



Exploring the Impact of a Farm Safety Intervention Programme in Ireland

Examining Farmer's Behaviour towards Farm Safety -

A Study of the Farm Safety Mentor Programme

MA in Rural Sustainability, Discipline of Geography, National University of  
Galway Ireland

Submitted to

By

Cathal Brennan

ID: 10387457

Under the Guidance of

Dr. Maura Farrell

August 2015

## **Acknowledgements**

Firstly, I want to take this opportunity to extend my sincere gratitude to my dissertation advisor Dr Maura Farrell. Her continued support and guidance throughout the research was unparalleled and this study would not have been possible without the expertise and immense knowledge shown to me by her.

In addition to my advisor, I would like to thank my other lecturers Dr John McDonagh, Dr Therese Conway and Dr Marie Mahon who were extremely influential throughout the year and their direction, encouragement and support made this research and the academic year entirely enjoyable.

I would also like to thank the extended faculty of Geography in NUIG and other academics, who worked with us throughout the year. A special mention is also extended to Dr Siubhan Comer who also supported this research study.

This study would not have been possible without the assistance of Irish Rural Link, most notably the co-ordinator of the Farmer Mentor Safety Programme Mr Vincent Nally. His willingness to support the research and obligingness was exceptional and this research would not have been undertaken without his support.

Lastly, I would like to thank my classmates for their support and endeavour throughout the course and while undertaking this research. The support everyone showed for one another was a catalyst for us succeeding throughout the year.

## **Abstract**

The agricultural sector is at the heart of rural Ireland and continues to be a major contributor to the local and national economy. Those at the centre of this industry are farm families who represent 97% of the farming population. Farming is as much a job as it is a way of life, an identity and a social representation for many. This identity has however in recent years been constantly threatened by yearly rises in farm accidents and fluctuations in farm deaths which climaxed in 2014 with 30 people losing their lives on Irish farms. Not only did 30 families lose loved ones, whole communities and regions have been adversely affected by these deaths which have far ranging negative influence on the sustainability of rural areas. Unfortunately one does not have to go far from the farm gate to find a farmer who has been severely disabled or injured as a result of a farm accident and often at times less further to the place of a farm death as farm accidents are so frequently fatal. The Farm Safety Mentor Programme was run in 2012 in order to counteract the high levels of farm accidents and deaths in the ‘black-spot’ areas of Westmeath, Meath, Cavan and Longford. Administred by Irish Rural Link, the programme sought to foster a behavioural change amongst farmers in the pilot area in the midlands. The programme looked to foster a change in the behaviour of farmers in the pilot area – an element of farm safety that has not been focused on previously. The programmes ‘farmer to farmer’ method of knowledge transfer accelerated this behavioural change as farmers accepted the views of their peers more readily than of authoritative bodies. The programme was seen as a positive influence in many other ways and gives an indication that this mode of knowledge transfer may have a huge role to play throughout Ireland in coming years.

## **Declaration of Originality**

Department of Geography

MA in Rural Sustainability

2014-2015

Student Declaration on Plagiarism for TI 502 Dissertation

This form is to be completed and signed and returned to your research supervisor.

Name (please print): \_\_\_\_\_

Student ID Number: \_\_\_\_\_

I declare that:

I have read the MA guidelines on plagiarism.

I have read the NUI, Galway Code of Practice for Dealing with Plagiarism.

I understand what plagiarism is.

I understand the procedures and the penalties for plagiarism at NUI Galway.

All work submitted by me for the purposes of assessment in the MA in Rural Sustainability 2013-2014 is my own work, except where I explicitly acknowledge otherwise through proper referencing of source materials.

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

2 Adapted from the NUI Galway School of Education (2008) Postgraduate Diploma in Professional Education Studies, 2008-2009. NUI Galway: School of Education, p. 25.

# Table of Contents

Acknowledgements .....	ii
Abstract .....	iii
Declaration of Originality .....	iv
Table of Contents .....	v
List of Figures .....	viii
List of Tables .....	ix
List of Abbreviations .....	ix
Chapter 1 Introduction .....	1
1.1 Rationale for the dissertation and problem at hand.....	1
1.2 Aims and Objectives .....	2
1.3 Method of Research .....	2
1.4 Structure of Thesis .....	3
Chapter 2 Literature Review .....	4
1.1 Introduction.....	4
Section 1 .....	4
1.2 Overview of Agriculture in Ireland.....	4
1.2.1 Crisis Point.....	5
1.2.2 Rural Sustainability Threatened.....	6
1.2.3 CAP Reform 2013 – Rural Development – Extra Pressure on Farmers .....	6
Section 2 .....	7
2.2 The cause of farm accidents.....	7
2.3 Accident and Injury.....	8
2.3.1 Disability .....	8
2.4 Who is at risk? .....	9
2.4.1 Male Dominated.....	9
2.4.2 Family Farming – Most Vulnerable at Risk.....	10
2.4.3 Correlation of injury between economically positive and negative farms and safety.....	11
2.4.4 Dairy farming – The most at risk .....	12

Section 3 .....	13
3.1 More than an Occupation – Socio Cultural Context of Human Behaviour .....	13
3.2 Behaviours and Attitudes .....	14
3.2.1 Mental Health problems .....	15
3.3 Risk .....	17
Behavioural Change: Trigger Events .....	16
Section 4 .....	17
3.1 Introduction .....	17
3.2 Farm Safety Interventions .....	18
3.2.1 Behavioural Interventions .....	18
The Certified Safe Farm Programme .....	19
Understanding of Irish Farm Behaviour .....	19
Applying a Behavioural Theory .....	20
Conclusion .....	20
Chapter 3 - Overview of the Farm Safety Mentor Programme and Irish Rural Link .....	22
3.1 Introduction .....	22
3.2 Profile of the Farmer Safety Mentor Programme .....	22
3.3 Irish Rural Link .....	24
Chapter 4 Methodology .....	25
Section 1 .....	25
4.1 Introduction .....	25
4.2 Desk Research .....	25
4.3 Philosophical Stance .....	26
Section 2 .....	26
4.4 A Mixed Method Approach .....	26
4.5 The Case Study Approach .....	27
Section 3 .....	28
4.6 Theoretical Framework .....	28
4.7 Research Strategy .....	28

Selection Process for Interview and Survey.....	28
Mentors .....	29
The farmers .....	29
Expert View .....	29
Data Collection .....	30
4.62 Method of investigation .....	31
The Questions .....	31
A Map of the FSMP Pilot Area.....	32
Identifying Participants .....	33
Analysing Data.....	33
Theory of Planned Behavior .....	33
Subjectivity .....	34
5. Ethical Considerations .....	34
Conclusion .....	35
Chapter 5 Results .....	36
Section 1 .....	36
County by County Evaluation of Farmer Participants .....	36
Section 2 .....	38
Attitude towards Safety.....	38
Farmers Attitudes: Factors Affecting Safety - Intention, Ability and Control to Working Safely ...	38
Stress.....	39
Risk Taking.....	41
Injury Prevalence .....	43
Does Age Matter? .....	43
Section 2 .....	44
The Influence of Safety Precautions .....	44
Has the FSMP changed behaviour? .....	45
Deaths in the Pilot Area .....	46
The Longford Purchasing Group (LPG) .....	48

Influence of Mentors: Networking and Social Capital .....	48
A Wider Benefit.....	50
Safety Campaigns .....	50
Coupling of the Basic Payment Scheme and Farmer Safety Training.....	52
A Rollout of the Programme?.....	53
Limitations of the FSMP.....	54
Theory of Planned Behaviour .....	55
Conclusion .....	56
Chapter 6 Conclusion.....	57
Recommendation 1: A Rollout of the FSMP in Cork and Tipperary .....	59
Recommendation: Annual Farm Safety Budget .....	59
Recommendation 2: Discussion Group Inclusion.....	59
Recommendation : Certified Safe Farm.....	60
Recommendation- Utilising Social Media.....	60
Appendix A.....	61
Bibliography: .....	70

## List of Figures

Figure 1 - Incidence of Farm Deaths 1993-2015 (HSA, 2015) .....	6
Figure 2 - Farm Deaths 2005-2014 (HSA, 2015) .....	7
Figure 3 - Farm Deaths of Farmers 65+ 2005-2014 .....	10
Figure 4 - Child Death 2005-2014 (HSA, 2015) .....	11
Figure 5 - Distribution of Farm Accidents 1993-2007.....	23
Figure 6 - Estimated Number of Dairy Farms Per County.....	23
Figure 7 - Perceived Control of Safety.....	49
Figure 8 - Risk Taking and Assessment.....	51
Figure 9 - FSMP Safety Signage.....	57
Figure 10 - Deaths in FSMP Pilot Area 2007-2015.....	57
Figure 11 - Map of the FSMP Pilot Area.....	58
Figure 12 - Farm Safety Campaign Influencing Deaths.....	61

Figure 13 - Contribution of Farm Income through Subsidies.....	63
Figure 14- Theory of Planned Behaviour.....	65

## **List of Tables**

Table 1-5 - County by County Evaluation of Farmer Participants.....	46
Table 6 - Factors Affecting Safety.....	49
Table 7 - Factors Affecting Stress.....	50
Table 8 – Stated against Weighed Statistics.....	55

## **List of Abbreviations**

IRL – Irish Rural Link

FF – Family Farming

FFI – Family Farm Income

FSMP – Farm Safety Mentor Programme

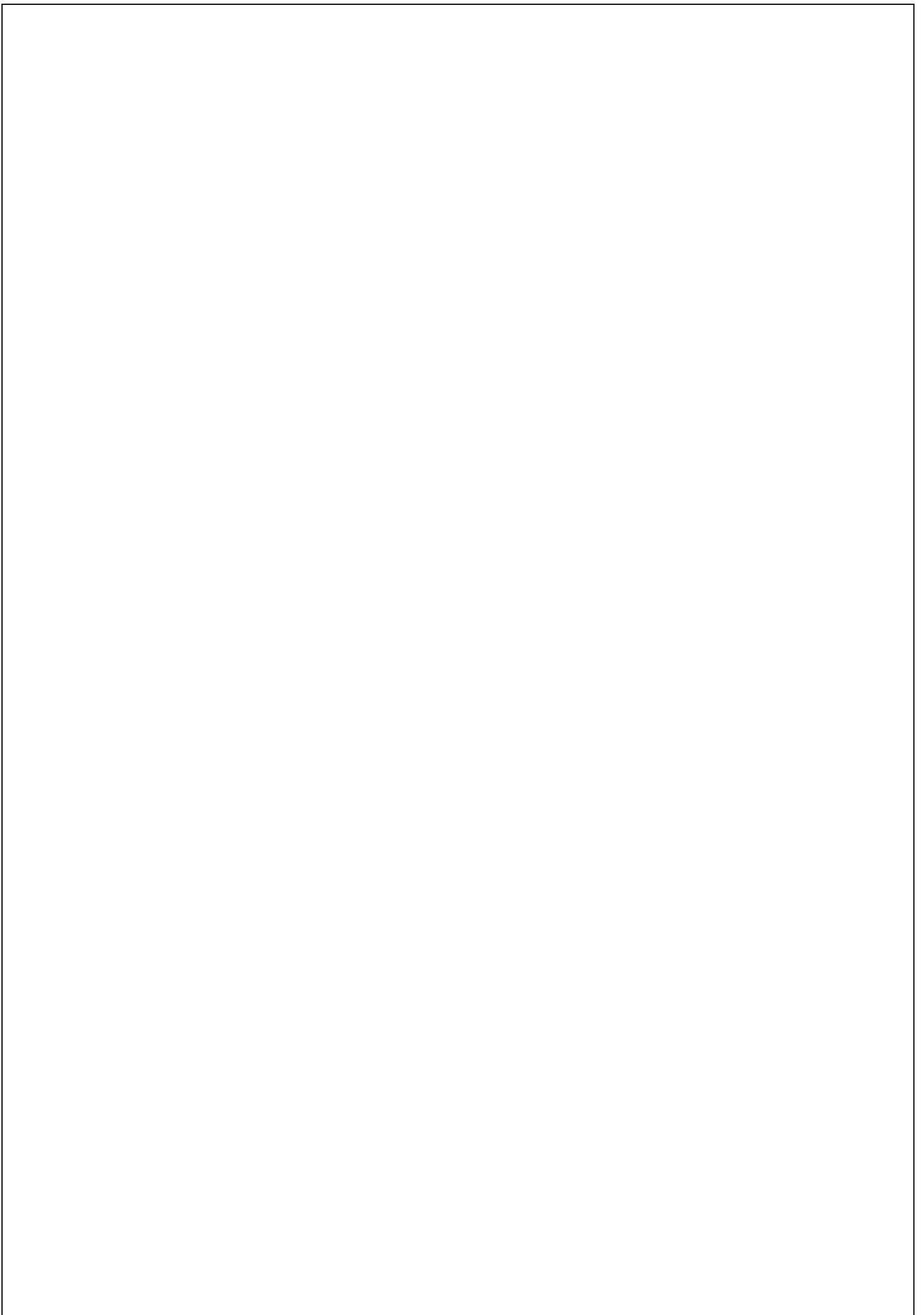
KTG – Knowledge Transfer Group

LDG – Longford Discussion Group

PA – Pilot Area (Westmeath, Meath, Longford and Cavan)

SE – Safety Expert

TAMS – Technology Advancement Modernisation Scheme



## **Chapter 1 Introduction**

The opening section of this paper outlines the justification for this study and explains the necessity of it as the content may possibly influence future rural development policy and budget allocation in Ireland and consequently impact the sustainability of rural areas. It discusses the logic behind the study and the ways in which the research questions will be investigated before providing a format of the remainder of the research paper.

### **1.1 Rationale for the dissertation and problem at hand**

Rural Ireland has a history of farmers and communities engaging in traditional forms of agricultural production which has been seen as the backbone of the countryside for many decades (Farrell et al. 2010). Ireland has a farming population in the region of 139,000 farmers but as the model of Family Farming (FF) is so prevalent this figure encompasses in the region of 400,000 people (Hanrahan et al. 2013). It is widely recognised that farmers face an ever challenging, complex and multifaceted working environment. Farmers must deal with variables such as an often destitute and fluctuating marketplace, adverse weather conditions which are coupled with high input costs of production. These variables have however raised constant concerns around the safety of the farming community on an annual basis. Ireland is currently recovering from its most disastrous year of farm related deaths since 1991 (Oireachtas Report, 2015), with 30 people having lost their lives on farms in 2014. It is well known that farming is one of the most “hazardous occupations in terms of the incidence and seriousness of accidental injuries” (Glasscock et al. 2007, Eklof et al. 2007). Since 2010, there have been a high number of farm deaths each year culminating with an 87% increase in 2014 contributing to 55% of all work related deaths (HSA, 2015). Although the number of people employed and active in farming has fallen significantly over the last two decades (Hanrahan et al, 2013), the number of farm fatalities has risen disproportionately. The terrible fact is that one does not have to go far from the farm gate to find the place where a terrible farm accident has occurred. Likewise the prevalence of farm safety campaigns has never been as high in the country but we are still witnessing large numbers losing their lives. In 2011, Irish Rural Link (IRL) launched the Farm Safety Mentor Programme (FSMP) in Westmeath, Meath, Longford and Cavan which was an innovative farm safety intervention programme using a farmer to farmer approach to communicate the message of safety. The studies and reports that exist to date on occupational accidents, injuries and deaths in Ireland have only investigated the epidemiological basis of farm accidents and farm related injuries. However,

little research has been undertaken on the psychosocial and behavioural factors of farmers in Ireland. Analysis of other sectors cannot be applied to the agricultural setting due to the non-consistent and diverse environment and range of activities undertaken by farmers on a daily basis. The current literature that has investigated the relationships between psychosocial and behavioural attitudes of farmers does not encapsulate the farm setting in Ireland that is much different to other EU member states in terms of farming population, farm size, a predominantly grass based farming system and age of farmers. As the agricultural sector struggles to contain the problem of farm related injuries and deaths, this paper investigates the potential of the Farm Safety Mentor Programme in addressing the issue in Ireland.

