access and maximize output in a variety of locations, potato producers must be aware of and prepared to respond to these changes. The use of technology and science in farming is a significant distinction. Some farmers have begun to use cutting-edge technology and precision farming practices to increase field productivity. These technological advancements allow for more effective crop management, increased production, and decreased labour needs. Traditional farming, on the other hand, may still depend on human labour and handcrafted equipment in certain areas.

By adopting a proactive approach to EU regulations, Cypriot government can significantly enhance the sustainability of the Cypriot potato industry. By integrating strategic stakeholder collaboration, advanced research initiatives, policy flexibility, enhanced support systems, market development, and monitoring, this approach can align EU regulations more closely with the needs of local farmers. Ultimately, it will ensure the long-term sustainability of the potato farming sector in Cyprus, promoting both environmental and economic sustainability.

Finally, launching a post-harvest management system is also vital for a significant impact on the effectiveness of the proactive measures or changes to the European regulations. The government of Cyprus considers pro farming and should certainly create a mechanism for pot harvest monitoring that will feed bottom to top the above-mentioned recommendations to complete the whole cycle of actions. This information and communication are crucial for feedback and reassessment actions to further assess what's really needed to sustain the industry and adapt better to new pest control and regulations imposed by Europe.

### 6.3.2 Marketing re-innovation

With an old marketing strategy of more than 50 years old the marketing needs to be re innovated to overcome challenges faced today in the modern world.

Cypriot agriculture has been developed in the past without certain strategy but was rather the result of marketing opportunity. Thus, the very existence of specific products was built around their export orientation. Exported potatoes, table grapes, citrus and wine products are simply not competitive anymore (Markou and Stavri, 2006, pp. 36–37). The lack of an adaptive marketing strategy as argued in my findings as well as sellers' responses support this great need.

The cost inequality makes it difficult for Cypriot potato farmers to compete on the market and attract price-conscious consumers. Price competition between Cyprus potatoes and inexpensive potatoes from Israel, Egypt and Italy in modern markets also suggests that there is a great need to modernise the industry' marketing. To address this issue, additional research is required to devise methods for reducing the price of Cyprus potatoes without compromising their quality. One alternative is to investigate agricultural practices that increase output while decreasing costs. On the argument now, could I really proceed with the rest of Europe in this, or maybe claiming differentiation as a country could really do the trick? Allowing for real reforms like utilizing sustainable cultivation practices, optimizing resources, and researching new technologies thus reducing potato production costs while increasing output could do the trick. Another consideration is the distribution system. To make Cyprus potatoes more competitive, it is essential to modernize distribution, reduce transportation costs, and eliminate intermediaries.

One of the things that affects the price and supply of potato goods is how much it costs to get approval that they are made in a sustainable way. More research should be done to find out how different certifications affect how people see sustainably grown potatoes and how willing they are to pay more for them. Farmers may be able to meet customer standards better if they discuss certification guidelines and look into new sustainable practices and certifications.

If potato producers and other market participants collaborate, they may be able to reduce costs and improve the sector's profitability. The exchange of best practices, information, and experiences may result in collaborative efforts to increase productivity and decrease production costs. Collaborative branding or cooperative marketing campaigns may increase the perceived value of Cyprus potatoes, enabling a higher selling price.

By utilizing strength like high-quality products with geographical advantages, strong local brand identity the Cypriot industry could focus in bringing this out. Market dynamics and pricing also should be accounted for as competitive pressures and regulatory frameworks influence pricing strategies and income stability, with sustainability becoming increasingly relevant in market positioning.

By capitalizing on its unique geographical and climatic conditions, Cyprus can position its potato products as high-quality, sustainable options, thus commanding higher prices and better margins. This differentiation also opens doors to premium markets that are less sensitive to price fluctuations and more focused on product quality and sustainability credentials.

Even if the niche product is there is a greater need to further employ a strategic marketing plan for further differentiation which will target niche markets. My research highlighted the critical role of market differentiation strategies such as focusing on niche markets and premium pricing for certified sustainable products. These strategies are particularly effective in distinguishing Cypriot potatoes from their competitors. My research highlighted the critical role of market differentiation strategies such as focusing on niche markets and premium pricing for certified sustainable products. These strategies are particularly effective in distinguishing Cypriot potatoes from their competitors. To further differentiate and make a real addition to sustainability the need for a more focused approach is needed.

Adding the Protected Designation of Origin (PDO) as a solution could enhance the economic sustainability of the Cypriot potato industry. The PDO status offers a distinctive way to promote and protect products that are unique to a particular geographic area. PDO is an approval used within the European Union to recognize, protect, and promote

products that are native to a specific geographical location. This designation ensures that only products genuinely originating in that region are allowed to be marketed as such. For Cypriot potatoes, obtaining PDO status could offer several benefits such as differentiate Cypriot potatoes in the global market as a unique product, thereby allowing them to command a premium price. This is particularly beneficial for offsetting the economic disadvantages of reduced yields due to lower pesticide usage. Also, Cypriot potato consumers will further appreciate the quality assurance and authenticity that the designation represents. This can lead to increased consumer loyalty and expanded market reach as building more trust with customers can only help sales. Diversification into different market segments could provide a defense against economic fluctuations. Hingley et al. (2011, pp 114-132) discuss how niche producers can enhance market stability by also serving mainstream markets, thus not solely depending on premium consumers. By launching a comprehensive marketing campaign to educate consumers on the significance of the PDO label will emphasize the quality, authenticity, and sustainability of PDO-certified potatoes to enhance market penetration. This will certainly bring closer consumers who have changed their purchasing trends to more ecofriendly and healthy products, thus increasing demand.

By capitalizing on its unique geographical and climatic conditions, Cyprus can position its potato products as high-quality sustainable options, thus commanding higher prices and better margins. This differentiation also opens doors to premium markets that are less sensitive to price fluctuations and more focused on product quality and sustainability credentials.

To further act on the above, stakeholders could benefit considerably from further acting on marketing strategies like group marketing and contract farming while on the production edge; additional land, higher-yield varieties, and irrigated potato growing must be utilized to increase harvests. Also, the necessity to utilize disease resilient potato varieties through research is vital. Government and research bodies must implement extra efforts to promote disease resilient potato seed varieties and thereafter as a natural effect produce ware potatoes attributing to food safety. Also, the Cyprus government must

promote the investment in the improvement of suitable structures for consistent quality of fresh potatoes. This could include packing and storage.

### 6.3.3 Knowledge transfer improvement.

Because various small-scale farmers have massive information gaps, knowledge transmission is essential for modernizing this sector in Cyprus. Farmers should get trained in the enhancement of farm organization, recordkeeping, consideration for sustainability by means of field expertise for checking and controlling in agricultural fields and climate-smart farming, reinforcing their private enterprises, and understanding marketing approaches to get self-government from vendors, entrepreneurs, and quality regulators, among others. With the current understanding in the EU, information establishments should support Cyprus in selecting the most appropriate potato market mixtures in a market-oriented manner and restructure the supply chains by bearing in mind the following aspects: logistics and infrastructure, alliances and stakeholders' organization, and transfer and skills knowledge. Significant opportunities for the private sector to develop are the establishment of tools for automation and sufficient storage services. Remarkably, the institution of storage amenities for joint utilization to preserve potatoes for many days will blur the variation of the product supply, which will impact various fragile points in the potato supply chain, including; the wavering in the pricing system, the uncertainty among potatoes global trading, losses reduction, prospects for the local invention of potato seed, and the creation of a processing chain because the supply can come to be definite. Potato storage can sustain the trade of numerous shareholders in the supply chain.

To render this sector more professional and transparent, the institution of a registration scheme and the establishment of a system wherein the agronomists can spread knowledge, acquire education and guidance, and attend workshops in farmer-free enterprises are necessary to establish agriculturalists in the direction of productive market alignment.

Promotion of farmers unions is crucial to easier transfer of knowledge in all areas regarding the potato industry. By promoting farmers unions, knowledge transfer can occur



easier, and growers can be educated on innovative technologies and CAP regulation adaptations as well as new varieties and pesticides. This reflects the need for Cyprus's national strategic plan, which will make sure that the growers' groups will work under certain conditions that will promote and retain the functionalities of growers' groups previously failed.

These growers' groups are reflected to be a good technique for knowledge transfer especially in areas with many small growers like the Cypriot potato industry with an objective to increase sustainability and productivity (Davidova and Thomson, 2013). This will additionally facilitate the process of observing the capacity of growth and exported products and their stability. Further improvements can also be made as collective knowledge and direction can be given to the growers with focus on further improving quality and certifications such as GLOBALG.A.P. and HACCP which are better and more economically efficient when applied in groups of growers.

Recommendation for implementing digital platforms to improve and expand knowledge and further inform growers on global and or regional markets is a current disadvantage to farmers in many ways, starting with limited market information accessibility, limited choice of market buyers or outlets, and hereafter, restricts their bargaining power. In addition to enhancing road networks in the potato growing zones and boosting farmers ability to work independently, market infrastructure that intensifies market information accessibility to these growers must be accounted and set up. This can be done by launching schemes where with ICT Information and communication technology services are situated at strategic sites or give special access to platforms where growers can be constantly informed on subjects like disease outbreaks, market prices or new pesticides. Cyprus in today's technological era favours the use of ICT in commercializing farming.