## **1.2 Aims and Objectives**

The overall aim of this project was to establish if the Farm Safety Mentor Programme has fostered a positive change in behaviours and attitudes of farmers towards farm safety and assess if there is merit in a nationwide rollout of the programme.

In order to achieve this, the following objectives were determined:

- 1) Investigate if there has been a positive change in the behaviours of farmers towards farm safety in the Farm Mentor Safety programme pilot area
- 2) Examine if and how the 'Farmer to Farmer' concept of knowledge transfer practiced by the Farm Safety Mentors has been successful in fostering this change
- 3) Conduct a comprehensive study of agricultural health and safety experts, the Farm Safety Mentor Programme mentors and farmers involved in the programme
- 4) Analyse if there is potential for the Farm Safety Mentor Programme to be rolled out in further areas
- 5) Produce a map of the pilot area to provide visual evidence of the impact of the programme on the pilot area

## **1.3 Method of Research**

Research constituted of a comprehensive primary and secondary study. Three different groups were analysed consisting of interviews with five farm safety experts, four mentors and

thirty surveys with farmers of the FSMP. Analysis of data was conducted through thematic analysis of the interviews and the use of SPSS to interpret the open ended surveys used on the mentors and farmers.

#### **1.4 Structure of Thesis**

The following section will outline a contextualisation of secondary material available at a national and international level regarding farm safety. This literature review will set the scene for the remainder of the paper while drawing from the main research undertaken on this topic from early to contemporary sources and the importance of the research question of this paper will be evident from this. Secondly, an overview of IRL and the FSMP will set some context of the overall study before the methods are outlined. The methods section will outline the theoretical and philosophical framework of the paper while the methodology will also be discussed. It will then move to the results section where the research question will be investigated before a discussion of the overall findings. As the paper draws to the end recommendations will be given and a conclusion of the overall thesis.

## **Chapter 2 Literature Review**

### **2.1 Introduction**

The literature contained in this in depth review of farm related occupational health and safety are wide ranging and encapsulate research from the field of agriculture, health and safety, medicine, psychology, rural development and human geography. These issues, although entirely different in their own respect often come together to intertwine and play a huge role in farm related injuries and deaths. Section 1 will give an overall overview of the significance of farm injury and death while section 2 will delve into the mind-set, behaviour and attitude of farmers towards health and safety. Section 3 will close the literature review with an insight into safety interventions that have been employed throughout productivist and post productivist countries.

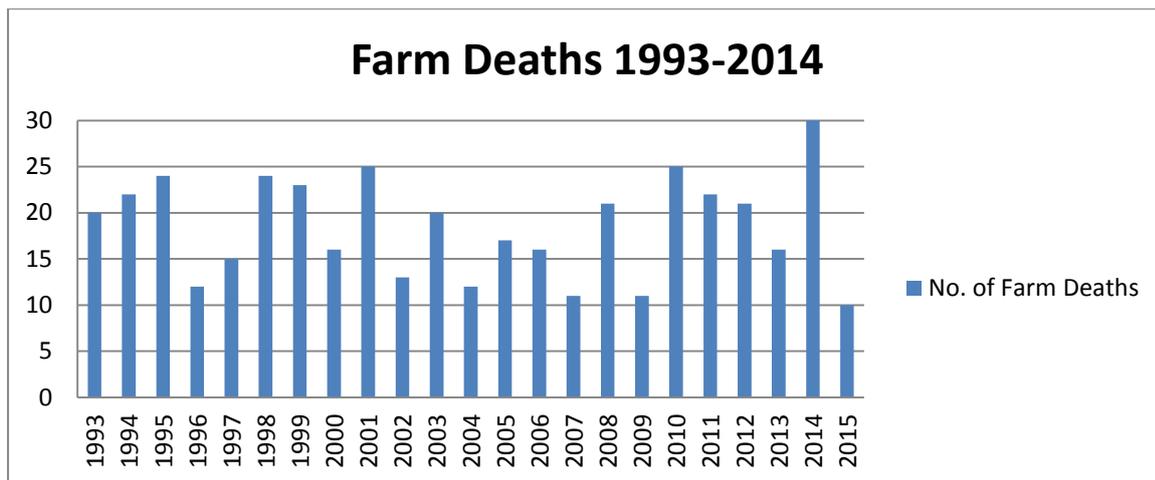
### **Section 1**

#### **2.2 Overview of Agriculture in Ireland**

Since the inception of the European Union, European Agricultural policy enacted through the Common Agricultural Policy has provoked continuous and widespread change throughout the agricultural community of member states (Daugbjerg, 2009). These changes have occurred at contrasting scales at a farm, regional, national and international level. The transformation of the agricultural sector has been unprecedented, as farmers have advanced from the modernisation paradigm to a post productivist era with many now positioning themselves towards a multifunctional farm enterprise or in the direction of a neo productivist or return to a productivist farm system (Burton and Wilson, 2015). These paradigm changes have been influenced by EU environmental policy introduced by the Mac Sharry Reforms of the early 1990's (Daugberg, 2003), modernisation and technological advancement of machinery in the agricultural sector, globalisation, the EU single market and bureaucratic governance of member states. The continuity of change and exacerbating negative factors such as an often destitute and negative returning marketplace, adverse weather conditions coupled with high input costs of production and financial pressure have resulted in many farmers health and safety been put at risk and the following will outline the reasons for this.

### **2.2.1 Crisis Point**

Ireland is currently recovering from its most disastrous year of farm related deaths since 1991 (Oireachtas Report, 2015), with 30 people having lost their lives on farms in 2014. It is well known that farming is one of the most “hazardous occupations in terms of the incidence and seriousness of accidental injuries” (Glasscock et al. 2007, Eklof et al. 2007). Since 2010, there have been a high number of farm deaths each year culminating with an 87% increase in 2014 contributing to 55% of all work related deaths (HSA, 2015). Although the number of people employed and active in farming has fallen significantly over the last two decades (Hanrahan, 2013), the number of farm fatalities has risen disproportionately. The problem is not curtailed to Ireland however as within the EU 1,000 people are killed on an annual basis while undertaking farming activity (Oireachtas Report, 2015). These deaths are far reaching and have adverse effects, not only on the farming family which encompasses 97% of all farms in the EU (Davidova and Thompson, 2013) but also on the wider close knit community that farmers are often part of which consequently inhibits community harmony, community development and social capital. A comparative analysis of farm deaths at an EU level does not exist (Meredith, 2010). The Common Agricultural Policy budget for the period 2014-2020 stands at €408.31 billion (EC, 2013). This budget equates to 68% of the total EU budget for this time period but no working legislation or EU body exists on farm safety. This is inconceivable when the number of deaths in the agricultural sector stands at over 1000 per annum (HSA, 2012). Some statistics do exist on the number of farmers killed in farming and shows that Ireland is lagging far behind; the death rate per 100,000 of population working in agriculture is 10.8 in Great Britain, 15.8 in Germany, 12 in France, 14.4 in Italy and 4.2 in Spain while Ireland remains higher than these at 22. The HSA (2012) report that the average rate of farm fatalities in the EU is 12 per 100,000 but is over 30 in some EU countries. It is very hard to comprehend how this sector which receives the greater majority of EU funding is allowed to be legislated at a national level without been overseen by the EU and that little research exists on the matter. The figure adjacent shows the prevalence of farm deaths from 1993- July 2015.



**Figure 1 - Incidence of Farm Deaths 1993-2015 (HSA, 2015)**

### **2.2.2 Rural Sustainability Threatened**

Sustainable development has been defined as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (Brundtland, in Cantor, 2011). Moving away from this ‘one fits all’ definition, it is more important to look at the sustainability of rural areas and agriculture in this as a continuum of development in the rural but also as a threat to human development that is often not looked at. The sustainability of agriculture in rural development on society, especially family farms has investigated ‘self-sufficiency; quality of life and social stability; rural economy, landscape’ (Borch, 2007). However, no report was found to have directly linked rural sustainability with farm injury and deaths

### **2.2.3 CAP Reform 2013 – Rural Development – Extra Pressure on Farmers**

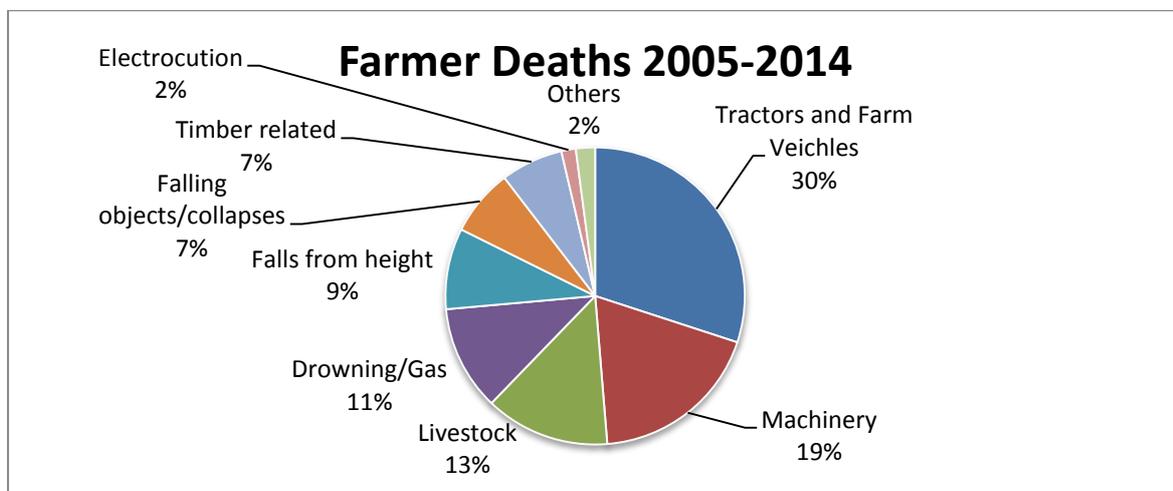
Many farmers must now undertake environmental and biodiversity conservation (Howley et al. 2011) as farmers are no longer just looked as producers of food and fibre but as custodians of the countryside as rural restructuring has turned rural areas into places of consumption as well as production (Farrell, 2008). The administrative and ever changing policy of the CAP makes it difficult for farmers to adapt to the agricultural landscape of the day increasing the amount of pressure already felt by farmers. The CAP has gone through many reforms in its over fifty year lifespan, most notably the MacSharry Reform of 1992, the Mid Term Review of 2003 and the 2013 CAP reform that looks ‘to further strengthen the relation between agricultural production and environmental responsibility by explicitly linking up to 30% of the direct payments envelope to greening practices’ (Boulanger and Philippidis, 2015). The

new RDP 2015-2020 has been criticised by farmers for reducing their historical Single Farm Payment through convergence and introducing the new Basic Payment Scheme and Greening payment which has undoubtedly been hard for farmers to adapt to. These schemes inherently mount pressure on farmers and may have incremental impacts on their day to day activities with less money available to the farm (Atkin, 2011). Howley (2012) affirms that the direct payments farmers receive enables them to modernise and invest in their farm and any reduction in this could inherently threaten safety.

## Section 2

### 2.3 The cause of farm accidents

As already stated farming is an extremely hazardous occupation. There are many reasons for farm related accidents and injuries which include “tractors and farm vehicles, machinery, livestock, drowning and gas, falls, crushing, timber related and electrocution” (DeRoo and Rautiainen, 2000). The figure below shows the primary causes of accidents resulting in death on farms in the figure below.



**Figure 2 - Farm Deaths 2005-2014 (HSA, 2015)**

The same factors account for farm deaths in nearly every report and even have a direct correlation between countries. For instance, looking at a report on death on U.S farms - there is a direct connection between the percentages of people killed using farm machinery and tractors (Myers et al. 2009) as in Ireland (49%).

## **2.4 Accident and Injury**

Inherently when one thinks of farm health and safety or safety campaigns – farm deaths come to mind but as is evident from the following section, the greater number of farm accidents do not result in death but their effects are everlasting. Ireland has seen a huge fluctuation in farm injuries in the past with 2,459 per 100,000 reported in 2011 which was up from 1,815 in 2006 but down from 5,000 in 1991 (McNamara, 2012). The increase in the 2011 figures may well be related to an increase of people returning to agriculture having lost jobs in other sectors following the recession. These physical injuries often have life changing effects which are everlasting and can lead to problems with mental illness which will be addressed in section 2. Meredith et al. (2010) indicates that ‘little empirical research has been publicised concerning farm fatalities in Ireland’. His working paper came at a time when farm accidents had consistently declined since the late 1990’s but the fatality rate per 100,000 had risen from 15 (1997-2001) to 22 (2005-2009). Added to this, the 2010-2014 incidences of fatalities are quite distressing with a 48% rise on 2005-2009 figures to 30 per hundred thousand.

The incidence of accidents of farmers in a lifetime has been shown to be quite high as Harrell (1995) reports 60% of respondents incurring at least 1 injury requiring medical attention. Harrell (1995) asserts that the longer a farmer spends working (hours) the greater the chance of an accident occurring and that full time farmers are more likely to incur an accident than part time farmers but this is contrast to Ireland where it was found that farms classified as full time have over twice the inclination of incurring injury than part time farmers (McNamara, 2012). Pfortmueller et al. (2013) reports however that the majority of accidents could be avoided if simple preventative measures were taken on the farm prior to undertaking farm activity and the HSA (2012) state ‘most farm injuries are predictable therefore preventable’. Pfortmueller et al. (2013) attributes a multitude of agricultural accidents to ‘seasonal tasks that have to be undertaken quickly to take advantage of favourable weather conditions, leading to long working hours and subsequent sleep deprivation- factors that significantly increase injury risk’.

### **2.4.1 Disability**

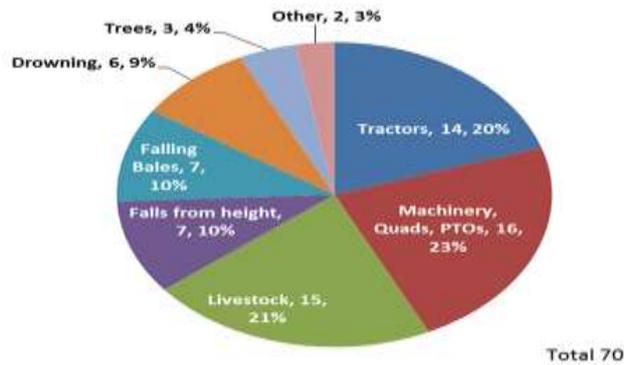
Disability was reported on 19.5% or 23,332 of Irish farms in 2001 and the farm operator accounted for 39.5% of those disabled of which 70% of the incidence of injury occurred due to a farm accident (McNamara, 2007). McNamara (2007) continues that younger farmers were at lower risk of disability or injury from farming than older farmers. Ireland has

changed dramatically since 2007 and the agricultural sector has intensified production significantly. Looking at America as an example of a country that is far more intensely farmed than Ireland older farmers have a lower overall injury risk compare to farmers under 55 as they are the ones who use specialised equipment and machinery (Myers, 2007). However, where farm injuries occur to this age category the injury is more severe and results in more deaths to this age category

## **2.5 Who is at risk?**

### **2.5.1 Male Dominated**

Farming is a male dominated and controlled occupation due to the family farm, by rule passed down from father to son ensuring that the patriarchal structure of the farm is preserved (Brandth, 2003). Thus the greater majority of farm accidents and deaths occur to this cohort of the agricultural community. A report by Meredith (2010) indicated that farmers over the age of 55 were far more at risk of fatality than those of a younger age. Casey et al. (2014) investigation of farm related trauma is compatible to the Meredith et al (2010) and Griffin et al. (2014) statistics in that age and male orientation are central issues to the fatalities. In the research period (2005-2011) there were five farm related deaths recorded in Castlebar General Hospital County Mayo – all male with an average age of fifty three years. Four of the five were livestock related which is in keeping with the beef sector that is prevalent in the west and nationally livestock accounted for 21% of deaths of farmers over 65 between 2005 and 2014. 104 of the 130 non-fatal farm injuries were male, which indicates that male farmers are far more susceptible to injury (Casey et al. 2014). This can be aligned that more men are involved in the agricultural sector but there must be an issue with psyche or mentality towards farm safety, especially towards handling animals and the prevalence of suckler and beef farming in the West of Ireland.

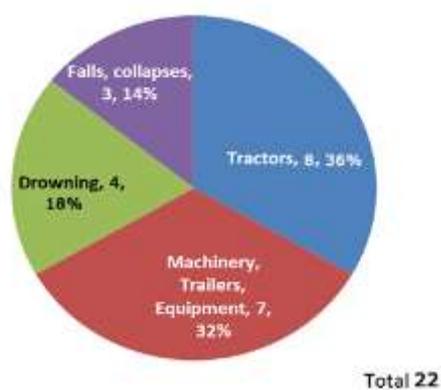


**Figure 3 - Farm Deaths of Farmers 65+ 2005-2014**

### **2.5.2 Family Farming – Most Vulnerable at Risk**

Family farming is defined by The Food and Agricultural Organisation of the United Nations as an “agricultural holding, which is managed and operated by a household and where farm labour is largely supplied by that household” and within this context, the family farm concept encompasses 97% of the 12 million farms in Europe (Davidova and Thomson, 2013). Children within the family farm setting have been cited as playing an integral role in the daily operation of many farms but “youth working in agriculture have a 3-fold greater risk of death than young workers in the private sector” (Berg et al. 2005). Ireland has witnessed the untimely passing of 22 children due to farm deaths between 2005 and 2014 (HSA, 2015) of which causes can be seen in Figure 4 below. The tragedy these deaths leave behind is unimaginable and child safety must be prioritised. Berg et al. (2005) report that parent’s perceptions of risks on their farms directly correlate with the exposure of their children to farm hazards. Farmers who do not perceive an activity to be hazardous themselves are more likely to let their children undertake that activity or “the extent of their child’s involvement in that work” (Berg et al. 2005). Elkind (1993) reported that even if farmers perceived an activity to be hazardous, farmers would not change their working practices in order to be safer and prevent injury, which would also put their children at risk. Lee et al. (1997) offers that farmers engage their children in work to have positive effects on them such as “the desire for a child to gain work experience, develop a strong work ethic and build self-confidence” while showing them operating styles in order to gradually pass farm ownership to the younger generation. This literature stresses the importance of keeping children safe on the farm but shows that there is a direct correlation between the safety behaviours of parents and their children with farmers who engage in unsafe practices directly putting the lives of the

wider family at risk. Regulation of children primarily comes from their parents and children mimic what they witness from a young age. As was seen in Denmark, behaviour of children towards sun exposure and protection on farms was directly correlated to the behaviour of their parents, namely their mothers in the case of applying sun cream (Larsen et al. 2014). As we can see, cognitive behaviour has a huge bearing on the way people learn farm safety practices and the way farmers behave throughout their life may indeed stem from childhood. It is also noted that the death of somebody within the farm family due to a farm accident has devastating effects on the relationship causing distancing factors in the family and blame (Rosenblatt, P. and Karis, T. 1993).



**Figure 4 - Child Death 2005-2014 (HSA, 2015)**

### **2.5.3 Correlation of injury between economically positive and negative farms and safety**

A Canadian based report into economic worry on farms and safety risk consequently revealed that farmers with high levels of economic worry correlated with higher rates of risk on farm and those with low levels of worry vice versa (Dosman et al. 2013). The report also suggests that the financial situation of a farm corresponds to the decisions the farmer makes, with those with the ability to spend more on safety measures at lower risk of accident. This report is well grounded in its research and if it is equated to the Irish agricultural sector it is very worrisome but may answer some questions surrounding the high levels of farm accidents. In 2013, only 35% of Ireland's farms were viable, with 32% classed as sustainable and 33% as vulnerable (Hennessy et al. 2013) which constitutes to 65% of farms been unviable without monetary resources supplied from another entity such as off farm income. Connecting economically positive and negative farmers with farm safety may provide valuable information on health and safety as well as the behaviour of farmers. Disability also plays a

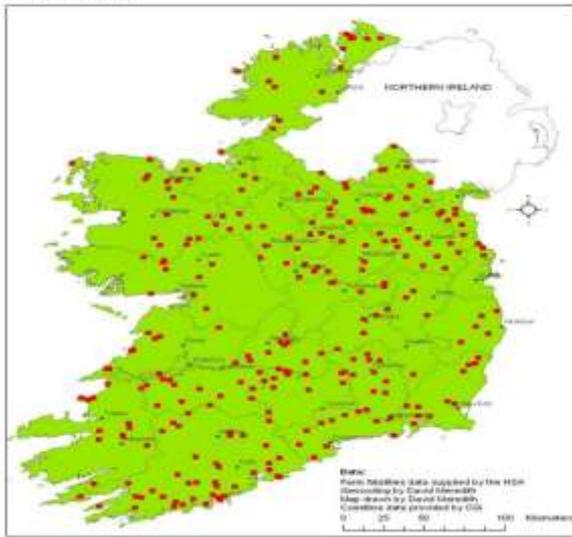
role in that Family Farm Income is on average €2429 lower where a farm operator was disabled and the farm had a higher dependency on direct payments receiving on average €1050 more in subsidies (McNamara, 2007). A concerning but very much relevant issue surrounding farm safety that is raised by Elkind (1993) is that farmer's economic state often overshadows safety concerns. This would be in keeping with deaths of Irish farmers which are concentrated around times of harvest and handling livestock for movement for market. Elkind et al. (1993) remarks that only 22% of surveyed farmers were more concerned about health and safety than the price received for their product. The research suggests that as farmers strive to make a profit on their product, they are consequently putting themselves and those working with them at risk of accident.

#### **2.5.4 Dairy farming – The most at risk**

Dairy farming has long been a pivotal pillar of the agricultural sector in Ireland. Its grass based system of producing milk has placed its fresh, green, healthy image as a world leader in the dairy sector. The sector continues to be the most profitable in Ireland with an average income of 68,000 (Hennessy et al. 2014). Dairy farming demands many farmers to work full time on the farm as their system of production is extremely labour intensive. However, with this intensive work load is aligned with weighted pressure and therefore adverse effects. Dairy farmers have been increasing production, accessing land and attaining finance in order to expand and maximise production as quotas were lifted. A huge superlevy faced by farmers in 2015 imposed by the EU, a volatile milk price in the recent post quota era and pressure to increase milk output by 50% by 2020 is a challenge that faces each farmer (Farrelly, 2014). These mounted pressures reflect the dire number of farm deaths that occur on dairy farms. The harrowing fact is that 57% of farm deaths occur on dairy farms although they only account for 17% of farms in the country (Griffin, 2013). Nationally, counties with the most productive land have been used for dairy farming (Matthews, 2007). As can be seen from the map below, a great proportion of fatalities have situated in these counties of Cork, Tipperary, Westmeath, Cavan, Longford and Meath. Cork has been consistently poor having recorded 6 farm deaths in 2013 and 2014. Cork has seen 14 people lose their lives on farms in the last 3 years. This may be due to a huge increase in milk output in recent years as the country waited for the abolition of quota (2015) and the ambitious Food Harvest 2020 targets of the government. O'Connor and Kane's (2014) report on dairy farming in the county reveals 'Cork is estimated to account for approximately 30% of growth in milk output nationally by

2020'. These figures are worrisome as an increase in output may well align with an increase in deaths as can be seen historically in the figures below.

**Distribution of Fatal Farm Accidents  
1993 - 2007**



**Estimated Number of Dairy  
Farmers per County\***



**Figure 5 - Distribution of Farm Accidents 1993-2007**

**Figure 6 - Estimated Number of Dairy Framers Per County**

### Section 3

Having discussed many of the challenges that affect the agricultural sector, the following discusses the behaviours and attitudes of farmers towards their working environment and subsequently the psychosocial dispositions that underpin how they perceive safety practices on farm or lack of which have a fundamental impact on the health and safety of those engaged in farming.

#### 2.6 More than an Occupation – Socio Cultural Context of Human Behaviour

It is evident that farmers are at a higher risk of injury and death in their occupation than in other sectors, so why do they continue to farm? Reed (2004) implies that farming is “in the blood” and she reports that farmers would never think of leaving the farm, even after the loss of a limb due to a farm related accident. Willock et al. (1999) reported ‘Farmers are usually highly satisfied with farming as a way of life and enjoy greater job satisfaction than other professions’. ‘A farmers person, role, and social identities are complex, dynamic, and often context specific, (McGuire et al. 2013) and therefore there reasons for continuing to farm even though they are at risk of injury and often returning negative equity with high reliance on subsidies – is complicated. Identity is extremely important to farmers and is based

inherently in their behaviours and attitudes. Sulemana and Harvey (2014) believe identity centres around how farmers see themselves and how they think others perceive them while adding 'social factors and public image' are of huge importance to farmers. As we can see farming is more than an occupation and often a lifestyle choice and identity of many. Farmers attribute a significant importance to the community based networks, conventions and practice (social capital) that underpin their livelihoods and also cultural capital which is what farmers define to be a good farmer (Macken-Walsh, 2009). Lucas (2010) offers that humans are social learners, are inherently co-operative and their decision making is constrained and not rational meaning farmers behave in the way other farmers do and do not act alone. There is obviously a deeper connection at farm level between a farmers desire to continue this occupation despite been 8 times more likely to die while working than in other occupations (HSA, Oireachtas, 2015). Farrell et al. (2010) adds to this argument of identity affirming that many farmers have a tie to land that cannot be broken and that although many have an opportunity to diversify to a multifunctional enterprise through forestry which predominantly yields a greater income – this option is never explored. An interesting article by Saugeres (2002) which may add an unconventional reason for farm accidents is the relationship between masculinity and agricultural machinery – namely tractors which reproduced through everyday discourse and practice' may inhibit male farmers from perceiving actual risk around them and as seen in studies, complacency and perceived control have played huge roles in affecting farmers safety and a main causation of accidents.

## **2.7 Behaviours and Attitudes**

Research on the behaviours and attitudes of farmers towards farm safety have indicated that they play a huge role in the incidence and demographic of farm trauma and fatalities. To begin with, the individuality of farmers having to manage in most instances, all aspects of the farm enterprise, potentially allows "psychosocial factors such as stress, personality, and attitudes to exert a greater influence on task planning and performance" (Glasscock et al. 2007). The self-regulation and individuality that most farmers encounter in their daily working lives has a huge bearing on farm deaths as 85% of those killed in agriculture are self-employed (HSA, 2015) and indicates this cohort of farmers may have a casual mind-set towards farm safety. Willock et al. (2000) adds that behaviour and decision making are influenced by attitudes, risk taking, innovative attitudes, environmental attitudes, satisfaction with farming, stress and attitudes towards legislation. The self-regulation of the sector means that farmers often have nobody to liaise with regarding the way in which they undertake tasks

and it is their own instinctiveness applied inherently. ‘Inducing behavioral change not only involves imparting knowledge and skills, but also involves changing established habits, altering well-established attitudes and beliefs, and preparing the person to handle reactions from others toward the individual following change’ (Hemsworth and Coleman, 2002).

### **2.7.1 Mental Health problems**

Having discussed the potential physical defects of farming, there are attributed mental illnesses that stem from physical injuries and stand-alone mental illnesses. These problems can have a considerable influence on the behaviour and attitudes of farmers. Fraser et al. (2005) investigative literature of 52 papers regarding mental illness in the farming population presented that farmers health may be adversely affected due to the ‘physical environment, structure of farming families and the economic difficulties and uncertainties associated with farming’. The paper discusses the farm as both a workplace and homestead which can have negative implications on mental health which in turn can have a negative effect on farmers’ safety while working. Cleary et al. (2012) suggested that many practices that Irish farmers engage in are detrimental to their health as the cultural acceptance of alcohol, stigma of mental illness and availability of support for mental illness is low. Social exclusion is rife they add with 80% of their surveyed population having reported a history of service contact for psychological problems with three men having sought assistance for suicidal behaviour. These issues have severe implications for health and safety as those of unsound mind possibly operating a farm machine under the influence can have untold negative implications. Mental illness can be related to the question of stress and physical injury due to a farm accident and as Goffin (2014) reports mental illness has a direct correlation with physical injury. To take it one step further again, ‘Disability may have an impact across many facets of life, with roles, habits and routines significantly altered following disability’ (Kinsella et al. 2009). Kinsella et al. (2009) continues that behaviour of farmers can be altered significantly by disabilities – the agricultural sector reporting the highest number of disabilities of any sector in Ireland with rural farmers having lower access to health care services, professional services and community facilities leading to personal anxiety and distress amongst those with disabilities. As is evident there is a clear indication that mental illness, alcohol dependency and stress can have serious repercussions on physical injury caused on the farm and these variables can be reversed and behaviour is therefore impacted by these elements.

### **2.7.2 Cognitive Behaviour: Contributory factor**

Cognitive behaviour refers to the way in which ‘a person learns to act and think in certain ways as a result of their lifetime experiences and how they perceive those experiences – this learning is a life-long process’ (ICP, 2015). As seen in section 2.5.2 there is a definite connection between how a child behaves on farm and their attitude towards safety and how their parents themselves act as Berg et al. (2005) adds parents’ negative perception of risk directly influences the safety of their children. Evidence that cognitive behaviour may have an important role in these behaviours and attitudes is reported by Bock and Shorthall (2006) ‘that narratives and beliefs associating working conditions with a way of life meant that workers tended to continue in work conditions that were detrimental to their health because “it’s your whole way of life”’. These studies show that there is a direct influence with how a person has acted all their lives and how they learnt to act. Improper practices on farms in the days before the drive for safety seen in the last number of years may still have an impact on farm injuries and deaths. This may relate to older farmers 55 years or over who consist of 51.4% of farmers nationally and farmers 65+ culminating in 36% of farm deaths between 1993 and 2014 (CSO, 2010).

### **2.7.3 Behavioural Change: Trigger Events**

It is reported that it is often an accident or injury to the farmer or someone they know that evokes behavioural change of farmers towards farm safety (HSA, 2014). If applying Burton et al. (2012) conceptualisation of change processes in farm decision making, these events may be called ‘trigger events’. A trigger event may be an injury sustained by the farmer or someone they know or a close call that makes them question their safety which makes them look at their safety more closely. This event then instils a change of behaviour or attitude in the farmer towards safety on the farm. It must be added these ‘trigger events’ can have detrimental effects on farmers health as so many percentage of accidents result in bed nights in hospital while 10% of physical injury results in amputation of some sort (Kinsella, 2009). Farmers continue to risk their livelihood’s and these trigger events may indeed cost them everything before they can implement change. Therefore a behavioural implementation programme is needed which looks to provoke or influence a change in the mind-set before such tragic trigger events happen.