#### 6.3.4 Proactive Market Strategies

The potato industry in Cyprus, often operates reactively to market demands. This approach, while pragmatic, may not fully exploit the opportunities to fully differentiate and gain a competitive edge in regional and international markets. As mentioned in my findings the consumers preferences shift constantly which unfortunately for the Cypriot

potato marketing is not helping, as it's a highly priced product, making it more volatile to these changes. This underscores the need for continuous engagement with consumer preferences and behaviors to tailor products that meet evolving expectations. Consumer preferences for sustainable products influence farming practices and marketing strategies. By analyzing consumer trends, the industry can refine its marketing strategies to focus on transparency, traceability, and sustainability, key factors that influence consumer decisions today. There is an increasing consumer preference for products that are not only environmentally sustainable but also transparently branded and marketed.

My research highlighted the critical role of market differentiation strategies, such as focusing on niche markets and premium pricing for certified sustainable products. These strategies are particularly effective in distinguishing Cypriot potatoes from their competitors in both local and international markets.

The marketing strategy for the Cypriot positioning in the markets must be further employed with stronger marketing and competitive approaches to overcome the challenges faced today and achieve economic success and sustainability. In today's extremely competitive agricultural world, stakeholders must restructure methods to differentiate themselves from the competition, create a strong client base, and improve sales. Product differentiation is an essential component of both competitive and marketing strategies. Potato growers may suit the demands of a diverse variety of customers by specializing in the production of specialist varieties.

Cypriot potato industry may further differentiate from the competition and appeal to certain market segments by producing potato varieties which are country or region favoured. As argued in my research and from my current experience this usually happens by demand orientation from markets rather than marketing strategy to seek these varieties. A good example of this case is the 'Babylon variety in the Greek market. The variety was highly in demand for years, but Cypriot potato growers only opted in growing when it was merely offered by seed trader.

By utilising a proactive market strategy through a robust market research and trend analysis will make a great addition to the sustainability of the potato industry. For the

Cypriot potato industry, this means conducting detailed studies to understand the evolving preferences and trending needs of different markets in Europe and the rest of the world. By identifying trends in consumer behaviour, such as preferences for potatoes with specific gastronomic traits and uses, growers can utilize the demand for this varieties which will create an extra entry in new markets. In combination with Cypriot origin in marketing them through traditional way of cultivation, sustainable and better taste, grown in red soil will pull more customer focus and attract more sales. This forward-looking proactive marketing approach will allow them to adjust production in advance, positioning themselves as market leaders rather than followers.

Strong brand and marketing strategy is also required for success in every market. Brand recognition and consumer loyalty are increased by creating a compelling brand identity, which includes a distinct logo, innovative packaging and branding strategies to differentiate. This should be further improved for these new varieties as to make sure the markets get quickly familiar and differentiate from other competitors offering the same varieties.

Also new creative online and offline marketing techniques can be employed to help the new targeted customers and persuade them of the added value of their goods. Establishing excellent ties with distributors and retailers is essential for a successful introduction into new markets. Also, development of alliances and coalitions with these organizations could create stable markets making sure that reliability, quality, and consistent supply is following the Cypriot potatoes.

Through my research, international market expansion was viewed as a necessity for sustainable future for the Cypriot potato industry. Professional sellers emphasized the importance of expanding into new markets as well as the importance of intense market competition and the need to effectively manage it.

Effective market research and trend analysis are not merely about understanding the current state of the market but anticipating future shifts and preparing to meet them proactively. For the Cypriot potato industry, investing in these research activities is essential for tapping into new markets, enhancing product offerings, and ultimately

securing a competitive edge in the global agricultural market. By staying informed and agile, producers can not only meet but shape consumer demands in the ever-evolving landscape of food consumption.

The significance of understanding demographics and placing the customer first must be emphasized. Professional sellers also proposed a vast range of additional promotional strategies such as the use of social media, advertisements, free product giveaways, and other trade show incentives. The research emphasized the importance of marketing strategies for addressing market challenges and enhancing Cyprus's competitiveness. Effective advertising, branding, and client-group targeting were regarded as crucial for increasing sales and entering new international markets.

Until now Cyprus potato industry was taking advantage of on its unique geographical and climatic conditions, positioning its potato products as high-quality and sustainable, thus imposing higher prices. It can be argued that this was not enough to get better returns to the growers. As reported by Vermeir & Verbeke (2006, pp169-194), there is often a discrepancy between consumer intentions and actual buying behavior, particularly when it comes to sustainable products, where personal convenience and cost may override ethical considerations. Surely, this differentiation opens doors to premium markets that are less sensitive to price fluctuations and more focused on product quality and sustainability credentials, but consumer behavior can be volatile and influenced by many factors. The risk of overestimating consumer interest in sustainability is significant. A study by Bray et al. (2011, pp 597-608) found that while consumers express a preference for sustainability, their purchasing decisions are more complex and influenced by multiple factors, including product price and availability. This opens the argument that was brought up in the professional sellers' responses that there is great need to enter the markets in time as there is usually a short gap to hit premium prices, especially before local crop is uplifted as well as before competing countries with low-cost products enter the markets like Egypt.

Therefore, a leading marketing strategy that should be employed by stakeholders is to formulate a strategy by which the crop is uplifted on time. Timely crop uplift should be implemented to help the process of harvesting and preparing the crop for export as close

as possible to shipping dates, which minimizes the time the produce spends in storage. This is particularly important for perishable goods like potatoes, where freshness directly correlates with quality. Implementing an efficient process for crop uplifting can help in preserving the core value of the potatoes, reducing waste and therefore claims from clients as well as extending shelf life upon arrival.

Also, the need to formulate an all-in-one logistics solution is of great need. Establishing direct shipping routes and reducing transit stops can significantly decrease the transportation time. For the Cypriot potato industry, negotiating more efficient shipping routes and schedules with carriers can minimize delays and reduce the risk of product degradation during transit.

By strategically scheduling shipments and securing slots in advance, stakeholders can avoid the common delays faced at ports. This proactive booking strategy can ensure that the cargo space is reserved, and the produce can be loaded and unloaded on time. This can be critical in the peak season of spring or in festive times like Christmas and Easter when it is impossible to synchronize exports with sales.

Also working closely with port authorities to effectively utilize operations which can reduce waiting times for loading and unloading. This might involve negotiating priority handling for perishable goods or investing in infrastructure at key ports to expedite these processes. Strong partnerships with shipping and logistic companies can lead to improved handling and care during the shipping process. These partnerships may also provide access to better resources, such as high-quality shipping containers equipped with climate control systems that are ideal for transporting perishable goods like potatoes.

### 6.3.5 European agricultural policy readaptation

My research findings clearly indicate that the European CAP regulations might support environmental sustainability but might neglect the real economic sustainability of farms who are greatly affected by them. The decrease and restriction of pesticide use has led to a decrease in yield for potato farmers, ultimately impacting their income and economic

sustainability. Transitioning to sustainable agricultural practices often involves upfront costs that can be prohibitive for small-scale farmers. According to Seufert et al. (2012), organic farming, which is often a significant component of sustainable agriculture, can result in a yield gap of 20-25% compared to conventional farming when first implemented, which might discourage adoption among farmers concerned about immediate yield losses.

This indicates a significant disconnection between agricultural policies (EU CAP regulations) and the ground reality for farmers. This misalignment points to a critical oversight in policy formulation and implementation. This gap suggests that policies might be theoretically sound but practically inadequate, failing to support farmers in transitioning to sustainable practices without losing economic sustainability. As argued by Piorr et al. (2018), the effect of these European policies postulates the need of CAP to tailor incentives to regional and local objectives.

The misalignment between European standards and the needs of Cypriot farmers calls for a more flexible, region-specific approach to agricultural policymaking. This could involve developing localized guidelines that better address the microclimatic and economic conditions of Cyprus. The existing CAP regulations are perceived as unsuitable for Cyprus due to its unique geographic and climatic conditions. This indicates a disconnect between European agricultural policies and their practical application in different member states.

Cyprus geographical position, being placed near middle east implicates unique climate conditions which must be accounted for and differentiated in the formation of any agricultural regulations imposed by Europe. Also, the topology of Cypriot farming plots, which are very small in scale (sometimes just 1000 square meters each) is another uniqueness that must be accounted for, as spraying other crops like tomatoes next to the potato fields might contaminate due to wind drift. With an industry aging more than 65 years, the Cypriot agricultural sector is being constantly damaged by everchanging regulations.

As stated in my findings the matter of banning or reducing traditional pesticides has also led to chain development of new diseases and viruses since new 'allowed' pesticides don't work like the old ones. In an aim to keep their crops from getting diseases, the growers use triple amounts of the allowed pesticides. This creates a hidden cost which especially in the case of small medium farmers greatly affects their existing over increased cost of production. The focus on high-cost sustainable practices could potentially widen the economic gap between large-scale and small-scale farmers, as highlighted by Connor (2018), who notes that the high initial investment and the skills required for efficient sustainable farming are often beyond the reach of smaller producers.