## **2.8 Risk**

Farming is a risky business. On a daily basis farmers are faced with risk – adverse weather, unpredictable animals, machinery and market prices to name but a few which the farmers has little or no influence over (Charlwood and Byard, 2014). Albeit this, farmers continue to risk their lives over elements that they can exert safer practices to reduce this risk. Risk is an element of farming that changes from farmer to farmer and domain to domain as behaviour and attitude varies. It is noted in Chapter 1 1.7 a study (Elkind, 1992) found only 22% of farmers classed health and safety over economic return and Hansson and Lagerkvist (2012) state that risk is directly relevant to economic benefit while ‘decision making under risk is based on their beliefs, which are formed by their perceptions’. Perceptions or how farmers perceive their safety has been researched amply but a void exists on the subject in Ireland. Arcury et al. (2002) investigation of perceived risk and perceived control over farmers safety offer that persons must perceive themselves susceptible to risk before they will take action and suggest that perceived control, not perceived risk, leads to action. This indicates that although farmers are aware of risk, they must firstly put themselves in a situation where they are at risk before they perceive the situation is out of control and thereafter act upon it. These farmers also produce less than risk averse farmers while the price received fluctuates greatly and risk takers are more likely not to adopt new agricultural technology (Aimin, 2010). However all farmers do not look to put themselves in risky situations and Clay (2015) asserts that ‘farmers find themselves in risky situations rather than engaging in risk-seeking behaviour per se’.

## **Section 4**

### **2.9 Introduction**

Having discussed the causation, reasoning and other relative literature pertaining to farm safety, behaviours, attitudes, beliefs and so forth the next section will examine how farm safety intervention programmes have been implemented before and how successful their different aspects have been .

### **2.9.1 Farm Safety Interventions**

A safety intervention may be defined as ‘measures deliberately applied to decrease the frequency or severity of accidental injuries in the work place’ (Dyreborg et al. 2015). These intervention programmes aim to change attitudes and behaviour through safety campaigns and/or training and can combine safety climate, attitudinal, behavioural or structural components (Dyreborg et al. 2015).

### **2.9.2 Behavioural Interventions**

“Understanding how behavioural interventions create change is a fundamental ingredient for translating public health and safety intervention research into everyday practice” (Arcury et al. 2013). The behaviour, attitude and beliefs of farmers play a huge role in farm accidents and therefore these dispositions merit examination especially in the overall context of this research paper. Arcury et al. (2013) believe there are three integral factors to be considered if behavioural change is to be created/formed. The first is that for an intervention to be successful, it must be built around theoretically informed targets which are believed to be important in order to achieve change. These targets are based on health behaviour theories, the perceived severity of health threats or consequences of unchanged behaviour and farmers beliefs about their ability to change behaviour. The target population of the intervention play a critical role if it is to come to fruition and they will vitally influence the effectiveness and final product. Although the target population play a vital role, the success of such a strategy is often based on “the qualities of the intervention vehicle shape”. Pilot projects are needed to fuse an intervention strategy, target population and mentors of such a project. Such pilot projects can give a significant grounding both in terms of a policy perspective in distributing it nationally and in a psycho-social capacity in changing behaviours and attitudes of people.

### **New Direction For Intervention Programmes**

Farm safety intervention strategies in Ireland have taken many forms in the past but most notably through the dispersal of safety material through newspapers, DVD’s and signage to raise awareness. Although these materials are welcoming they are purely prescriptive, telling farmworkers how to behave, but they fail to tell how behaviour’s will reduce risk and subsequent injury and death (Arcury et al. 2002). Elkind (1993) believes that farm safety campaigns have often not got to the root of farm safety problems and states farmers must be addressed in some capacity at their workplace. DeRoo and Rautianien (2000) review of 25

farm safety interventions noted that they ‘generally involved farm safety audits, environmental or equipment changes and/or safety education’ but many fell down on the design of their education strategy. Some interventions have looked to incentivise farmers with monies for safety and technological advancement (Lundqvist 1996) and reported a 22% decrease in injury rate while others have included farm safety training and safety visits from the intervention co-ordinators (Rasmussen et al. 2003) which recorded a 30% decrease in injury rate. Eklof et al. (2007) offers that because farmers have to develop, plan and solve their and others safety, and “the support of fellow farmers and arenas for safety development could be beneficial”. They add that alternative intervention methods must be tested and motivation of attitude and behaviour evaluated over a longer time period. Hovden et al. (2010) states that intervention programmes are still based on concepts formulated in the 80’s and 90’s and have not moved with the times and new concepts of interventions are needed.

### **2.9.3 The Certified Safe Farm Programme**

A highly successful farm safety intervention programme that has emerged as a forerunner of intervention strategies in agriculture is that of the Certified Safe Farm Programme (CSFP) (Donham et al. 2007). The success of this CSFP is due to its multifaceted approach as it ‘incorporates several modalities, theories and principles of intervention and health promotion’ from the agriculture sector, the health and safety sector, insurance and the occupational health sector. The CSFP included ‘an occupational and wellness health screening, education, an on farm safety review and incentives based on achieving safety standards’. Results from the programme showed that farmers who gained the highest CSF status of 96% or above saved \$275 on medical costs stemming from illness and injury than control farms and after year three 97% of farmers had gained CSF status having improved the safety scores year on year by making safety improvements. The study is validated by its ability to correspond safer farms with lower incidence of injury and illness costs.

### **2.9.4 Understanding of Irish Farm Behaviour**

Understanding the behaviours and attitudes of farmers towards their health and safety is an issue that is severely lacking in Ireland. Studies have looked at farmers behaviour and attitudes but have predominantly been on farm animal welfare schemes (Dwane et al. 2013), suicidal behaviour (Cleary et al. 2012), indebtedness of farms (Howley, 2012) and economic – the effect of decoupled payments on farmers behaviour (Howley, 2012). A study by Griffin

et al. (2014) has not been fully published but its results section is available which studies the behaviour of Irish farmers towards risk taking. However this is the only such report that looks at farmer's safety behaviour in Ireland. As Blackstock et al. (2010) affirms that in order to evoke a behavioural change there must be an understanding of the existing behaviours and how advice can 'help influence behavioural change' which is limited in Ireland. Advice is something that farmers have no shortfall of as it is attainable through all different forms such as extension advisory services, safety authorities, hardcopy form and internet to name but a few. However as Blackstock et al. (2007) notes advice is 'interwoven with other elements influencing farmer decision making and behavioural change, farmer's capacity to change and their willingness to change which all need to be examined in more depth.

### **2.9.5 Applying a Behavioural Theory**

Many theories have been applied to farmers' safety behaviour in past reports ranging from The Integrative Agent-Centred Framework Theory (Feola and Binder, 2010), The Health Belief Model (Nahar et al. 2013) and the Theory of Planned Behaviour (Colemont, 2008, Beedell and Rehman, 1999 and Donham, 2010). There are contrasting views to whether or not a theory can be applied to behaviour with some expert's believing human behaviour cannot be measured through a model or behavioural theory and reiterate that a contextualisation only suffices to explain behaviour (Madsen and Adriansen, 2004) while (2010) state an explicit and well-motivated behavioural theory is considered essential to investigate agents' behaviour and its relationship with system dynamics.

### **2.10 Conclusion**

It is clearly evident from this review of literature and Ireland's contemporary situation regarding farm safety that the country is at crisis point. Although there are many factors affecting farmers health and safety of which they have no control, on the contrary there are many that they have influence over but often do not exert this influence out of disregard for the possible effects and repercussions. The behaviour and attitudes of farmers are a facet of a complex social phenomena that have not been addressed adequately in respect of the agricultural sector in Ireland. It is acknowledged that many organisations are doing their best to reduce the incidence of accidents occurring at farm level but the frequency of these events is far too high. Each farm fatality has exponential consequences for the families of the victims but also for the community where they reside which inhibits community spirit, social

capital and the sustainability of rural areas as the effects are far-reaching. Having consulted the research available on the subject of farm safety, it is evident that a paradigm change in the way farmers approach the subject is needed with a clear focus on changing the behaviours and attitudes essential.

Writing this, 10 farm deaths have occurred in Ireland until the month ending July 2015 and if evaluating past figures the number of projected deaths will be from 15-20. These numbers are distressing to anybody involved in the agri. sector. There is need for a new farm safety intervention programme; one that does not only descriptive but that seeks a change in the way health and safety is approached and not waiting for an accident to happen before change is implemented.

## **Chapter 3 - Overview of the Farm Safety Mentor Programme and Irish Rural Link**

### **3.1 Introduction**

The following section gives an overview of the Farm Safety Mentor Programme (FSMP) and Irish Rural Link (IRL) who co-ordinated the programme. It gives an indication of why the programme was undertaken and the activities that the mentors of the programme engaged in. The reasoning behind the programme is outlined before moving on to the methodology of the study at hand.

### **3.2 Profile of the Farmer Safety Mentor Programme**

In 2012, Irish Rural Link, in partnership with the Health and Safety Authority developed an intervention programme to tackle the increasing number of injuries and fatalities occurring in the Irish farming sector and specifically the accident black spot of the pilot area. They believed there was need to change the way farmers perceive their safety and the safety of others while subsequently looking to exert influence on their behaviours and attitudes. The programme recruited thirteen farm safety mentors from the counties of Westmeath, Cavan, Meath and Longford and these mentors (farmers themselves) were advocates of farm safety. They were both male and female and received a FETAC level 6 farm safety course from Teagasc before returning to their respective areas where they would become ambassadors for farm safety at local level. The FETAC level 6 course was designed to:

1. Communicate farm safety measures
2. Help farmers complete farm safety statements
3. Transfer skills, insights and knowledge helping to become a professional in farm safety

Following the training, each mentor had to perform 8 activities over the following 9 months which happened individually but also collectively with the other mentors. Activities the mentors engaged in included:

1. Setting up of local farm safety discussion group

2. Speak at discussion group events
3. Modification to farm yard re safety
4. Undertake farm safety walk
5. Assist other farmers with farm safety statement / update
6. Farm yard safety sign distribution
7. Schools (primary/transition year) talks/competition
8. Assist at Ploughing/other events
9. Interviews / articles local media
10. Social media, computer app- etc.
11. Promoting farm safety awareness fortnight
12. Farm safety annual conference support
13. GL Nobel Denton (Understanding Behavioural Change) participation and Irish Farm Health Study 2013.

The programme was the first of its kind in Ireland with farmer to farmer peer influence and evaluation been the key driving component of the programme as it looked to alter the behaviours of farmers in each catchment area. It was thought that a farmer to farmer system of safety evaluation in farmer's place of work would be more beneficial and influencing than a more bureaucratic style of implementation carried out by other agricultural and government bodies. This bottom up approach of implementation and endogenous development has shown to be integral in addressing rural issues throughout the EU (Marsden and Ploeg, 2008). Farmers normally have strong networks and are respected amongst their peers which would give added value to farmers themselves been mentors. The farming community has always been strong, closely knit and very supportive of each other and this programme seen this as an opportunity to take advantage of this. The slogan of the programme was to 'sow the seed of Farm Safety' in the mind set of farmers. Just as farmers must sow seeds in order to grow crops and raise their animals, there is as vital a need to engrain the message of safety in the psyche of farmers also.

The FSMP was also innovative and secured discounts when purchasing safety equipment. The programme innovatively manufactured a remote iodine dispenser prototype, improved all in one calving gate design, produced a retractable front spike and a slurry gas anaerobic digester was in the process of manufacturing at the time of research.

A proposal sat at the time of this research sat with the Department of Agriculture Food & Marine with the view of IRL being to rollout the programme in the counties of Cork and Tipperary – so called black-spot areas that have had high numbers of farm deaths in recent years. The programme would be managed in a professional manner, with clear targets, mentor supports and overall co-ordination.

### **3.3 Irish Rural Link**

Irish Rural Link (IRL) is a national organisation representing the rural communities of Ireland. It represents the interests of these communities that are often situated in disadvantaged and marginalised rural areas. It is a non-profit organisation whose remit is to highlight the problems of rural Ireland, lobby government and policy and work with other organisations throughout the country. Its ethos is to develop a sustainable rural Ireland where society, the environment and rural development prevail and co-exist - all of which have suffered exponentially from the downturn in the economy in recent years. IRL represents almost 500 community and NGO's with membership surpassing 25,000.

## **Chapter 4 Methodology**

### **Section 1**

#### **4.1 Introduction**

Understanding the logistics of farm safety is by no means a straight forward phenomenon. This multi actor process is influenced by social norms, psychology, behaviour and attitudes with further forces at play which the farming community have no influence over. These actions and processes are fused and multi dynamic and therefore require to be researched through different techniques. The methodology will demonstrate the research structure and give an understanding of the processes implemented by the researcher in order to draw the results believed to answer the research question. Firstly the importance of conducting desk research and gaining an insight into secondary data will be expressed. Following this the philosophical stance held by this paper will be presented followed by the methods used to gather the data. The theoretical framework that underpins the research will then be evaluated before concluding remarks on the chapter will precede the data analysis/results chapter.

#### **4.2 Desk Research**

Firstly desk research was undertaken to gain a comprehensive review of the situation regarding farm safety, deaths and injuries on an international scale. Clifford et al. (2010) notes it is important to thoroughly review theoretical and empirical literatures and consult all the necessary secondary material available while moulding researching questions. This thorough examination of previous behavioural reports of the farming population offered relevant methodologies that could be recreated and adapted to this report. Having consulted all the literature available it was apparent that there was a considerable gap in the research area of farmer's behaviour towards health and safety in Ireland's agricultural sector. Quantitative data was readily available but the humanistic variables had been overlooked considerably. The secondary data examined was subject to the philosophical stance taken by the researcher which will be addressed in the next section.

### **4.3 Philosophical Stance**

Madsen and Adriansen (2004) believe there is need for a philosophical stance as a methodological segment of a research process when engaging in rural research where the philosophy deals with ontological and epistemological aspects of research and methodology of theory and methods. They state it is extremely important to engage with an understanding of the philosophical aspect as it provides us with methods for studying motives, values, preferences of the individual actors which are the underlying issues for agency and decision making. Farmers are an intrinsic part of rural areas in economic, cultural and societal terms and many elements of their lives must be investigated when looking at their attitudes and behaviour. As noted by Lucas (2010) in page 21 farmers are not rational and Macken-Wlash (2009) affirms that understanding existential rationality is instrumental for accounting for individual and social behaviour. Madsen and Adriansen (2004) and Macken-Walsh (2009) state it is important to investigate the 'relations between practice and values of rural actors where 'practice' refers to the land use by the actors and 'values' seen as the 'traditions, thoughts and beliefs'.

## **Section 2**

### **4.4 A Mixed Method Approach**

It is well regarded that using a mixed methods approach to research is welcomed in geographical studies, namely in the social sciences (Madsen and Adriansen, 2004). It was evident from the beginning of the research that there were other issues at play regarding farm safety and so a multi method approach was merited and Philip (1997) states that 'the combination of methods may allow a broader range of issues to be addressed during the course of conducting a research project than would be possible if exclusive use of either quantitative or qualitative methods had been made'. Curry (2009) also states that mixed methods are particularly helpful when formulating new lines of inquiry for new fields of research, because they allow more than one angle.

In terms of recommending towards policy change, if policy makers are to use findings of a study they 'expect methodologies to be standardised and repeatable and that they can be applied nationally' (Beedell and Rehman, 2000. Burton, 2004) They also express hazard at

subjective studies that only take into account a small number of farmers and believe that these are often not as ‘convincing or replicable’ in informing policy makers. Beedal and Rehman (2000) state that in order to evaluate why and how farmers behave it is imperative to examine ‘the policy structure facing farmers, the advisory/information services available to them and the feelings, motives and goals of the farmers themselves’.

Hardwick (2009) states case studies are most appropriate when a researcher wishes to utilise a set of mixed methods of data collection and analysis in order to bring out the viewpoints of multiple participants. Mixed methods are particularly helpful when formulating new lines of inquiry for new field’s research, because they allow more than one angle. Although quantitative data is important in assessing farm safety it falls short of explaining the behaviour and attitude of farmers towards risk taking for instance and the mentality behind this. It was also evident from the literature and especially in the case of Ireland that studies have predominantly been epidemiological and qualitative studies of behaviour have not been applied to the health and safety of farmers which gives merit to this study and its research question.