To address the problem above re-innovation of CAP regulations tailored to the Cypriot context is proposed. This would require a coordinated and strategic approach that involves multiple stakeholders at both national and European levels. The data and research as shown above must be put down and compiled in a strong demonstration in demanding the change to happen. Also, an impact analysis should be made by the Cypriot government showing the potential benefits of tailored CAP regulations, including projections of economic gains, sustainability improvements, and alignment with broader EU environmental goals.

Suggested as imperative is the actual importance and effect the argument will make on legislators and decision makers. The identification and collaboration with other EU member states that face similar agricultural challenges or have an interest in reforming CAP regulations will greatly help this proposed solution as well as lobbying with MEPs, especially those on the Agricultural and Rural Development Committee, to advocate for the proposed changes. Legislators' insights into farming have started to change recently (DeSoucey, 2010, pp. 432–455). In the instance of potatoes, recurring food scarcities, the increase in global product costs and food security issues have created increasing attention in potato production (Scott and Suarez, 2012, pp. 234–239) (Mehmet and Tahiroglu, 2003, pp. 45–59). I believe with increased awareness of the matter in hand will bring out the issue and increase the movement of all stakeholders into acting.

The proposed solution could include and not limited to several aspects of the Cypriot industry like the integration of local agricultural knowledge into Common Agricultural

Policy (CAP) reformation. By building upon the traditional knowledge of local communities, CAP initiatives can help to preserve valuable agricultural practices that have been passed down through generations (Pretty and Bharucha, 2014). This not only ensures the continuation of sustainable farming methods, but also promotes cultural preservation and community cohesion. In doing so, CAP programs can empower Cypriot farmers to adapt to changing environmental conditions and market demands, ultimately leading to a more sustainable future. This holistic approach can result in more targeted and effective support programs that address specific issues such as water scarcity and new crop diseases. Additionally, by valuing and incorporating traditional knowledge into policy development, CAP initiatives can adopt a sense of pride and ownership among farmers, leading to increased participation.

Proposed measures for changes should include amongst others the increase of funding and support for research and development of disease-resistant crop varieties and advanced agricultural technologies suited for Cyprus. This would include subsidies for farmers who adopt these innovations, training programs to help farmers transition to sustainable practices, and incentives for the use of precision agriculture techniques that minimize environmental impact but at the same time preserve their economic sustainability.

Also, a formulation of pilot programs prior to any changes should be implemented where pilot programs in selected regions will test the feasibility and impact of the proposed changes. After the successful pilot testing, the revised policies can be implemented across Cyprus with continuous monitoring and adjustment mechanisms to ensure that both environmental and economic sustainability is achieved.

Stakeholders can also function collaboratively to execute these resulting suggestions:

- a) Support smart farming technology based on Cyprus, which boosts soil fertility and alleviates the adverse impacts of climatic changes and new pesticide restrictions. It is significant to inspire the implementation and prevalent usage of high-quality yields, improving inputs like clean potato seeds, organic manure, pesticides, inorganic fertilizers, and agroforestry activities.



- b)** As an effect of the ban in foliage destruction chemicals in recent years the endorsement of measures on agronomic practices on the farms for uplifting only mature potatoes and using suitable harvesting machinery, specific to the unique Cypriot farms (with rich red soil) to limit bruises and cuts on fresh potatoes. The usage of labour-improving technology will additionally ease labour expenses and unnecessary work.
- c)** Measures to improve potato yield within the existing and new framework of changes.
- d)** Enhance the accessibility and usage of clean, smart, high-quality, and well-performing varieties of seed potatoes. Public-based seed reproduction hubs must be set up to increase the distribution of this preferred potato seed.
- e)** Support community projects in the improvement of local adaptability hubs, to guarantee a smooth transition in future application of new CAP regulations. Additionally, they should intensely focus on decreasing post-harvest losses.
- f)** Enhance the management and speed at which market information is distributed across Cypriot potato farmers to support them in application of new pesticides in the market or even the chain development of any new diseases that arise because of the changes.
- g)** Involve Europe and government officials through support and discussion to reestablishment and reinforcement of potato industry in the country. Potato products are crucial to improving food safety and revenue in Cyprus.

### 6.3.6 Further recommendations

Since Cyprus is an island, everything is shipped in and out. As such, I recommend the need of better solutions to the existing is required to assess the technical efficacy of potato transport systems to markets to provide suggestions on infrastructure and technologies

to extend and improve potato delivery, as well as on route storage duration and effects on quality.

Heckman's (1979) first-stage choice paradigm suggests that the likelihood of potato market input is influenced by similar descriptive variables such as level of education, gender, the amount of credit used, cooperative membership, intermittent revenue, distance to the neighbouring marketplace, slow market prices, personal transportation services, seed variety, and the frequency of extension services. The Heckman second-stage outcome, on the other hand, specifies that the family head education level, membership in a cooperative, family size, land size, seed type utilized, lagging market prices all influence the subsequent summary regarding farm families' scope of potato market involvement. According to my research findings, potato growers in Cyprus distribute potatoes via resellers such as wholesalers, marketers, retailers, and consumer market channels. This is again something that I would propose to be further investigated as the traditional marketing routes could be improved or changed accordingly.

Most potato farmers rely on the crop as their principal source of income due to their business and sporadic potato sales. Potato merchants employ the cost-plus price technique as their primary pricing strategy. The most common marketing constraint is low sales prices, while high transportation costs increase the existing cost of marketing. Prices vary greatly across variations, affecting the total marketing limits for potato dealers of the various kinds. According to my research findings, product-related and institutional constraints were identified as the primary drawbacks to the sustainability of the potato supply. These included low selling prices due to competition and limited market accessibility due to sea transportation, low availability of shipping containers, and dependency on oil prices, leading to expensive transportation costs. Therefore, these factors could be further investigated by the Cypriot government and stakeholders for further improvements or changes to help improve and strengthen the efficiency of Cypriot potato exports. Furthermore, advancements in crop post-harvest management methods, specifically in storage and processing, are immediately needed to limit the various price fluctuations, which negatively impact the stability of returns for farmers and dealers. As a

result, creating and innovating cost-effective trader/farmer user-friendly expertise is required.

Collective marketing measures should also be introduced and endorsed by non-governmental organizations and private groups, which should work with these farmer groups and facilitate the creation of these groups where they are non-existent. In a comparable method, contractual agreements between market supply chain players (traders and farmers) will be reciprocally helpful as it will develop traders' and farmers' market confidence, and guarantee that each of them undertakes their obligations, which will in turn improve market effectiveness. Contractual agreements should, for that reason, be sought and expedited to assist several market chain members in carrying out fair business transactions. This could be carried out through farmers and traders organized by farming organizations and local governments (Ministry of Agriculture). Contractual agreements will benefit potato growers in connection with specific markets and will additionally help the traders in connection with the assurance of high-quality potatoes and the accessibility of satisfactory bulks from the farmers.

Technological and further investments are needed to be able to compete in the European and international marketplace. As such it is suggested that stakeholders must investigate and promote investment among private and public sector investors in technology to help sustain production process and quality. Surely the issue also arises as to whether there are opportunities for attracting more foreign investments in Cyprus (Patterson and Josling, 2005, pp. 76–80). In similar conditions of glasshouses in Cyprus, major investment has been applied by foreign investors. This is proof that investments in agriculture are possible and as such should be investigated and promoted.

Consumers, input suppliers, supporters, producers, chain supporters, and traders are major stakeholders in the potato value chain. In contrast, significant assimilation of corresponding parts has yet to be seen. Wholesalers are the most important market participants as compared to other value chain players because of their outstanding capital spot and mass buying power. Every element in the potato value chain improved its value dramatically. Land allotted, distance, market knowledge, family size, inorganic fertilizer, and the number of oxen is some of the factors included in the model that suggestively

describe market-level participation decisions. In contrast, the extension contacts, education, land offered, experience, and fertilizer all had a significant beneficial influence on the amount of potato trade. Cyprus's suitability for potato growing, access to continuous market demand, and improved product value were the top prospects, while a lack of better-quality seeds, natural factors, diseases, a lack of a post-harvest organization system, and a lack of a policy structure for price-setting were also critical constraints in the potato value chain. Value chain shareholders build an important link in the improvement of a sustainable value chain for potatoes.

My research has identified unstable marketplaces, imprecise pricing, poor infrastructure, sales drop and improper quality as major challenges in marketing potato goods in Cyprus, the EU, and the worldwide markets. I would recommend that these issues be addressed to increase the efficacy of the potato market at all levels. On the other hand, the efficiency of potato production is primarily determined by the product's price and harvest. The findings demonstrate a variety of yields on each farm, implying that different farmers may achieve improved financial results if they can considerably concentrate on the marketing aspects affecting potato sales that are under their control. Among these considerations is the adoption of higher-quality potato varieties, which seems to be a problem given that a significant proportion of respondents utilize local seed. The use of occasionally cultivated high-quality local varieties is scarce, and more technological knowledge is needed to inspect whether new varieties or renovations of old ones could be developed in Cyprus. Studies should include extensive promotion of innovative seed varieties and support them by distributing them during land research and trials. The potential to generate high-quality seed in a much shorter time has intrigued the interest of both the corporate and public sectors in potato production (Vehbi, Yüceer and Hürol, 2019, pp. 58–82) (Gravagnuolo and Varotto, 2021, p. 347).