It was also noted that a comparison must be able to be made in order to possibly inform policy makers in the future and McKendrick (2009) states that employing a multi-method approach can ‘gain the confidence of an audience’. It has been argued that policymakers have been more wary of conclusions drawn from small-sample, in depth, qualitative investigations and that careful integration of complementary large scale quantitative survey results may be helpful in gaining the trust of an otherwise sceptical audience’. This reemphasised the need to undertake a comprehensive and stringent study.

#### **4.4.1 The Case Study Approach**

‘Many forms of social science research is undertaken through a case study – especially if the main research questions are how and why, a researcher has little or no control over the behavioural events and the focus of the study is contemporary’ (Yin, 2014). The focus of the study at hand was contemporary and the overall aim of the study was to investigate how, why and if the FSMP had an influence on the farming population of the pilot area while the researcher had no influence on the case study population. Indeed the study used a single case study model which was exploratory upon commencement of the research process but became

explanatory as the project proceeded which Hardwick (2009) states is often the most reliable and valid of case study research. ‘The case study approach is particularly useful to employ when there is a need to obtain an in-depth appreciation of an issue, event or phenomenon of interest, in its natural real-life context (Crowe et al. 2011). Hardwick (2009) states case studies are most appropriate when a researcher wishes to utilise a set of mixed methods of data collection and analysis in order to bring out the viewpoints of multiple participants. Expanding on Crowe et al. (2011) it was seen that meeting farmers at their place of work would be integral to gaining an in depth and comprehensive insight into their safety behaviour on a day to day basis. Madsen and Adriansen (2004) further add that ideas are better formed when data collection is performed in situ and by doing this, contextualisation of the overall subject been researched is better performed. Accordingly, a mixed method approach was applied to this investigation as it had been identified that previous reports in Ireland have often been overly focused on epistemological data and have disregarded qualitative data.

## **Section 3**

### **Theoretical Framework**

The following will outline the theoretical perspectives that have informed the development of the research question and give an idea of the way analysis was undertaken.

#### **4.5. Research Strategy**

This section will outline one of the most important aspects of the study. Having established a methodological framework and a mixed method approach to gathering data, Cope (2009) believes a strategy must be applied in order to conduct the data collection.

##### **4.5.1 Selection Process for Interview and Survey**

The FSMP is a multi-layered, multi-faceted and multi-actor system. Its vertical training system through Teagasc and horizontal mentoring system mean it has actor involvement of many levels. Accordingly, the programme developers were identified as those who would have the primary role in establishing the programme and their input would be required. These

stakeholders have a keen interest in farm safety and are advocates for change in the mind-set of farmers towards safety. Those that were identified for interview were:

1. FSMP co-ordinator, member of Irish Rural Link and farmer.

#### **4.5.2 Mentors**

The Safety Mentors were identified as those possibly having the most influence on the farming population in terms of inspiring change. Of the 13 mentors, four were randomly selected from a list including one woman from two in order to get a gender balance with equal representation from the four counties of the pilot area achieved. IRL had no influence on those who were selected having supplied a list of names and contact numbers.

#### **4.5.3 The farmers**

The end users of the programme and those to which the programme had tried to exert behavioural change were the farmers. It was believed the programme both directly and indirectly reached upwards of 10,000 farmers within the four county trial area and beyond. However, because the population the programme reached is undefined it made it problematic in accessing the demographic of farmers evenly. There was limited availability of contact numbers of farmers who partook in the programme. Contact details of farmers who partook in the BARE co shaft, chainsaw giveaway were supplied by IRL. 50 names were received and 15 names were drawn at random and selected for telephone questionnaire. The mentors subsequently provided additional contact details of farmers who they were involved with in their area.

#### **4.5.4 Expert View**

In order to generate a cohesive report, the examination of farmer's behaviour would not be valid without input from sources outside of the FMP programme. Therefore it was seen to be imperative to get the view of farm safety experts throughout the country who are professionals in the field. While undertaking the literature review, the names of those with a higher grounding in national advisory services were noted but also prominent members of the Farm Safety Partnership were selected. It was thought the knowledge these representatives hold would give an overall analysis of farm safety at a national level. As a thematic analysis would be used in order to evaluate their interviews, this data would be compared to the

mentors and farmers interviews and surveys respectively. Those that were selected and contacted for interview were:

1. Senior Inspector and Farm Safety Specialist within the Health and Safety Authority.
2. National Health and Safety Specialist with Teagasc.
3. Agricultural Extension Advisor. A past board member of the Farm Safety Partnership Advisory Committee with the Health and Safety Authority.
4. National Training Manager Farm Relief Services and member of Farm Safety Partnership.

#### **4.6 Data Collection**

Having identified the participants the study interviews and surveys were seen as the most appropriate method of data collection which took the shape of semi structured interviews and open ended surveys all of which were recorded. Interviews can be more valuable in terms of a deeper understanding of context and process (Cope, 2009) and it was more realistic to interview the farm experts and mentors because of the amount. Three (experts, mentors, farmers) different questionnaires were developed but the themes of the questions included were similar so that a comparative analysis could be undertaken of the different viewpoints. The questionnaires were developed in a manner that compliments evaluating the behaviour of farmers towards their health and safety but also explores other issues around farm safety which were necessary to research in order to gain a full insight of the subject. Desk research was undertaken to determine some of the variables of questions from other similar reports on this subject and it was evident that the questions of this report must be adaptable to those of other reports so results may be comparable and for further investigations on the subject in the future.

To assess the extent of FSMP the attitudes of the farmers were investigated as attitudes influence how a person acts or behaves thus influencing behaviour. The attitudes that were observed to have an impact on behaviour were intention, control, ability and risk taking. In order to gain an insight into stated behavioural change and the actual attitudes recorded towards intention, ability, control and risk – these four variables were weighed against stated behaviour to gain a better insight of farmer's actual behaviour. Subsequently other elements

of safety were reviewed such as training, signage, TAMS and safety mechanisms on the farm. These TPB was finally adapted to the results.

## **4.7 Method of investigation**

The format of the survey questionnaire was extremely important due to the elements of the programme investigated. Ideally such an investigation would be a follow up/progress/longevity report where the participants of the FSMP would have been investigated before and after their participation in the programme giving a non-prejudiced account of their actions. However as was the nature of this thesis study and time available, the only format achievable was a 'post evaluation' of behaviour. The study therefore relied upon the honesty of participants responses. However, it was believed one way of yielding honest feedback was to ask the farmer about general farm safety and their safety practices at the beginning of the survey which would explore their behaviours before later investigating the impact of the FSMP in the questionnaire. The questions can be found on page 100? and shows a general enquiry of safety before delving into the influence of the FSMP. The results are presented in a vice versa pattern with participants engagement in the FSMP stated first and the general investigation following.

### **4.7.1 The Questions**

Both the questions of the farmers and mentors began with an assessment of identity, farm system and hectares farmed. Age, gender, farm type and size all stuck out as important factors related to safety in the literature and needed to be assessed. The main aspects of these groups investigated included **intention** to work safely and the **ability** of farmers to do so. **Control** of safety was also evaluated and what would positively or negatively affect this. **Risk** was another facet of safety behaviour that was considered while **stress** and **safety precautions** were also investigated. Other factors that affect behaviour such as **safety signage, training and schemes** were also enquired about. Section 2 of the questions then looked at the FSMP including **perceptions of attitudes and behaviours, safety awareness, safety orientated and safety expectations**. The final question which was the same in the mentor and expert questions related to the **coupling of the BPS with farm training** and was looked at to draw some conclusions about direct payments and farm safety that had been

discussed at EU level in recent times. The questions of the three groups can be seen from 75 onwards. The questions were developed in such a way that comparisons could be drawn between the three groups and this was seen as imperative to the study as it would give an idea of the perspectives of those at the expert or macro level and those at the farmer and micro level. The expert questions would assess the elements already mentioned while also gave an in depth analysis of safety in the agricultural sector in Ireland and approaches to safety. These elements will be assessed by means of SPSS, thematic analysis and the farmers beliefs applied to the Theory of Planned Behaviour.

#### **4.7.2 A Map of the FSMP Pilot Area**

The pilot area of the programme extends through the midland counties of Westmeath, Meath, Longford and Cavan. As the counties border one another it was believed that a map would be created which would display different elements of the FSMP. Cartographic evidence is extremely important and ‘ we use our cognitive map to store information and knowledge about the world we know; we use our cognitive map as the basis for communicating information about the world as we know it; and we solve problems everyday by analyzing the spatial information we have stored in our cognitive map’ (Bell, 2009). The map presents elements of the FSMP such as:

- 1) The areas the mentors engaged in safety awareness
- 2) The areas where people have lost their lives from 2007-May 2012 and from May 2012 until July 2015

This type of map would show behavioural change within different areas and gives a more in depth understanding of human spatial behaviour and human spatial decision making (Bell, 2009). The map shows where the mentors resided and as a main priority of the programme was to transmit the message of safety to neighbouring and surrounding areas the map will illustrate if deaths have occurred in the areas where the mentors were active on the ground. Although conclusions may be limited from the map due to an unknown number of injuries in the pilot area, the geographic spread of deaths this visual aid offers may give an idea of the influence of the FSMP. It may present trends of safe and unsafe practices amongst farmers and areas which need to be specially targeted in terms of safety.

### **4.7.3 Identifying Participants**

‘A distinction is customarily drawn between qualitative and numerical identity or sameness’ (SEP, 2004). For the purpose of this paper, participants are identified using a numerical identification system which protects identity. They have been separated into three groups and are identified as follows: Farm Safety Experts 1-4 as FSE#1-4, Farm Safety Mentors 1-4 as FSM#1-4 and the farmers surveyed as FR#1-30.

### **4.7.4 Analysing Data**

As the study encompassed both a qualitative and quantitative approach to gathering data it was necessary to employ two methods of analysis. Quantitative data was analysed using SPSS while qualitative data by means of thematic analysis. SPSS is a comprehensive and flexible statistical package that analyses and manipulates complex data with simple instructions for interactive and non-interactive use (<http://www.spss.co.in/index.aspx>).

A transcription of each interview was undertaken. Transcripts were analysed using thematic analysis, which is a qualitative method of “identifying, analysing and reporting patterns (themes) within data (Braun and Clarke, 2006). The coded key word approach was then applied which involves reading the transcriptions thoroughly and assigning a code to each comment in order to identify themes or categories within the text. Patterns and themes throughout the interviews then protrude from the transcriptions and these factors are subsequently focused on. Due to the nature of this study Joffe (2012) offers that it is important to have prior knowledge of previous thematic findings in similar reports so one does not ‘reinvent the wheel’ but to also ‘take seriously findings that do not match with previous frames and have the potential to revolutionise knowledge of the topic under investigation’.

### **4.7.5 Theory of Planned Behavior**

Having considered the theories spoke about in Chapter 1, Section 3.5, the TPB was most appropriated to this study as it had been widely used to explain behaviour of farmers in the past (Colemont and Brouke, 2008) . The Theory of Planned Behaviour was examined and questions were formulated so that their results could be applied to the theory. In the context of the FSMP these questions were based on the farmers attitude toward the behaviour, the normative belief or how they or other farmers perceive one another’s behaviour and control beliefs which are the extent of which the farmers believe they have control over their

behaviour (Azjen, 1991). This theory affirms that when these three elements are taken into consideration this leads to an intention of behaviour. Taking these into consideration ‘the more favourable the attitude and subjective norm, and the greater the perceived control, the stronger should be the person’s intention to perform the behaviour in question’ (Azjen, 1991). The FSMP was said to have positively or negatively influenced farmer’s behaviour by the extent of change in attitude, subjective norm and perception of behavioural control and the programme was evaluated as a behaviour intervention programme. The quantitative data drawn from the farmers survey was used to adopt the TPB and a diagram will show the effect of the FSMP on the intentions and behaviours of the farmers and thus stating if it has worked.

## **4.8 Subjectivity**

Subjective knowledge was always analysed before entering the field as it was important not to show any bias towards answers of any of the questions been asked which may influence results. A non-biased and independent research method was always strived towards, however ‘no single method of conducting fieldwork provides unmediated, unbiased, and privileged access to the topic, place, and people under investigation’ (Bosco and Moreno, 2009). This is very true especially of the topic in question ‘farm safety’ as it is constantly in the public domain via media campaigns and social media.

### **4.8.1 Ethical Considerations**

Due to the nature of this study many ethical considerations were applied to this paper. To begin with research guidelines were consulted on the NUIG website and compiled with subsequently. The researcher undertook the study to the highest standards and every avenue and resource at the researcher’s disposal was applied. The consent was got from each participant interviewed and surveyed before the voice recorder was enabled. Each participant was reassured that the information given would be handled with the strictest confidentiality and their names would not be associated with any of the data within the text of the research paper. Name anonymisation was then undertaken which would respect the confidentiality of the participants and the use of pseudonyms were applied to comply with the assurances given to the participants.

## **4.9 Conclusion**

This chapter has highlighted the philosophical, methodological and theoretical frameworks implemented by this study. The format of the questions asked in the interviews and surveys are constructed in a way that comparisons can be made within this research, they are adaptable to other reports for comparison and formulated so a non-prejudiced account can be given by the participants. By utilising the mixed method approach, both the quantifiable and qualitative data could be assessed by using SPSS and a TA while appropriating the TPB was seen to give the study and the FSMP grounding amongst complementary reports. Having three sets of respondents sampled in the study, each important group were assessed from the macro to the micro level. Ethics were always followed and at no point was the anonymity of the respondents jeopardised. The transcriptions were transcribed from the voice recorder directly and coded appropriately. The intensive research design of the project was based on a single case study model of the FSMP and the defined pilot area was mapped as a visualisation of what is happening on the ground was seen as important.

## Chapter 5 Results

The following section will assess the 8 face to face semi structured interviews that were conducted and 40 open ended telephone surveys undertaken. There are four different sections to this study which investigate if the FMSP has had a significant impact on the behaviours of farmers in the FMSP pilot area. The questions asked to generate these results can be found in the appendices on page.

### Section 1

#### 5.1 County by County Evaluation of Farmer Participants

The following gives details the age, farm system and hectares farmed by the farming participants at the time of the study.

County: Westmeath								
<b>Age</b>	<b>20's</b>	<b>30's</b>	<b>40's</b>	<b>50's</b>	<b>60+</b>			
<b>Category:</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>1</b>			
<b>Farm System:</b>	<b>Dairy</b>	<b>Dairy and Other</b>	<b>Beef and Sucklers</b>	<b>Beef- and Sucklers</b>	<b>No Beef and Sheep</b>			
	<b>1</b>	<b>1</b>	<b>5</b>	<b>2</b>	<b>1</b>			
<b>Average Hectares Farmed: 78</b>								

County: Meath								
<b>Age</b>	<b>20's</b>	<b>30's</b>	<b>40's</b>	<b>50's</b>	<b>60'+</b>			
<b>Category:</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>1</b>			
<b>Farm System:</b>	<b>Dairy</b>	<b>Dairy and Other</b>	<b>Beef and Sucklers</b>	<b>Beef- and Sucklers</b>	<b>No Tillage/Livestock</b>			
	<b>3</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>			
<b>Average Hectares Farmed: 93</b>								

<b>County: Longford</b>									
<b>Age</b>	<b>20's</b>	<b>30's</b>	<b>40's</b>	<b>50's</b>	<b>60+</b>				
<b>Category:</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>1</b>				
<b>Farm System:</b>	<b>Dairy</b>	<b>Dairy and Other</b>	<b>and Beef Sucklers</b>	<b>and Beef-Sucklers</b>	<b>No Beef and Sheep</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>1</b>				
<b>Average Hectares Farmed: 75</b>									

<b>County: Cavan</b>									
<b>Age</b>	<b>20's</b>	<b>30's</b>	<b>40's</b>	<b>50's</b>	<b>60+</b>				
<b>Category:</b>	<b>0</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>2</b>				
<b>Farm System:</b>	<b>Dairy</b>	<b>Dairy and Other</b>	<b>and Beef Sucklers</b>	<b>and Beef-Sucklers</b>	<b>No Beef and Sheep</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>1</b>				
<b>Average Hectares Farmed: 59</b>									

<b>Total Pilot Area</b>										
<b>Age</b>	<b>20's</b>	<b>30's</b>	<b>40's</b>	<b>50's</b>	<b>60+</b>					
<b>Category:</b>	<b>2</b>	<b>6</b>	<b>10</b>	<b>12</b>	<b>7</b>					
<b>Farm System:</b>	<b>Dairy</b>	<b>Dairy and Other</b>	<b>and Beef Sucklers</b>	<b>and Beef-Sucklers</b>	<b>No Beef and Sheep</b>					
	<b>5</b>	<b>3</b>	<b>14</b>	<b>10</b>	<b>4</b>					
	<b>Mainly Sheep</b>									
	<b>4</b>									
<b>Average Hectares Farmed: 76.25</b>										

All counties recorded an above national average farm size which is 47 hectares (Hennessy and Moran, 2015).

## **Section 2**

“Very disappointing in 2014 and sad for all the families – most of the accidents were preventable. After a number of very successful years, it was disappointing after years of hard work by farmers, legislators and all parties concerned” – Expert3’s response to the farm deaths in 2014.

### **5.2 Attitude towards Safety**

The end users of the FSMP were the farmers and those IRL intended would be primarily affected by the programme. The participants of the survey had taken part in the FSMP at some capacity and the attitudes of these farmers were evaluated to see if behaviour had been influenced by the programme. As stated in the methodology, the process of attaining information on attitudes was done through a process of general enquiry of safety before analysing the contribution of the FSMP to these beliefs. The questions are available on page 100.

#### **5.2.1 Farmers Attitudes: Factors Affecting Safety - Intention, Ability and Control to Working Safely**

It was found that farmer’s intentions to work safely were predominantly positive as 30% reported a very strong intention to work safely while 70% had a strong intention to perform with safety in mind. No respondent reported a poor or very poor intention which indicates a positive attitude towards safety while farming.

In terms of ability to perform tasks safely, 17.5% believed they were unable to perform tasks safely, 65% felt they were able to work safely and 17.5% felt very able to work safely. We see 82.5% reporting a positive ability to working safely which is beneficial to health and safety but it is worrisome 17.5% report an inability to work safely. The graphs below exhibit the respondent’s perceived control of the farming working environment and the factors influencing ability and control of farmers to act safely are addressed in the graph adjacent.

As can be seen from the graph below 87.5% of farmers believed they had control of their working environment while a small percentage (12.5%) believed they had not. Looking more closely at those who believed they were normally always in control (12.5%) these farmers may be at risk as complacency amongst farmers is a significant attributor to farm injuries.

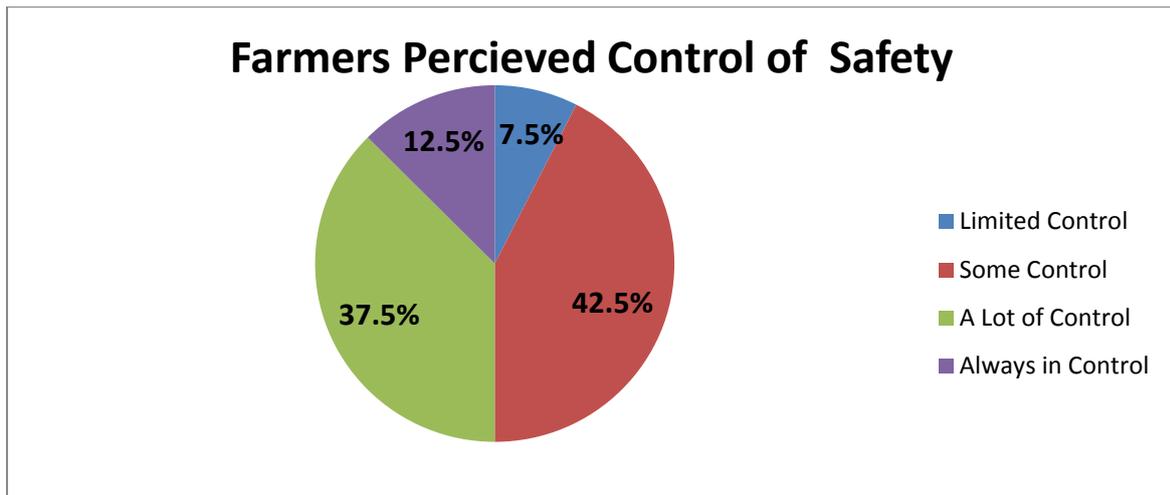


Figure 7 - Perceived Control of Safety

Farmers were accordingly asked what factors in their working environment had a bearing on their ability, control and intention to work safely. These factors are noted in table by prevalence of factors mentioned by each farmer.

Factor Affecting Safety	Incidence
Machinery	29
Weather	36
Time	26
Workload	17
Finances	19
Stress	9
Handling Facilities	20

Table 6 – Factors Affecting Safety

### 5.2.3 Stress

85% of farmers reported being stressed at some point in their farming lives which although is a high number is not a surprise as the literature details this substantially. The table below shows the most prevalent factors recorded affecting stress. Respondents noted from 1-4 different factors.

<b>Factor Affecting Stress</b>	<b>Incidence</b>
<b>Financial</b>	26
<b>Weather</b>	28
<b>Time</b>	20
<b>Workload</b>	20
<b>Price Received at Market</b>	18
<b>Basic Payment Scheme</b>	15
<b>Lack of Interaction with People</b>	7

**Table 7 – Factors Affecting Stress**

Both the factors that affect a farmer’s intention, ability and control were also seen to cause stress to farmers. Many of these issues are in direct comparison to Griffin et al. (2014). Price received for products are not mentioned in Griffin et al. (2014) or is the direct reference to the new BPS that was mentioned by a number of people with issues of losing a sizable amount of money in the next few years a great concern along with land eligibility issues. The incidence of price may be higher in other years as the beef sector was performing well at the time and a high proportion of farmers represented this sector while the factor of isolation was noted which has had a huge effect on farmers in rural Ireland (Cleary et al. 2012) but as noted later the FSMP has challenged this. The farm safety experts also looked to acknowledge the tough working environment of farmers – “Weather, financial/ household pressures are contributing factors in my opinion. Unfortunately, the weather causes huge stress on farmers and there are considerable pressures to complete their silage, slurry and other jobs in short good weather windows. Farmers continue to have relatively low incomes particularly in the beef sector which exacerbates financial pressures - this can lead to distractions during their work which then is a contributing factor to accidents” (Expert3).

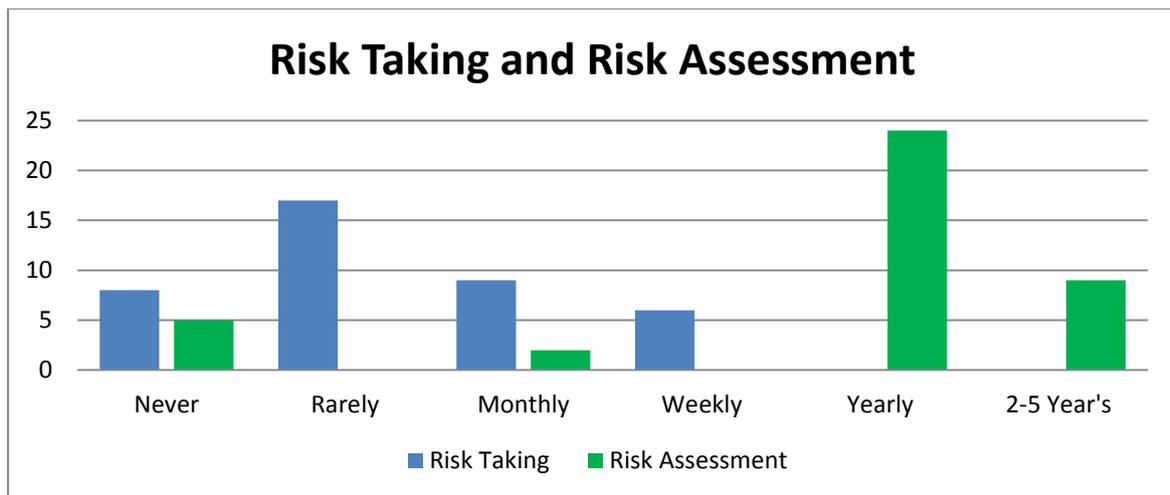


Figure 8 - Risk Taking and Assessment

Risk was assessed by time interval per risk taken and risk assessment undertaken on the farm.

#### 5.2.4 Risk Taking

Risk is hard to measure correctly because what equates as risk taking for one farmer may not to the next. In that, two simple questions (page) were asked to investigate risk. 90% of respondents believed farming was a risky occupation. Figure 8 shows four values that were offered to assess the risk taken with those in red replied they took risks on a regular basis and those in blue who rarely or never took risk. As can be seen in graph45, 37.5% take risks on a monthly basis and within this and 15% on a weekly basis. 62.5% of farmers reported rarely or never taking risks which show a positive attitude towards risk. Although almost the entire surveyed group believed farming is a dangerous occupation 75% of farmers risk their safety at some stage. Many reports have shown that risk and farming are often associated with one another (HSE, 2002). The farmers were also asked questions on the frequency they undertook risk assessments. By law every farmer must undertake a risk assessment (RA) on their holding each year (HSA, 2015). 65% of farmers surveyed revealed they undertake a RA each year which is a substantial number but still shows that quite a number are not corresponding with this legal requirement. If contrast, the farmers surveyed have a higher rate of conformity to the rule than the general population as McNamara (2012) reveals 55.1% of farmers nationally had undertaken a RA in 2011.

It was believed that there was a definite connection between farmer's intent, perceived ability and perceived control to work safely. Therefore these variables were seen to need to be investigated congruently along with looking at risk.

Looking at perceived control firstly, those that fall within the some control-a lot of control category (83%) were seen to be extremely safety aware and this was aligned with lower risk taking by these farmers. Those feeling they had limited control accounted for a low percentage (7.5%) of farmers and were all located in the 50+ age category which has been notorious for farm injuries often accounting for over 70% of farm deaths (HSA, 2015). 12.5% of farmers always felt in control of their safety and although this is en masse positive, complacency may be an issue within this grouping. Over confidence and complacency has been seen to be correlated with injury on farms (Mitchell et al. 2002) and was noted by the SE's as having impact on injury and SE#3 believed that every farmer has to "understand that they are all at risk and to try and change the mind-set that it won't happen to me". Overall farmers had a high awareness of the control they exert over their working environment and attitudes were observed to be positive towards safety in this respect as they recognised the factors that affect this control and only a small proportion of farmers believed they had no control or total control.

In terms of ability to perform work safely, 65% of respondents reported they felt able to work safely, 17.5% very able to work safely and 17.5% unable to work safely. Again there was seen to be 82.5% of participants who believed they felt able to work safely. However, there was a 10% gap between those reporting limited control (7.5%) and negative ability (17.5%). Thus there are a number of farmers who feel they have control over their working environment but lack ability to perform tasks or vice versa. Details were not enquired about regarding health of the participant but it is believed as older farmers were those who namely reported lacking a feeling of control and ability this may have severe implications for the future of their safety.

All of the SE's believed that farmers attitudes were changing for the better - "there has been a noticeable shift in attitudes with a more positive approach towards Health and Safety by farmers" (Expert2) with Expert4 adding the "huge Health and Safety profile throughout agriculture today". Expert3 noted "regrettably if you analyse the accidents and fatalities in the past 12 months for example, some were probably caused by a lack of understanding or underestimation of the risks and a relaxed behavioural attitude by the individual to their farm and its workings" and was seen to be in keeping with what was found by this research.

### **5.3 Injury Prevalence**

The frequency of injury and the impact of the FSMP on injury prevalence in the pilot area were determined by comparing farmers reported injuries in the last 10 years against the number of deaths in the last 3 years since the inception of the FSMP.

A total of 9 injuries were reported in the last 10 years which equates to 22.5% of farmers incurring some physical ailment due to farming in this period and 2 (5%) of these occurring in the last 3 years. Contrasting these results a similar study, it is seen that the incidence of injury reported by farmers is higher than by Griffin et al. (2015) which stood at 17% in a ten year period. However comparing the incidence of injuries in the 7 year period in the pilot area before the introduction of the FSMP (1 per annum) and after (0.666) per 40 farmers shows a positive trend. Increasing these statistics to incorporate a 'per 100' figure model (.4x2.5), the number of injuries stood at 2.5 injuries per 100 previous to the FSMP and 1.67 post the influence of the FSMP. The early figures show close resemblance to McNamara (2011) in that the national average injury per 100 farmers stood at 2.46 in 2010. With a 0.79 less incidence of injury recorded in this study than on a national average (McNamara, 2011) it gave a clear indication that the role of the mentors and message of farm safety had prevailed in lowering the number of injuries amongst the farmers who participated. These figures represent a 32.2% decrease in the number of injuries since the FSMP began. Comparing these results to similar reports, Lundqvist (1996) reported a 22% decrease in injury rate but the intervention strategy included a monetary physical and technological grant. Rasmussen et al. (2003) showed a direct correlation with this study in that they recorded a 30% reduction in injury rate but also these farmers had received a day's training course and a farm visit. It can be also presumed that due to the lower incidence of accidents and injury in the pilot area there would be less annual occupational and illness costs (Donham et al. 2007).

### **5.4 Does Age Matter?**

Age has been shown to directly correspond with farm injury and death (HSA, 2015). Reports have categorised older farmers as those from 55+ and 65+ most frequently. This report looks at farmers over the age of 50 and does not intend to direct the title of old on anybody. 15 farmers (37.5%) reviewed were in the 50+ age category and this represents a lower than national average number for this group which stands at 51.1% (NFS, 2011). 5 of the 9 injuries recorded in the last 10 years were farmers aged 50+ with those in their 30's and 40's

suffering 2 respectively. The number of injuries of the 50+ age group was seen as worrisome but as only 1 had occurred in this group since the FSMP there may be a downward trend but the relatively small number of injuries did not merit analysis as little would have been learnt from it. “The shift in older farmers is less but where they are linked up with younger farmers, the change is noticeable. The challenge now and in the future (and has always been) is the older farmers and how to educate them. According to DAFM figures there are approximately 30,000 farmers in Ireland that don’t have any formal contact with a farm advisor – hence another challenge in that they are removed from any substantial contact” (Expert 2).

## **Section 2**

### **5.5 The Influence of Safety Precautions**

Farmers were asked four questions regarding aspects of farm safety that emerged from the literature and relative reports and were believed to have an impact on health and safety. 77.5% reported having undertaken some structural works in the last 5 years which made the farm safer and these included handling facilities, safety barriers, concrete walls and slat replacement. 15% had applied for the TAMS and this was seen to be a high number compared to the 6000 application nationwide (DAFM, Oireachtas Report, 2015) which equates to circa 4.5% of farmers in the country. 72.5% of farmers reported having safety signage erected and 60% recorded having some safety training in the past. Taking all these safety elements into consideration it was seen overall that safety was a priority amongst the vast majority of farmers. Recent safety works and intent to carry out safety works (TAMS) were high amongst the farmers and safety positive while a similar trend was seen for safety signage. These three aspects were seen to have a major influence on behaviour as they are factors that affect a farmer on a daily basis and thus the farmer responds to the working environment around them; if safety measures are implemented risk is lessened and the accidents are less likely to happen. Safety training was one aspect of the study that leaned in the direction of SP but a large majority of farmers still had no previous farm training. A key implement in the diffusion of safety information was the ‘slurry gas’ sign that was developed by the programme co-ordinator and the mentors and these signs have been dispersed throughout the PA. These signs were made available along with other farm safety clothing at

a reduced price to farmers and there was a willingness by manufacturers and distributors to provide the discounts as it was raising awareness of safety.