Prices in the potato industry fluctuate greatly depending on the season, as seen by a wide variety of profit margins. More cold stores could be created and used to preserve potato crops for future sale when the market is strong or to avoid product saturation, which is currently what is happening in most cases. To fully appreciate the benefits of a free trade context, potato producers must first understand the market dynamics on the ground. This

is only possible if the farmers organize themselves into groups and organizations, which will increase their negotiating power. Farmers may use organizations to take advantage of funding or bulk purchasing power. Also, a pool of funds can be created, which in turn provides funds during crises while expecting higher prices when there is an uneven potato supply in the market.

Further suggestions include:

- a) Establishment from Cypriot government of training centres to train and continue educating to growers the significance of efficient potato storage, the administration of potato stores, and other organizational characteristics connected to pre- and post-harvest potato management measures, marketing, and the improvement of potato supply chains.
- b) Encourage well-organized growers' groups, which will aid in maintaining potato quality through actual potato crop grading and sorting before they are packed to cut transaction prices, limit manipulation, and improve potato marketing and revenue.
- c) Incorporate approaches that raise awareness of the Cypriot potato added health value to consumers, to help an operational improvement of marketing and sales.
- d) Development hubs for potato farmers to access and implement procedures to boost sales and marketing through quality preservation of their crop.
- e) Involve more government officials through support and discussion to reestablishment and reinforcement of potato industry in the country. Potato products are crucial to improving food safety and revenue in Cyprus.

## 6.4 Impact

My research offers new insights and strategic recommendations via an in-depth analysis and set of recommendations adapted to enhance the sustainability and market

competitiveness of the Cypriot potato industry. Notably, it bridges the gap between academic research and practical application by translating findings into actionable strategies. This approach is innovative in its comprehensive integration of environmental sustainability with economic competitiveness, a critical factor for the potato farmers who are facing global market pressures and environmental concerns.

Furthermore, my professional knowledge and 20-year expertise in the potato industry as the general director of the biggest potato exporting organization of Cyprus means that I have the power and can make decisions at both a political and international level to implement my research outcomes into valid actions. My active role in the Cypriot potato community as well as governmental influence in Europe means that I can actively and strongly influence the industry. On full completion, my research will be officially presented to the minister of agriculture as well as the five grower unions of Cyprus. Also, a presentation to the parliamentary committee of agriculture will be made with special notes on the suggested regulatory changes. Also, my research will be used as a data set for the Cypriot agricultural academy.

My research adds completely new innovations in agricultural practices and marketing. One of the key contributions of my work is its focus on sustainable agricultural practices that are adapted to the specific conditions of Cyprus. The emphasis on the proactive adaptation to EU Common Agricultural Policy (CAP) regulations highlights a forward-thinking approach to agriculture that balances productivity with environmental care to economically sustain the potato farmers.

In terms of marketing innovations, my research proposes a re-innovation strategy that moves beyond traditional methods. It addresses the need for the Cypriot potato industry to adapt to strong competition, changing consumer preferences and global market trends, with re-innovating marketing of Cypriot potatoes with the Protected Designation of Origin (PDO) approval. This unique approach utilizes Cyprus' geographical and climatic advantages to market Cypriot potatoes in a higher position than it is today, rebranded as a higher-quality, more sustainable traditional product to take advantage of extra market share internationally.

Also, my research contributes significantly to professional knowledge by detailing the interrelation of agricultural practices, market strategies, and regulatory frameworks. It provides a model for other agricultural sectors within and beyond Cyprus, demonstrating how to integrate sustainability into core business strategies effectively. The strategic recommendations will serve as a blueprint for stakeholders ranging from local farmers to policymakers. This not only enhances the industry's preparedness for future challenges but also equips professionals with knowledge and strategies to navigate the complexities of modern agricultural industries.

My research impact on the professional community is great as through my findings I provide a holistic view of the Cypriot potato industry's challenges and opportunities, making it a valuable resource for industry stakeholders. By addressing specific local challenges and offering tailored recommendations, I aim to empower industry professionals to make informed decisions that will enhance both sustainability and economic sustainability. The emphasis on stakeholder engagement and policy adaptability offers a new framework for how industries can influence regulatory frameworks to better meet their specific needs. This can lead to more effective and sustainable industry practices that are responsive to both environmental imperatives and market dynamics.

Also, my research recommendations for the Cypriot potato industry have a profound potential impact on both economic and environmental sustainability. By advocating for precision agriculture and sustainable practices adapted to local conditions, it directly addresses the dual objectives of enhancing yield and reducing environmental impact. This is particularly crucial for Cyprus, where agricultural practices must be balanced with conservation efforts to maintain both soil health and crop productivity. The farmers' economic position will benefit considerably from the adoption of these recommendations. My research emphasizes the need for policies and practices that are sensitive to the challenges faced by these farmers, such as limited access to technology and knowledge. By fostering an environment where sustainable practices are both economically sustainable and supported by the government and regulatory frameworks, these farmers can improve their competitiveness and sustainability without bearing prohibitive costs.

Also, the unique recommendation for proactive adaptability to market and policy changes aims to enhance the industry's vulnerability to external market and policy changes. This is crucial in a global agricultural landscape where market demands, and regulatory environments are constantly evolving. By preparing the Cypriot potato industry to swiftly adapt to these changes through strategic stakeholder collaboration and advanced research initiatives, it helps ensure the industry's long-term sustainability and growth.

Improving knowledge transfer, as my research suggests, directly impacts farmers' ability to implement advanced agricultural techniques and adapt to new regulations. Educational programs and resources designed to enhance understanding of sustainable practices, market trends, and regulatory compliance are critical for empowering farmers. This leads to an industry that is not only compliant with modern agricultural standards but also more resilient against market and environmental pressures.

In addition, the call for a re-adaptation of European agricultural policies to better fit the unique conditions of Cyprus could lead to more effective and applicable agricultural regulations. Such alignment would reduce the disconnect between EU-wide policies and local needs, ensuring that sustainability efforts are not only environmentally sound but also economically feasible for local farmers.

In summary, my research not only advances academic understanding of agricultural sustainability but also delivers unique practical, strategic insights that can be directly applied by the professional community of the potato industry. It sets a precedent for future research and policymaking in the agricultural sector, emphasizing the importance of integrating sustainability into core business and regulatory strategies.

The document's impact on the Cypriot potato industry and its farmers could be transformative. By aligning agricultural practices with both market demands and environmental needs, advancing adaptability, and enhancing farmer knowledge and resource access, it lays a solid foundation for sustainable growth. This approach not only benefits the potato industry in Cyprus but also serves as a model for other agricultural sectors facing similar challenges globally.



## 6.5 Statement of Limitations and recommendations for further research

The acknowledgement that there is no end to this work is both exciting and alarming. I was aware of the need to remain focussed throughout and not be drawn in by findings that were interesting but distracting.

I can identify that the major limitations to my research were mainly due to my own limited resources and the time available to me. Access to high-quality, comprehensive data on agricultural practices, yields, and environmental impacts specific to Cyprus was limited. This affects the broader analysis of my research.

The limitations of this work are also related to the lack of collaboration with similar countries who might face similar problems. There is no forum where stakeholders can discuss the issues we are facing or to suggest collaborative ways of working as we are all competing. It is possible that I may be able to share my findings and recommendations with our competitors, but we are all chasing after the same markets.

It would have been helpful to this work and the findings if I could have collaborated with our competitors to gain a bigger picture, but this information is not likely to be shared as it is sensitive information. It is possible that levels of sustainability may be available for comparison from other countries but the individual data that would provide a more complete picture would be more difficult to access and use.

Recommendations for further research:

To maximize potato yield, cutting-edge technologies, including remote sensing and precision agriculture, must be utilized. Research into the implementation of these technologies in areas like irrigation management, disease detection, and yield prediction may lead to the development of more efficient and sustainable agricultural systems.

The research on how potato production in Cyprus affects farmers' living standards, income, and quality of life has social implications. This examination of the sector's social and economic characteristics may help policymakers improve the lives of farmers.

The long-term effects of different soil management practices on potato soil health and fertility. Using sustainable soil management practices, this research may result in increased agricultural output, nitrogen cycling, and soil health.

Considering Cyprus's acute water constraint, irrigation technologies and water effectiveness in potato farming are being considered. Future research might look at the economic and environmental impacts of water-saving technology like trickle irrigation and precision irrigation systems.

The potential for enhanced diversification, value-added processing, and product innovation in the Cyprus potato industry is being explored as part of a wider inquiry into value chain growth. Future research allows for an assessment of the market potential and competition of value-added potato goods such as crisps, refrigerated dishes, and starch.

Examining the social and cultural backdrop of potato growing in Cyprus, with a focus on how local attitudes, traditions, and conventions impact agricultural practices and regulations. This research might offer insight on the social dynamics of agricultural communities as well as the importance of cultural heritage preservation. Sustainable agriculture may be congruent with local customs and beliefs.