Figure 9 - FSMP Safety Signage

## 5.6 Has the FSMP changed behaviour?

This section will give an analysis of the stated influence of the FSMP on farmers behaviour against the attitudes mentioned in section 2 which this study believed portray a realistic behaviour of the farmers. Therefore, the stated behaviour change and the attitudes that form behaviour could be weighed against one another and a true representation of the effect of the FSMP on behaviour generated.

82.5% of farmers felt they had a more positive attitude towards farm safety than before and their behaviour while farming was more safety orientated because of a higher awareness of safety due to the FMSP. This however was not seen as enough of an evaluation of the FSMP to merit any real justification of the research question. Therefore the stated positive attitude (85%) was weighed against the positive attitudes of the participants that were believed to effect safety behaviour: intention, ability, control and risk. These are found in the table:

Attitude	Positivity	Difference
Intention	100%	17.5%
Ability	85%	2.5%
Control	82.5%	0%
Risk	67.5%	15%

Table 8 – Stated Against Weighed Statistics

As can be seen, intention, ability, and control all correlate with the stated attitude and results are over 82.5%. There is a notable gap (15%) although between those stating the FSMP had a positive influence on them and still took risks.

As intention, perceived ability and perceived control were substantially positive toward safety, the risk taken by farmers could be appropriated to a study of New Zealand farmers that suggested 'farmers find themselves in risky situations rather than engaging in risk-seeking behaviour per se' (Clay et al. 2015). Thus it is the elements that a farmer does not have control over that puts them at risk of accident. Adding to this, it was seen that those who engaged in risk taking (37.5% monthly) for whatever reason were predominantly involved in beef farming (80%) with dairy (15%) and sheep (5%) coming next. It is acknowledged that a high percentage of the surveyed group were involved at some capacity in beef farming and this is recognised in the amount of risk taken by these farmers. Injury rate amongst dairy farmers and sheep farmers have been noted to be the highest in Ireland (McNamara, 2012). A change in behaviour takes time and is often not something that happens overnight as . Although farmers have stated that they have changed their behaviour this may take time to happen on the ground. Another element that came through in the study was the intention of two farmers who had accidents in the past was positive and stated they take no risks on the farm. 1 believed their accident was preventable and 1 was out of their control. As their intention and risk was positive it may show that the FSMP has had an influence on them but it may also mean that these accidents were 'trigger events' that changed the behaviour of farmers towards their safety. These transformative events are not a way of behavioural change that is merited by the programme and the least number of these events the better.

## **Section 3**

### **5.7 Deaths in the Pilot Area**

The FSMP began in May 2012 when mentors took an active responsibility in communicating safe farming in the four counties. Desk research was undertaken to assess if death rates had fallen since the inception of the FSMP. The graph below shows farm deaths per county in the pilot area on a yearly basis from 2007-2014. This study looks at numbers of deaths from 2009-2011 and May 2012- May 2015 to draw a comparison between two time periods for the effect of the FSMP on death rates.

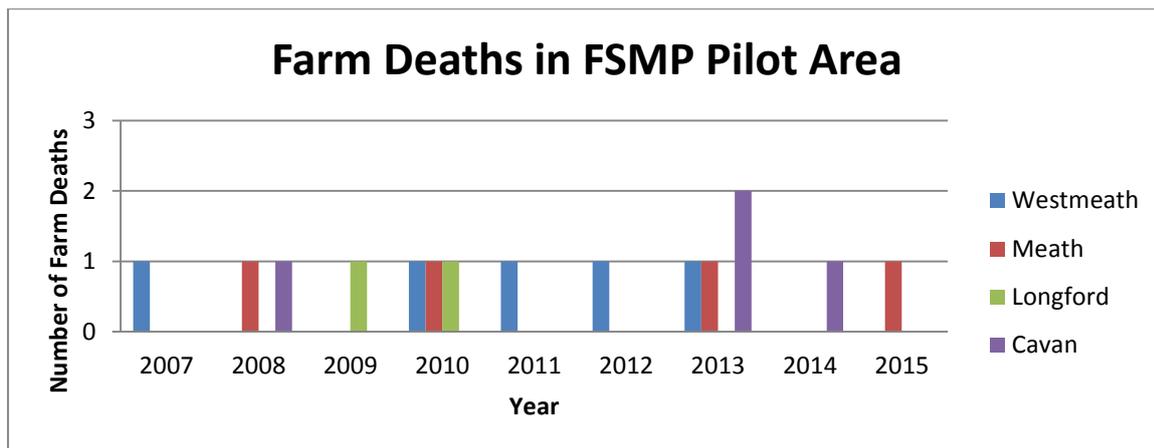


Figure 10 - Deaths in FSMP Pilot Area 2007-2015

The FSMP shows no definite impact on death rates in the two 3 year periods and actually presents a negative trend since it began with 1 more death in the May 2012- May 2015 period (6) than the 2009-2011 period (5) with the negative trend growing to 7 deaths if taking in up until July 2015. However, as Blackstock et al. 2007 notes ‘there can be a long period between advice being read/heard and being acted upon due to constraints on ability to act, or changes in willingness to act’. Taking into consideration Blackstock et al. (2007) the effect the FSMP would have had in 2012 and indeed 2013 could have been limited as the mentors only began an active role on the ground. As the programme has progressed and looking at 2014 - one of the worst years on record for national farm deaths, there was but one death in the pilot area. A huge decrease can be seen in the percentage of farm deaths in the pilot area as a percentage of the national trend in 2014 (3.3%) down from accounting for 31.25% of national deaths in 2013 and the 2014 figure currently accounts for deaths in up until July 2015.

### 5.7.1 Map of Pilot Area

A map of the pilot area was generated using ArcView GIS. The map below shows the pilot area in green, the area the mentors reside in red, farm deaths from 2007- May 2012 depicted in black stars and deaths from May 2012-July 2015 in purple stars. Examining the map it can be seen that there has been no farm death in Longford since the FSMP began with three occurring in Cavan and two in Meath and Westmeath. Apart from the death in the Moynalty area of Meath there have been no deaths in the immediate areas around where the mentors reside which indicated a positive influence of the DSMP. There was a deficit of mentors in the central to east Meath area and in the central Westmeath area where over a third of all deaths occurred since 2007.

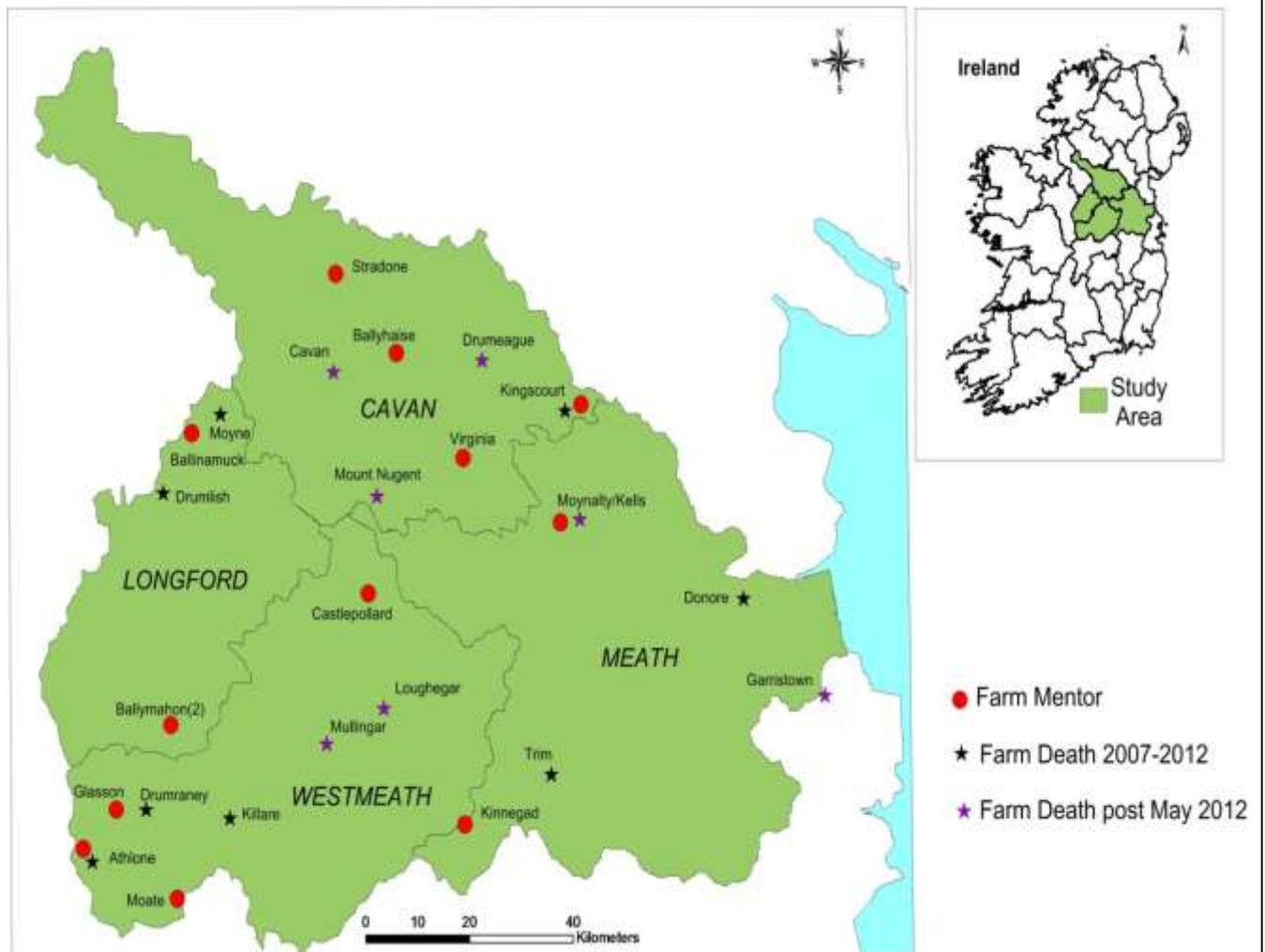


Figure 11 - Map of the FSMP Pilot Area

## 5.8 The Longford Purchasing Group (LPG)

A major success of the FSMP was its influence on the LPG and it was directly seen that mentor involvement in the LPG was positive. The LPG consisted of 100 farmers who buy products in bulk receiving deductions in prices and monthly meetings were also held by the group at which safety was discussed. A mentor got involved with the LPG and plans were put in place to supply members with BARE-CO PTO covers at 90% discounted price of €5. Not only did the farmers of the group engage in buying the safety equipment, all 100 farmers pledged to demonstrate the BARE-CO cover to at least 3 other farmers which collectively amounted to 400 people seeing the positives of using safety equipment and one mentor noted “if somebody can see the positives in using the PTO cover they will continue to use it”.

## 5.9 Influence of Mentors: Networking and Social Capital



time for nothing (payment) you kind of have to listen and take heed". Relating this to Lucas (2010), she asserts that human behaviour is influenced socially by the actions and beliefs of others in their cultural groups and it is evident that the model of 'farmer to farmer' knowledge justifies this and this research shows it has also created a 'cumulative culture' of safety. If we apply the themes of social and cultural capital to their results, it can be seen that the FSMP had generated considerable social capital in the pilot area as 57.5% of farmers stated talking about the FSMP within their networks. Cultural capital was also seen to have prevailed as farmers felt an obligation on themselves and on other farmers to farm more safely and believed other farmers carried a similar responsibility.

### **5.10 A Wider Benefit**

Many farmers have noted been socially isolated and lacking human contact on a day to day basis. Studies have found that this has detrimental effects on farmer's health and safety and can result in mental illness, alcohol dependency and suicide, especially amongst male farmers (Cleary et al, 2012. Goffin, 2014) It has been shown that the FSMP has been seen to be a social outlet for the farming community and a preventative programme against isolation. As noted by Macke-Walsh et al. (2014), it was found that farmers who had opportunities to discuss and converse with their peers was extremely valuable and that 'peer to peer exchange through casual interactions with neighbouring farmers, discussion groups and farm walks were most valued'. It was subsequently understood that the FSMP may have far more indirect benefits than only been a safety intervention programme. The model of the FSMP is casual and numerous farmers stated that this was strength of the programme. Expert1 and Expert 3 were clearly in favour of the discussion group aspect of health and safety KT and believed this will be adopted significantly in the near future.

### **5.11 Safety Campaigns**

An important aspect of this study and which incorporated debate from the three groups was the matter of general farm safety campaigns (FSC) as they have been the focus of attention throughout 2014 and 2015. Farmers were asked if FSC's had made them more aware of how they operate on their own farm and there was a resounding positive Yes answer from each participant which indicated that these campaigns had a positive influence on the group. The same answer was generated from the SE's who believed the awareness they generate had a positive influence on farmers behaviour as "they are more conscious of their safety"

(Expert3). Expert1 added that “these campaigns occur because of monies made available by authoritative bodies in the wake of years with high death rates but like everything they dry up when deaths fall”. Noting this and assessing the years with high numbers of deaths, for instance in 2001, 2003, 2008 and 2010 there were significant declines in the number of deaths in the years ensuing which can be seen in Figure 12 below. Applying that farm safety campaigns play a role in raising awareness and changing behaviour – the trend lines indicate that there is a significant decline in death rates in years ensuing high death rates and as safety campaigns are funded more substantially, awareness is heightened the following year and often in the next 2-3 year period and as funding lessens death rates rise.

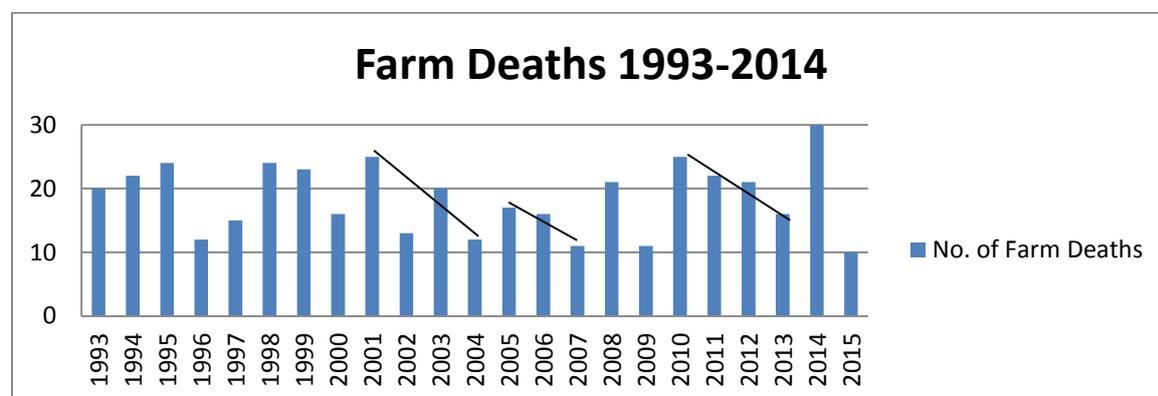


Figure 12 - Farm Safety Campaign Influencing Deaths

Expert2’s view on safety campaigns was “I cannot state definitively that the campaigns have worked for all farmers but they seem to be more conscious of safety. The internet based campaigns are very good but as the majority of Irish farmers are over 55 years of age, many of them have no access or do not use the internet. In my discussion with young farmers they seem to get most of their information through internet based campaigns, whereas older farmers tend to get their information from the print media and radio still”. There was a resounding belief amongst all stakeholders that all safety campaigns have a help in raising awareness of health and safety. “60%+ of Irish farmers are serviced by private consultants/advisors now and understandably Teagasc in the past had most of the clients and expertise but that has now changed. Current campaigns are focussed around Teagasc/FRS but there needs to be wider campaigns to capture farmers not associated with either of these bodies. Teagasc client numbers will continue to fall in forthcoming years, therefore there needs to be a rethink and shift in policy to ensure that the majority of Irish farmers through private consultants are serviced. Funding will have to be given, similar to what Teagasc are receiving, if all farmers are to be captured correctly as private advisors/consultants are

business people and unfortunately there are very few farmers willing to pay for this service” (Expert 3). A large block of text but a need to point out that all government funding for safety campaigns must not be directly given to public led services.