Market access for Cyprus-produced potato products is being assessed for both potential and barriers. Future research might look at export potential, trade agreements, tariff hurdles, and quality standards in target countries, as well as provide suggestions for better placing Cyprus' potatoes on the worldwide market.

Effective advertising requires an understanding of customer preferences and behaviour. Price, accessibility, health advantages, sustainability, and even cultural issues should all be considered when determining which potato products to buy. The research results might help Cyprus potato farmers improve their marketing tactics and respond to customer preferences.

Market development and diversification prospects must be sought if sales of Cyprus-grown potatoes are to expand sustainably over time. Future research should look at underserved domestic and international markets, specialised markets with high potential,

and tactics for approaching and conquering these markets. Farmers may broaden their audience and focus their marketing efforts by learning more about the needs and preferences of various market groups.

To compete on a global scale, Cyprus potatoes must stand out from the crowd and provide a really unique product. A possible topic for future research in Cyprus includes branding approaches and the development of distinctive selling suggestions for potato goods. This research might look at the impact of packaging, labelling, and presentation on customer impressions of a product.

The study of how potato production in Cyprus affects farmers' living standards, income, and quality of life has social implications. Future examination of the sector's social and economic characteristics may help policymakers improve the lives of farmers.

Given the increasing importance of online platforms for business promotion, it is crucial to conduct research into effective digital marketing strategies for potatoes grown in Cyprus. One strategy is to assess the effectiveness with which social media marketing, online purchases, and internet advertising reach specific groups. Examining how internet platforms facilitate direct connections between producers and consumers may provide insight into how to strengthen relationships and increase customer engagement.

As consumers place a greater emphasis on sustainability, it is essential to comprehend how sustainable marketing strategies affect both sales and consumer perception. Open supply chains, eco-friendly packaging, and sustainability certifications may be investigated in the future as potential methods for interacting with environmentally conscious consumers. This research may provide producers with information on how to better incorporate sustainable practices into their marketing plans in order to better meet consumer expectations and assure the continued profitability of the potato industry.

Concerns have been raised about how climate change will affect the growing of potatoes. They listed rising temperatures, a lack of water, and bad weather as things that could hurt farming output and quality. To deal with these problems, members stressed the need for sustainable farming methods, such as developing crops that can withstand weather, rotating crops, and using water efficiently as the earth's temperature rises, potato farmers,

like those in the rest of the farming industry, must deal with weather trends that are becoming less reliable, more severe weather, and changes in how pests and diseases affect crops. Agriculture in Cyprus, like agriculture in many other countries, must fight with other businesses for water. If there isn't enough drainage, a lack of water could make it hard to grow potatoes. In a world where water is getting harder to find and more expensive, further research on this subject should be done.

Other significant areas for future research include.

- a) Framing patterns of consumers' demand in response to their income focusing on how revenue impacts the market of fresh potatoes.
- b) Framing the consumers' demand based on their health perception for fresh potatoes in international and European countries.
- c) The comparative significance of various stakeholders in the potato industry
- d) Marketing effect of fresh potatoes, including the procurement measures, the product advertising and value chain creation

The research could never stop as the climate and the economy is everchanging. As a final recommendation for future research the need for a strong worldwide organization which could effectively respond to all the above and try to find solutions might be the final answer to a better solution overall.

## 6.6 Summary

The Cypriot potato industry faces significant challenges due to the evolving European agricultural policies and the dynamic global market. To address these challenges and ensure long-term sustainability, a comprehensive set of strategic recommendations has been proposed. These recommendations (table 10) are related to key themes and findings mentioned in the previous chapter which in turn focus on the research questions and problem. With focus on strengthening the industry's infrastructure and market responsiveness these recommendations aim to bring sustainability to the industry:

Table 10. Recommendations and key points.

Recommendations	Key Points
1. CAP Regulations Adaptability	<ul style="list-style-type: none"> <li>• Emphasize proactive adaptation to EU regulations.</li> <li>• Implement precision agriculture and sustainable practices.</li> <li>• Use piloting and regulatory sandboxes for real-world testing.</li> <li>• Foster stakeholder collaboration for policy adjustments.</li> <li>• Develop pest-resistant and sustainable crop varieties.</li> <li>• Support with financial incentives and subsidies.</li> </ul>
2. Marketing Re-innovation	<ul style="list-style-type: none"> <li>• Overhaul outdated marketing strategies.</li> <li>• Sustainable cultivation practices and resource optimization.</li> <li>• Modernize distribution to reduce costs.</li> <li>• Investigate and utilize certifications for market trust.</li> <li>• Collaborate for branding and market penetration.</li> <li>• Utilize geographical and climatic advantages for positioning in premium markets.</li> </ul>
3. Knowledge Transfer Improvements	<ul style="list-style-type: none"> <li>• Address informational gaps in small-scale farms.</li> <li>• Enhance training in sustainable practices and CAP regulation adaptation.</li> <li>• Promote farmers' unions for easier knowledge transfer.</li> <li>• Implement digital platforms for continuous market and regulatory updates.</li> </ul>
4. Proactive Market Strategies	<ul style="list-style-type: none"> <li>• Conduct robust market research and trend analysis.</li> <li>• Focus on niche marketing and premium pricing for sustainability.</li> <li>• Develop and promote potato varieties favoured in target markets.</li> <li>• Enhance brand recognition through distinct branding strategies.</li> <li>• Formulate efficient logistical solutions to optimize market entry and presence.</li> </ul>
5. European Agricultural Policy Readaptation	<ul style="list-style-type: none"> <li>• Advocate for CAP reforms tailored to local conditions.</li> <li>• Integrate local agricultural knowledge into policy making.</li> <li>• Support the development of sustainable practices.</li> <li>• Establish pilot programs to test policy changes.</li> <li>• Collaborate with EU members with similar agricultural contexts for broader policy impact.</li> </ul>
6. Further Recommendations	<ul style="list-style-type: none"> <li>• Improve potato transportation and storage systems.</li> <li>• Enhance post-harvest management to stabilize market prices.</li> <li>• Utilize collective marketing and contractual agreements.</li> <li>• Promote investment in technological advancements.</li> <li>• Address key market challenges through organized farmer groups.</li> <li>• Continually educate growers on market dynamics and production optimization strategies.</li> </ul>

*(Source, Author 2023)*

1.CAP Regulations Adaptability: Adaptability to Common Agricultural Policy (CAP) regulations is crucial. The industry must embrace proactive adaptation strategies,

including the use of precision agriculture and sustainable farming practices such as crop rotation and water-efficient technologies. Piloting new policies and regulatory sandboxes will allow for the real-world testing of regulations, ensuring they are adaptable to local conditions before full implementation. Strengthening stakeholder collaboration and developing tailored pest-resistant crop varieties are also vital. Financial incentives and subsidies could support farmers in transitioning to these new practices.

2. **Marketing Re-innovation:** The marketing strategies of the Cypriot potato industry need an overhaul to stay competitive. This includes adopting sustainable cultivation practices that optimize resources and reduce production costs. Modernizing the distribution system to cut transportation costs and eliminating intermediaries will help in making Cypriot potatoes more competitive. The industry should capitalize on its geographical and climatic advantages to position its products in premium markets, emphasizing sustainability and quality.

3. **Knowledge Transfer Improvements:** Bridging the information gap among farmers is essential. Training in farm organization, sustainable practices, and CAP adaptations will empower farmers. Promoting farmers' unions will facilitate easier knowledge transfer and collective action, improving the overall efficiency and responsiveness of the industry. Also implementing digital platforms for continuous market and regulatory updates will greatly benefit the industry.

4. **Proactive Market Strategies:** The industry should adopt a proactive approach to market demands by conducting detailed market research and trend analysis. Specializing in varieties that cater to specific market needs and preferences can position Cypriot potatoes favourably in the market. A robust marketing strategy, including effective branding and logistical optimizations, will ensure the products meet the evolving consumer preferences and achieve market differentiation.

5. **European Agricultural Policy readaptation:** There is a need for CAP reforms that are more aligned with the unique conditions of Cyprus. Advocating for policy changes that consider local agricultural knowledge and conditions will help tailor CAP to regional needs. Implementing pilot programs to test these changes will ensure that the policies

are effective and beneficial before they are widely applied. Collaboration with other EU states facing similar issues can amplify the impact and reach of these proposed changes.

6. Further Recommendations: Improving the technical efficiency of potato transportation and storage systems is critical. Strategies include enhancing post-harvest management to limit price volatility and improving the infrastructure to support efficient market access. Collective marketing efforts and contractual agreements can also improve market effectiveness and stability. Continuous education on market dynamics and production optimization will equip farmers to better navigate the market.

The recommendations to adapt to CAP regulations, innovate marketing strategies, and re-innovate European agricultural policies are crucial. These align with the goal of achieving economic sustainability by reducing production costs, accessing premium markets, and obtaining financial support for transitions to sustainable practices. Environmentally, the push towards precision agriculture, sustainable crop varieties, and efficient water management directly contributes to reduced environmental footprints and better alignment with EU environmental goals, reinforcing the industry's commitment to sustainable agricultural practices. Also, by improving knowledge transfer through training and the establishment of digital platforms addresses the broader objective of modernizing the sector. This empowers farmers with the latest agricultural practices and technologies, bridging the gap between traditional methods and modern requirements.

The focus on proactive market strategies and the recommendation for tailored CAP reforms cater to the broader objectives of anticipating market trends and ensuring that policies are conducive to the local agricultural landscape. These strategies ensure that the industry does not merely react to external pressures but actively shapes its operational environment to foster growth and stability. By engaging in robust market research and advocating for policy adjustments that reflect the unique needs of Cypriot farmers, the industry positions itself to better manage risks associated with global market instabilities and regulatory changes. Also, the emphasis on collective marketing efforts, stakeholder collaborations, and the formation of farmers' unions aligns with the objectives of enhancing community cohesion and ensuring that all industry players have a voice in shaping the industry's future. These collective efforts enhance the industry's ability to

negotiate better terms in the marketplace, advocate for beneficial policies, and share valuable knowledge and resources, which are crucial for the sustained success of the industry.

By implementing these strategic recommendations, the Cypriot potato industry can enhance its sustainability, adaptability, and competitiveness. These strategies are designed to not only address the immediate challenges but also to lay a foundation for future growth. The integration of advanced agricultural practices, coupled with effective market and policy strategies, will ensure the Cypriot potato industry remains robust and capable of thriving in an increasingly complex agricultural landscape.



## Chapter 7: A reflexive account of my personal learning and professional journey

Looking back to the beginning of my DProf journey I can say that transformation is the single word that comes to my mind. Even if at the beginning of my research the initial drive to proceed with my work was to gain the qualification it became clear soon that my personal development and gained knowledge was addictive enough to take me further each time and try and push stronger towards my research goals. The reason for this was that as a professional in the industry with more than 20 years' experience and more than 800 grower families to take care of, the need for breakthrough solutions is a great need. Also, as the market is everchanging the necessity to be able to modernise the industry to sustainability is great.

Working on my doctoral study in combination with my fulltime job was very challenging and not easy. However, the personal and professional development that was gained though this was invaluable. Even if reflective practise was part of my professional everyday work through quality protocols and systems in the growing and packing of the potatoes, my understanding of reflection changed though my DProf journey as my reflective skills developed as an insider researcher. The combination of working on my research and dealing with professional issues slowly but surely by considering the larger context in which my actions occur, I have been able to identify patterns and trends that were previously overlooked. This has enabled me to make more informed decisions and implement more effective strategies in my work. Ultimately, my journey through the DProf program has not only enhanced my reflective skills but has also empowered me to be a catalyst for meaningful change within my field. I am now better equipped to navigate the complexities of my profession and drive innovation and progress in my work. The skills and knowledge I have gained from the DProf program have given me the confidence and tools needed to tackle challenging research projects and address professional issues head-on. I am now able to approach problems with a critical eye and develop creative solutions that make a real impact. Furthermore, I am excited to continue growing and evolving in my field, using my newfound expertise to drive positive change and shape the

future of the Cypriot potato industry. Overall, the DProf program has been a transformative experience that has prepared me to be a leader in my field and make a lasting difference in the work that I do.

By combining my expertise, conceptual framework and findings I managed to get deeper in researching by reframing my findings and identifying key relationships and interactions. To utilize my reframing process of the problem I also used a mind map based on the methodologies of Miles and Huberman (1994), where I was able to visually organize and link the reframed issues, highlighting interactions between market strategies, consumer preferences, regulatory impacts, and sustainability. This visual model was instrumental in illustrating the interconnectedness of these factors, allowing for a deeper understanding and facilitating strategic adjustments. Also, it helped me identify gaps in information, overlaps, or potential areas for further exploration and strengthened my confidence on suggesting recommendations.

In the evolving scene of agricultural sustainability, the art of reframing helped me come to profound improvements in my critical reevaluation of problems and strategic decision making. Reframing of initial research findings in the Cypriot potato industry significantly altered my perspective and enhanced the depth and scope of my study. This was in combination with assessing and embedding in the process my conceptual framework that incorporated environmental and economic sustainability, marketing strategies, and consumer preferences.

The use of reframing in my research was merely a corrective tool but more of a proactive strategy that opened new paths of inquiry and interpretation. Initially, my findings about the Cypriot potato industry highlighted an imbalance in environmental and economic sustainability, insufficient marketing, and a shift in consumer preferences. However, by integrating insights from the Potato Sustainability Alliance and applying my framework, these findings were transformed into opportunities for strategic innovation. The key finding of environmental and economic sustainability imbalance was initially perceived as a tension between ecological practices and profitability of farmers. By reframing this finding, I changed the view and perceived the sustainability efforts as investments in long-term sustainability rather than short-term expenses. This shift in perspective helped me

develop my reframing skills and the new results underscored the necessity of aligning sustainable practices with economic outcomes thus I thereof emphasized the importance of adapting these practices to the unique ecological and economic conditions of Cyprus. Of course, my professional work changed from the moment of realising this, as the view of the real problem and solution changed focus into a new direction.

Also reframing the finding of insufficient marketing made me realise that current marketing strategies were not adequately leveraging the sustainability efforts of the industry. By redefining marketing goals to integrate sustainability, the new framework suggested that marketing should not only promote the quality of Cypriot potatoes but also their sustainable cultivation and in effect utilise accreditations like Protected Designation of Origin (PDO) for Cypriot potatoes as a solution. This approach helped my knowledge and perception change, as to tap into the growing consumer preference for environmentally friendly products, I suggested a new solution of transforming a marketing gap into a competitive advantage. This application was used in my professional work with great impact and results.

Consumer preference shift initial finding highlighted a shift towards sustainable products. Through reframing, this shift was seen not just as a trend but as a central driver of market strategy. This reorientation allowed me to acknowledge that consumer behaviour is a powerful influencer of industry practices, urging a strategic alignment of agricultural factors to benefit from this reframe.

The reframing process did more than just alter the interpretation of my data; it also revolutionized my research approach itself. By improving my perception and critical thinking to a higher level, I was able to identify gaps, overlaps, and potential areas for further exploration, and helped me set the stage for actionable recommendations that are both innovative and aligned with broader sustainability goals.

My deeper understanding of the problem enabled me to acknowledge and suggest a holistic approach to tackling the challenges faced by the Cypriot potato industry, promoting a model that integrates environmental considerations with economic and marketing strategies to ensure sustainability and enhance competitiveness.

The practice of reframing in this research has proven to be a transformative approach that has reshaped my understanding of the issues at hand and guided the development of a comprehensive strategic plan for the Cypriot potato industry. It highlights the importance of a flexible, integrative research approach that considers multiple perspectives and adapts to evolving market and environmental conditions. Ultimately, reframing has not only enriched the quality of the research but has also provided a robust framework for future policy recommendations, marketing initiatives, and strategic planning in the industry.

Strategic Integration of Insights: Your approach has shifted from viewing sustainability as a cost to seeing it as an investment in the future sustainability of the industry. This reflects a deeper strategic thinking where sustainability is not just about adhering to environmental standards but is also a critical element of the economic and marketing strategy. By integrating insights from the Potato Sustainability Alliance into your reframing, you've embraced a broader strategic scope that aligns with both immediate and future challenges.

My adaptive and responsive research methods have been changed and encouraged me to adopt a more adaptive research approach, responsive to new insights and changes in the field. This adaptability is crucial for my professional work in addressing the dynamic nature of agricultural economics and consumer behaviour, allowing for further adjustments in marketing. Also previously, issues might have been viewed as obstacles; however, now I can see them as opportunities for growth and innovation. This shift in perspective encouraged me to use a proactive rather than reactive approach to challenges, focusing on developing strategies that leverage these opportunities for the benefit of the industry.

Overall, I can genuinely argue that my DProf journey has taught me many things about myself as well. I have struggled and acknowledged that getting better and upscaling my knowledge has led to more confidence in my work and personal life.

I can now see the real impact my work can have on the industry, and this gives me a great push to make things happen through my professional position. Also, I recognise that

my findings will serve other stakeholders and academic institutions and students to further benefit from my work for the greater good of the agricultural industry.

## APENDICES

### Appendix A: Word Frequency

Word	Length	Count	Weighted Percentage (%)
Supplementary	13	60	2.03
Sustainable	11	38	1.29
Competition	11	26	0.88
Agricultural	12	24	0.81
Certification	13	21	0.71
Sustainability	14	21	0.71
Participate	11	15	0.51
Positioned	10	15	0.51
Supermarkets	12	14	0.47
Aggressive	10	11	0.37
Competitor	10	10	0.34
Information	11	10	0.34
Understand	10	8	0.27
Involvement	11	7	0.24
Vegetables	10	7	0.24
Agriculture	11	6	0.20
Businesses	10	6	0.20
Appropriate	11	5	0.17
Approximately	13	5	0.17
Background	10	5	0.17
Beneficiary	11	5	0.17
Competitiveness	15	5	0.17
Conclusion	10	5	0.17
Conclusions	11	5	0.17
Confidential	12	5	0.17
Customers'	10	5	0.17
Experience	10	5	0.17
Experiences	11	5	0.17
Interested	10	5	0.17
Interviewee	11	5	0.17
Interviewing	12	5	0.17
Opportunities	13	5	0.17
Orientation	11	5	0.17
Participants	12	5	0.17
Participation	13	5	0.17
Permission	10	5	0.17
Perspective	11	5	0.17
Perspectives	12	5	0.17
Professional	12	5	0.17
Represents	10	5	0.17
Responsibilities	16	5	0.17
Validation	10	5	0.17
Certifications	14	4	0.14
Pesticides	10	4	0.14
Advertisements	14	3	0.10
Continuity	10	3	0.10
Affordable	10	2	0.07
Stakeholders	12	2	0.07
This competition	15	2	0.07
Accomplish	10	1	0.03

(Source, Author, 2023)

## Appendix B: Codebook

Name	Description	Exemplary Quotes
Sales and Growth Opportunities	There is need to understand the market, customers, competition, and industry trends, as well as a willingness to take calculated risks and invest in the right resources and capabilities.	"They are consumers that value their purchases." "Yes, our target range extends to foreign markets. We sell products also in Holland."
Sales Performance	Effectiveness and efficiency of a sales team or individual in meeting or exceeding their sales targets and goals.	"There are a lot of washed and pre-prepare potatoes in the supermarkets and also some other fresh potatoes are cheaper, like the Israel potatoes."
Potential for Growth	There is possibility of expanding the business operations, increasing its revenue, and improving its profitability over time.	"Of course, changes could be made towards growth of our sales."
Customer Opinion and Sales	By prioritizing the customer experience and using customer opinion as a guide, businesses can build strong customer relationships and drive sales growth over the long term.	"Of course, their opinions affect my sales, because if they are not sure about product sustainability, they did not even buy the product. So, the agricultural sustainability plays a major role."
Product Positioning	Limited market appeal	"Selling a niche product – Cyprus potatoes and that itself I think is the strategy."
Sustainability	Messaging strategy	"Marketing way that can pass through the purchases of a customer, the message that our potatoes are a sustainable product, meaning that we try to keep the environment clean."
Market and Competition	Understanding the market and competition is essential for developing a successful business strategy.	"Yes, our target range extends to foreign markets. We sell products also in Holland."
Competitive strategy	Need to position the business to be able to outperform its competitors and capture a greater share of the market.	"No, I don't enter in aggressive competition." Business philosophy: "I only try to do my jobs as good as possible."
Cypriot Products	Reflection of the country's rich agricultural heritage, highly valued both domestically and internationally for their quality and unique characteristics.	"Cyprus potatoes as a niche product is high cost, the target market is very specific. Also, we need to remember that there is aggressive competition with local products. So, the consumers will buy the cheapest product, the best quality product but with lower price, for example from Italy or Israel or their local product."

*(Source, Author, 2023)*

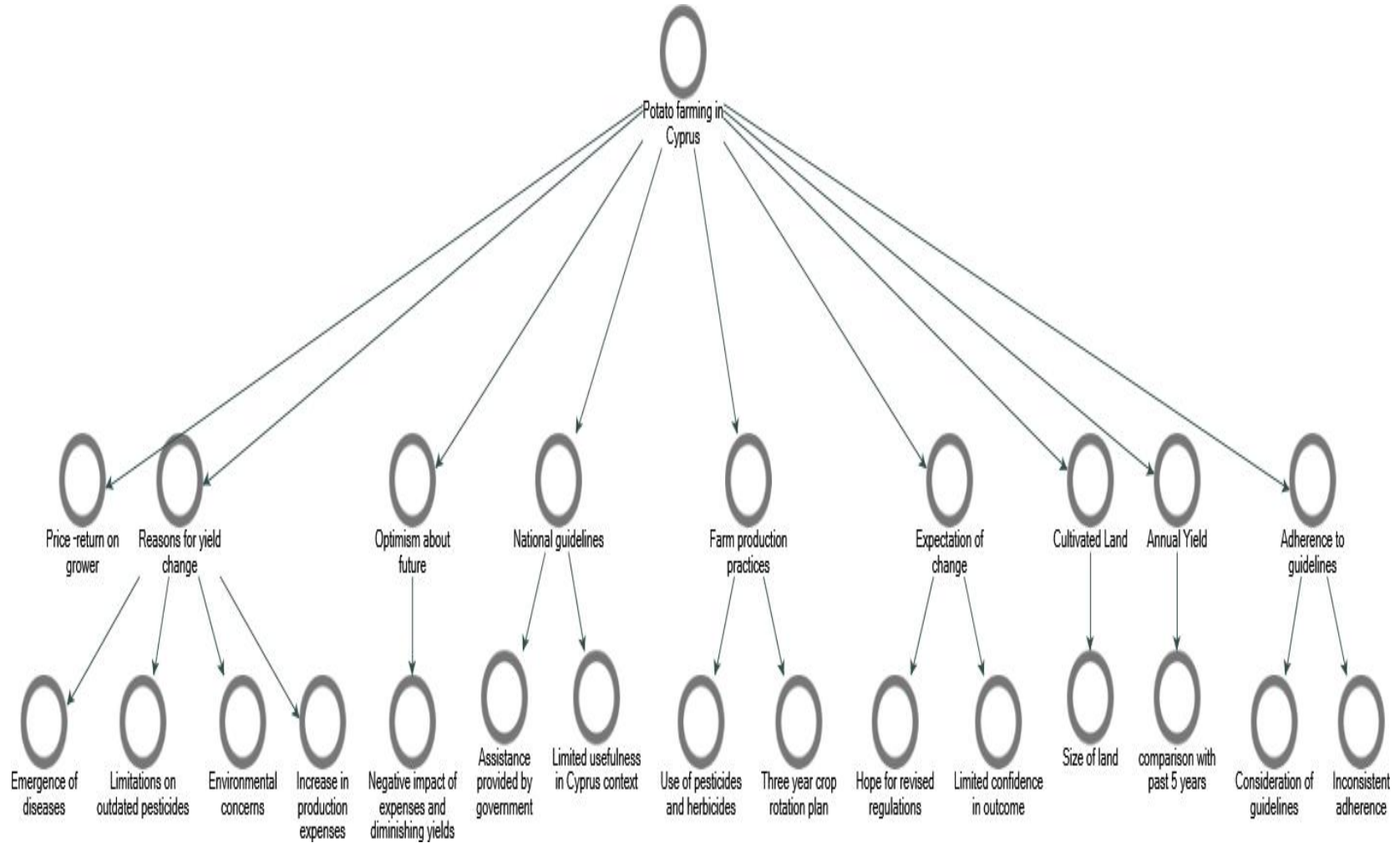
## Appendix C: Codebook

product	also	sales	interview	price	certifica	growth	affect	aggress	better	change	consid	descri	first		
				problems	compar	last	future	please	positio	positio	quality	questio	strateg		
potatoes	supplementar	yes	local				israel	time	best	buy	certifi	comp	contin	costu	
			sustainab	selling	consum	market			course	feel	field	foreign	fruits	great	
		cyprus					lower	used							
products	sell		think	sustainab	cyriot	may			dema	high	involv	italy	little	made	
		agricultural					marke	washe	enter	highes	main				
products	marketing	competitor	like	way	fresh	superm	opinion	always	establ	impac	major	ones	pre	prefe	
				years	going	target			arise	exam	influer	make	opinion		
								partici		believ	extend	inform	mean	plays	

(Source, Author, 2023)

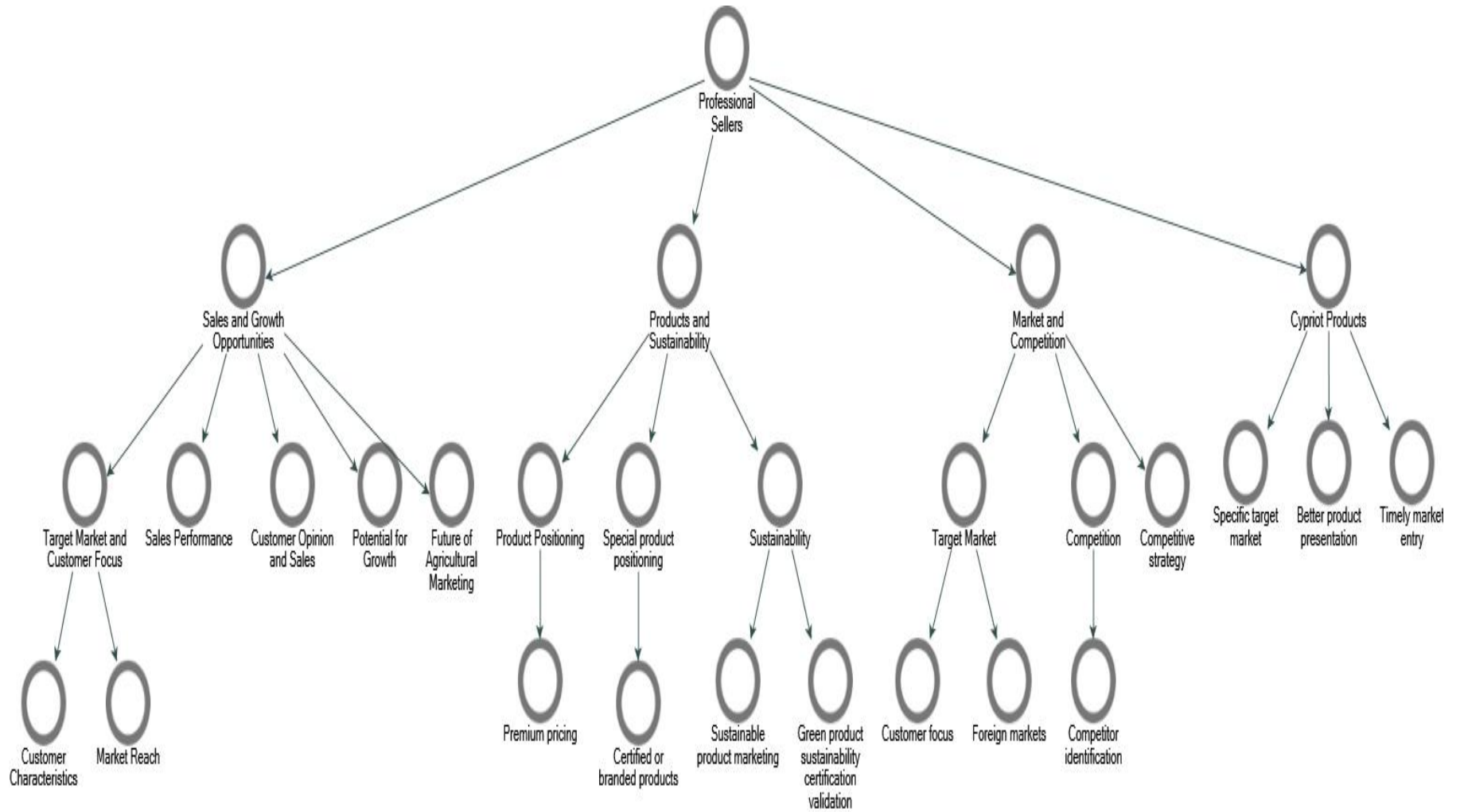


**Appendix D: Small to Medium and Large growers Map**



*(Source, Author, 2023)*

## Appendix E: Professional Sellers Map



*(Source, Author, 2023)*

## Appendix F: Thematic Analysis Frequency Chart

Themes	Major Categories	N <sup>1</sup>	Frequency of statements	Theme Totals
Potato farming in Cyprus	Cultivated Land	5	15(14%)	46 (39%)
	Annual Yield	3	10(8%)	
	Reasons for yield change	6	11(9%)	
	Expectation of change	7	4(3%)	
	Optimism about future	4	6(5%)	
Price Return on Growers	Income Decline	3	4(3%)	28 (24%)
	Reason for Income Decline	5	9(8%)	
	Future expectations	2	5(4%)	
	Improvements for Increasing Returns	7	7(6%)	
	Potential Solutions	3	3(3%)	
Impact of European regulations and standards on potato farming	European regulations and standards	2	4(3%)	20 (17%)
	Feasibility of chemical and pesticide regulations	3	6(5%)	
	Reasons for Cyprus' differences	5	3(3%)	
	Change in pesticides due to EU prohibition	6	7(6%)	
Problems and issues in potato cultivation in Cyprus	Environmental issues	4	5(4%)	24 (20%)
	Government Aid	2	12(10%)	
	sustainability of business	3	7(6%)	

(Source, Author, 2023)

## Appendix G: Interview to professional sellers.

Thank you for agreeing to participate in this interview. We are interviewing you to better understand the industry situation and its perspectives for the future. The viewpoint of professional marketers, as well as their experience in the field and knowledge, is going to be very valuable to us.

There are no right or wrong answers to any of our questions; we are interested in your own experiences.

Participation in this research is voluntary, and your decision to participate or not participate will not affect you in any way. The interview should take approximately half an hour, depending on how much information you would like to share. With your permission, I would like to audio-record the interview because I don't want to miss any of your comments. All responses will be kept confidential. This means that your interview responses will only be shared with research team members, so they can be analysed, and later the results will be used to extract the summary. You may decline to answer any question or stop the interview at any time and for any reason.

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Are there any questions about what I have just explained?

No

May I turn on the digital recorder?

Yes

“Can you please state your position and responsibilities in the company?” Can you also please describe what your main business is?”?

My responsibility in the company is to sell fruits and vegetables to supermarkets in Europe. I have been selling Cyprus potatoes for the last 15 years.

### 1. Products and Sustainability

1.1 What is your marketing strategy to establish your product position?

I do not have a specific marketing strategy to establish my product position. I am selling a niche product – Cyprus potatoes—and that, I think, is the strategy.

1.2 How are your products priced?

Our products are priced as premium products at a higher price than local or imported potatoes, mainly due to the fact that the product has been sold as a special product.

**Supplementary:** Do you sell any products certified or branded?

Yes, I sell fruits and vegetables that are certified. Also, I sell Italian potatoes, but at the same time, I sell Cypriot potatoes as well.

Does the certification of a product influence the price?

Yes, for sure, certification does influence the price. Also, if a product doesn't have the certification needed, you are not able to sell it in supermarkets or supermarket chains.

### 1.3 How do you consider sustainable product marketing?

I consider sustainable product marketing the direction of the funds to the growers through the purchases of a customer; the more money the growers have, the more sustainable we are.

**Supplementary: Do** you have any green product sustainability certification or validation?

Yes.

**Supplementary: Are** your company or products positioned as sustainable?

Yes.

## 2. Market and Competition

### 2.1 Describe your target market and customer focus.

They are customers that value their purchases. We are selling a healthy product – Cyprus potatoes, so health orientation. Also, they are people who visited Cyprus for holidays and want to remember the delicious potatoes that they ate in Cyprus.

**Supplementary: Does** your target range extend to foreign markets or stays local?

Yes, our target range extends to foreign markets. We also sell products in the rest of Europe.

### 2.2 Whom do you consider your highest competitor, and how do you tackle this competition?

The highest competitor, in my opinion, is first Israel, then, I would say, Egypt, and the local fresh produce.

**Supplementary: Do** you enter in aggressive competition?

No, we do not enter in aggressive competition. We only try to do our jobs as good as possible without price war.

## 3. Sales and Growth Opportunities

### 3.1 How do your sales compare with the last 10 to 15 years?

In the last 10 to 15 years, the sales of fresh potatoes have been lower than before.

**Supplementary: Which,** in your opinion, is the reason for this change?

There are a lot of washed and pre - cooked potatoes in the supermarkets, as well as some other fresh potatoes are cheaper.

### 3.2 What do you think are your customers' views on agricultural sustainability, and to what extent do their opinions affect your sales?

Of course, their opinions affect my sales, because if they are not sure about product sustainability, they will not even buy a lot of products. So, agricultural sustainability plays a major role.

### 3.3 Do you feel changes could be made towards positive growth of your sales?

Of course, changes could be made towards growth of our sales.

**Supplementary:** Which changes do you feel would make the greatest impact and why?

If there is a constant quality level and continuity of supply, I think that would have the greatest impact. Quality is something that plays a major role for the customers. Also, the continuity of supply is important because if there is a high demand, they will always have products to sell.

### 3.4 How do you see the agricultural marketing perspective in the near future?

I think that agricultural marketing will dominate the future. It doesn't hurt to have a little money to throw around in the name of public relations. The agricultural field is working to grow its consumer base, and marketing to a larger demographic is the way to accomplish this growth.

**Supplementary:** Do you believe agriculture businesses are going to stay viable?

Yes, they are going to stay viable, in my opinion, if they adapt to consumers' needs and those of the buyers.

## 4. Cypriot products

### 4.1 Describe your involvement with Cypriot agricultural products.

As I said I sell Cypriot fresh potatoes.

**Supplementary:** How long have you been involved?

I have been involved about 18 years.

### 4.2 What problems do you face selling these products?

Consumers now prefer prepackaged and washed foods; this takes away the competitive advantage we had with red soil. Also, Cyprus potatoes as a niche product are expensive, and the target market is very specific. We need to remember that there is aggressive competition with local products as well. So, consumers will buy the cheapest product, the best quality product, but at a lower price, for example, from Italy or Israel or their local product.

**Supplementary:** What was the first thing you noticed when these problems arose?

The first thing that I noticed when these problems arose was that the sales were very low, and each year they were going down. The demand went lower.

**Supplementary:** What sequence of events preceded these problems?

In the last few years, in the markets, they have been selling pre – cooked potatoes or washed ones in packages of 2kg or 3kg. The consumers prefer that because it is easier for them and more economical. Also, competition is something that is always there.

**Supplementary:** Do you believe these can be solved?

Yes, I think these problems can be solved by taking relative action.

4.3 What do you think could be done to increase the competitiveness of these products?

They must find a way to better show our products to consumers. Also, if we offer a better price for our potatoes, maybe people will prefer our product to the deluxe packaging of washed potatoes. We can serve Cyprus potatoes earlier than the local ones. For example, products should come to the Belgium market in early March and finish on May 15 to get the best-selling window.

5. Summary

Is there anything else that you would like to comment on that I haven't already asked you about?

I really believe we covered the subject.

*Thank you very much for your time and the information you shared today.*

(Source: Author, 2023)

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