## **2.12 Coupling of the Basic Payment Scheme and Farmer Safety Training**

Any threat to the subsidies of farmers is an extremely contentious issue in Ireland and this study reassured farmers position on the subject. 82% of farmers reported that having to undertake FST in order to apply for the BPS would directly impact and even threaten their livelihoods. The strong beliefs of the farmers on the subject were not reaffirmed by the Safety Experts. Expert1, Expert2 and Expert4 believed that a half days farm training course should be mandatory each year. Expert1 added to this stating that training should be carried out each year before a farmer is allowed submit their Basic Payment Scheme and non-compliance would simply mean no entry into the scheme that year. Very much on the same wave length on the matter Expert2 alluded to the mandatory pesticide training for all operators of spraying machinery to be completed by November 2015 “the spraying course was made mandatory for everybody and farmers realise that they have to do it – and if they had to do it for other aspects of farming everyone would have to follow suit but this style of implementation must be driven by legislative policy from EU”. Expert1 believes this training could be in any aspect of farm safety training as long as each farmer undertakes at least half a day each year. Indeed farmers and farming organisations may oppose such propositions at the beginning and ‘as Tranter et al (2007) notes there might be a difference in how farmers say they will react to a hypothetical change in policy as opposed to how they act in reality when the policy is in force’ (in Howley et al. 2012). Expert3 was in opposition to any such coupling stating “It would be negative I feel. The stick approach does not always work in such circumstances”. They add that “most farmers would reluctantly do the training to ensure they get their payments so it would be questionable would it be achieving the correct goals”. Howley et al. (2012) adds that these decoupled payments more easily allow farmers invest in their farm operation and their overall risk of exposure is decreased and thus any penalisation of these payments may threaten farmer’s safety. Expert 1, 2 and 3 stated that farmers who look for farm safety training are categorically doing so because it is a requirement of some scheme that they must adhere to. “No farmer comes looking for training so they can up skill, there’s none of that” (Expert2). As only 17.5% of farmers surveyed would willingly partake in FST to avail of the BPS it is evident any threat to the BPS is out of the question but this can be applied to the fact that the BPS accounts for such a percentage of farm income which is

detailed in Figure 13 below. As is evident from the table, the BPS is worth so much to the cattle and sheep sectors which encompassed 80% of the study population and this is reflected in the resistance to the idea of coupling the BPS and FST. Although not directly correlated with production, it can be seen that the BPS accounts for a high percentage of farm income and there may be a comparison between Elkind's (1992) study which found only 22% of farmers saw farm safety as more important than price received for their produce.

Farm Type	Subsidy	Contribution to income
	€	%
<b>Dairy</b>	20,489	30
<b>Cattle Rearing</b>	15,469	151
<b>Cattle Other</b>	18349	131
<b>Sheep</b>	18,022	124
<b>Mixed Livestock</b>	25,040	43

Figure 13 - Contribution of Farm Income through Subsidies (Hennessy and Moran, 2015)

### 5.13 A Rollout of the Programme?

It is evident from what has been learnt that the programme has had an overall positive influence on farmer's behaviour and its principles of safety, and methods of safety knowledge transfer through a farmer to farmer network are extremely important to developing a culture of farm safety. Having spoken to farmers, mentors and safety experts it is evident that many of the elements of this programme can be replicated. IRL have looked for a rollout of the project in Cork and Tipperary and the research indicates that the FSMP could be rolled out in these counties but the programme must be run in a different manner than the way it is currently administrated. A farm safety monitoring group must be set up in each county that will reach farmers directly as well as through farm safety forums, farm discussion groups, rural and farm organisations. There should also be the development and delivery of a farm safety communications plan that will reach every farmer and their family in any area.

### **5.14 Limitations of the FSMP**

There was a significant deficit of literature available on the FSMP and this study is the only evaluation of the project done to date. Although the programme has shown to be positive in respect of changing behaviour it is extremely difficult to approach government or authoritative bodies with little evidence of proof that the FSMP has been successful as IRL did. The extent of the farming population which the programme reached is also uncertain and no documentation or figures were available. This made the job of researching the end users far more difficult and relied on farmers from a previous chainsaw giveaway and farmers numbers provided from the mentors.

## Section 4

### 5.15 Theory of Planned Behaviour

Before concluding remarks on the impact of the FSMP, some of the findings of the study were inserted into a diagram of the TPB below. The results this far indicated that the FSMP has had an overall positive affect on farmers behaviour and practice towards their safety on farms. The positive responses were taken and inserted into the TPB to give an indication of the percentage of farmers surveyed who had a positive behaviour towards safety.

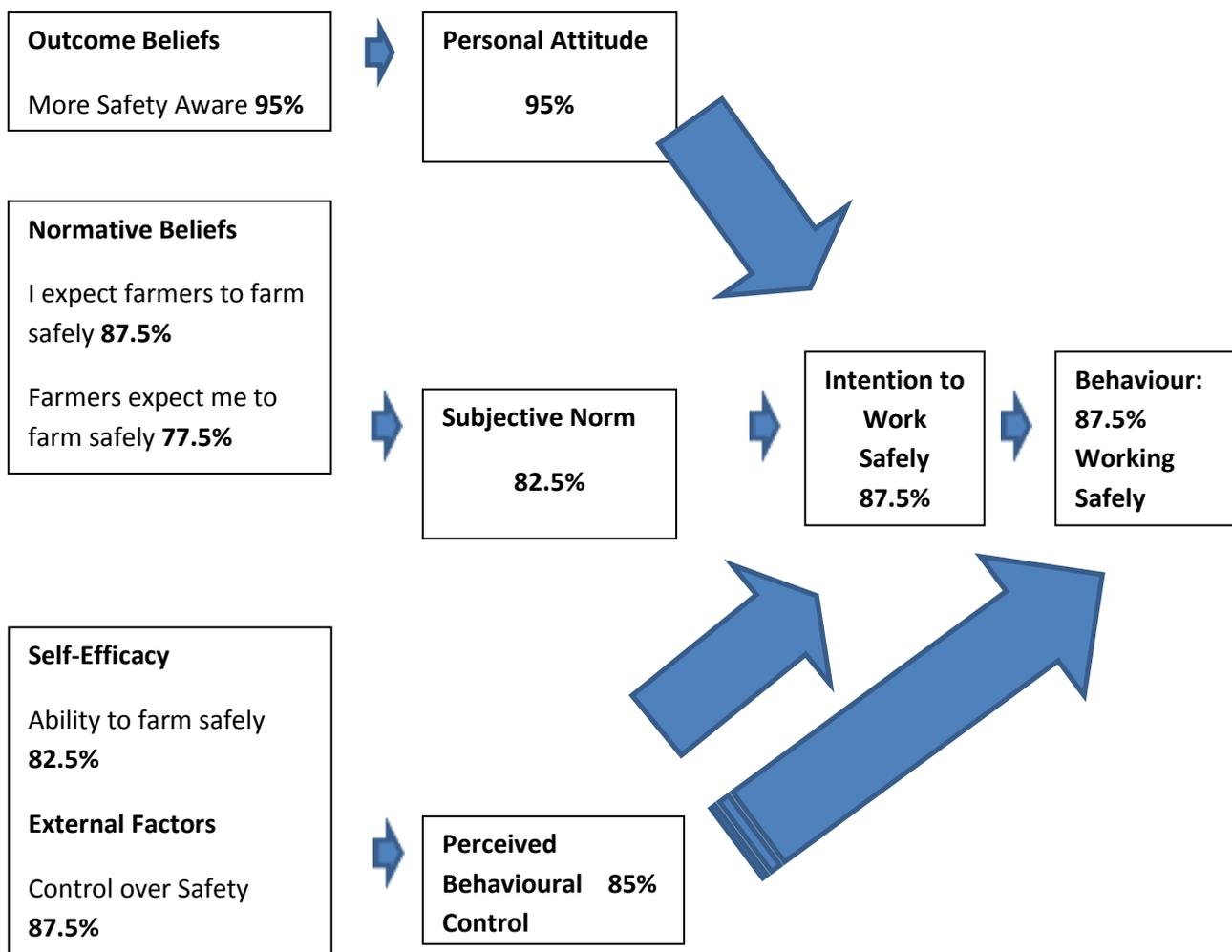


Figure 14- Theory of Planned Behaviour

By applying the TPB it can be seen that farmers in the pilot area had a positive behaviour towards performing safely while farming and that directly or indirectly the FSMP has shown to spread the message of safety in the pilot area. The strong positive figures in the graph

above gave an indication that all facets of the programme coalesced to assert the FSMP has positively affected a behavioural change amongst farmers in the four counties.

## **5.16 Conclusion**

The results shown by this research have been wide ranging in terms of both qualitative and quantitative information. To begin with, overall it was evident that perceived control, intention and ability to work safely were appropriately quite high amongst farmers but risk taking was still high amongst a cohort of farmers. However having investigated the deaths in the pilot area and noting Blackstock et al. (2010) assertion that farmers take time to adapt to new phenomena dealing with their attitudes and subsequent behaviour and it was also believed that risk taking should decline in the same way in coming years. Deaths were still high in the 3 year period 2012-2015 but in 2013 deaths in the pilot area accounted for 37.5% of deaths nationally which dropped to 3.3% in 2014 as the programme was adopted and rolled extensively in the pilot area. The map suggests that the farmer to farmer mode of knowledge transfer was working and the influence of the mentors was functioning with no deaths in the immediate areas around mentor's residence. Injury rates were recorded to have dropped by 32.2% since the programme began but it was seen that age still is a factor with risk also attributed to age but possibly not to the extent that is witnessed at a national level. Stress had an effect on the greater majority of farmers at some point in time and many of the stressors were related to the factors that affect control, intention and ability to work safely. The programme has had other positive influences on the farming community ranging from increasing social and cultural capital and been a social outlet for many farmers in the region – reemphasising the need for participation of farmers in knowledge transfer groups but also combatting the solitary farm setting. The influence of the programme on 100 farmers in the Longford Purchasing Group looked to have been significant with no death in the county since the programme began and it was evident that the discounted replacement PTO shafts scheme accelerated behavioural change in the county. Overall it was evident that the programme had an overall positive effect on the attitudes of farmers in their working environment and behaviour has therefore resulted in a more safety astute farmers. The programme was not only limited to influencing behaviour but had many far ranging benefits in the pilot area. As was evident, there did not look to be as far of a gap between the belief of Farm Experts and farmer's themselves that is often portrayed.

## **Chapter 6**

### **6.1 Conclusion**

This section returns to the aims and objectives set out at the beginning of the paper and shows how the results and analysis drawn from the research has answered these enquiries. The recommendations this paper offers will subsequently follow this before the considerations of the study are noted.

The agricultural sector and the role of the farmer and family farm in situ is part of a deeply seeded culture and heritage that has dominated the structure of farming in Ireland for centuries. The agricultural sector continues to grow at a resounding pace into a technologically modernised system, at an EU political level through the new CAP reforms and FH-2020 aspirations at a national level with international influence as milk price will now be traded at international level with dairy and beef also moving into new markets across the Atlantic and in Asia. These factors have shown to all contribute to a volatile lamb and milk price in 2015 with the beef trade showing a more steady market. These and other issues such as weather, land availability and financial pressure have a huge bearing on FFI and cause discontent and stress amongst farmers. The solitary nature of farming and low human interaction have untold negative implications on health and safety. Farmers however continue to farm through this adversity and a tie to the land, identity of culture of farming is as alive as ever. The health and safety of farmers is often at risk due to what was aforementioned. Ireland's injury and death rate on farms continue to rise as mortality rates in other sectors continually decrease. With a huge increase in agricultural output due, additional farm injuries and deaths are expected in the sector. Farm safety campaigns have been widespread throughout the country in recent years taking on many different forms but they have neglected to consider the attitudes and behaviour of farmers that are so important in understanding the way they approach their health and safety focusing more on descriptive and causation factors of health and safety.

The aim of this project was to examine if IRL's FSMP set about affecting a change in the behaviour of farmers in Meath, Westmeath, Longford and Cavan. Through a mode of farmer to farmer knowledge transfer the mentors were seen to have affected a positive change in farmer's behaviour. The principle of a farm safety mentor drawn from the agricultural community itself was attractive to farmers and well received by stakeholders involved

directly and indirectly which demonstrated that farmers were willing to accept the example given by other farmers who believed that farm safety was practical. The programme not only affected positive change in behaviour but was reported to be a considerable social outlet especially for farmers who engaged in discussion groups but possibly more positively for those who were engaged in the farmyard where the FSMP was also successful in addressing isolation which is a huge factor in Irish farming. Not only did it have an impact on social capital but cultural capital was heightened as farmers began to talk about the programme to others and a high rate of normative expectancy was reported. Injury rates had decreased considerably but even though death rates had not, it was seen that the pilot area had a huge percentage decrease on national death numbers in 2014 from 2013 with change taking time to come into effect. These elements all indicated that a rollout of the FSMP would have positive effects in Cork and Tipperary, counties which often account for half of annual agricultural deaths. The dairy expansion is likely to be focused on southern counties which will be at risk of heightened death rates as production rises dramatically. The FSMP is therefore looked at as an important tool in addressing these death rates and limiting further deaths in the future.

Overall the findings of the programme lead to the conclusion that the FSMP has had a positive influence on the farmers of its pilot area and beyond as the majority believe they have a better outlook on their and others health and safety. As an intervention programme it has succeeded in not only changing behaviour but fostering a cultural change towards health and safety on farms and considerably lowering the rate of injury. The 'seed of farm safety' looks to have been planted in many farmers mind-set but much room exists for further development within the pilot area and beyond. Although safety campaigns have shown to be influential - until there is a widespread change in behaviour towards health and safety the country will unfortunately continue a negative trend in respect of injury and death. However a step in the right direction has been taken by IRL through the FSMP and a continuation of the programme will hopefully arrest this trend.

*Every injury suffered on Irish farms is one too many and every death  
is a threat to the sustainability and development*

*of Rural Ireland.*

*Farm Safe*

## **7. Recommendations**

### **7.1: A Rollout of the FSMP in Cork and Tipperary**

The primary recommendation of this report is that the FSMP be rolled out in the counties of Tipperary and Cork. These areas have been accident ‘black spots’ and this can be seen on the map on page 29. Cork is Ireland’s main dairy producing county and is expected to account for 30% of the milk production increase in the country by 2020 (O’Connor and Kane). Cork continues to account for a high percentage of farm deaths each year and its large dairy industry means extra pressure on time, resources such as labour units and land coupled with financial stress due to expansion will prevail in the post quota era. These elements will mean that already under pressure farmers will succumb to more farm accidents as production rises. Therefore the FSMP that has shown to be influential in changing the attitudes and behaviour of farmers towards their safety and the safety of the family farm should be adapted in Tipperary and Cork. The expressed interest from a farming discussion group in Cork to adapt the practices of the FSMP is another argument for the rollout of the programme.

### **7.2 Recommendation: Annual Farm Safety Budget**

The findings from the primary and secondary data reveal that an annual allocation of farm safety funding is vital to agricultural safety campaigns each year. Although many disagree of the worth of safety campaigns (Eklind, 1992), this report has found they are unequivocally of fundamental importance in the Irish agricultural sector. Expert respondents noted that years with an abundance of safety campaigns saw a lower number of farm deaths than years with fewer campaigns. Graph 1.8 demonstrates that years with high death rates are ordinarily followed by years with lower death rates owing to the fact that safety is in the public domain and a priority to all members of the agricultural community but as death rates fall so does funding and as a result death rates fluctuate. It is offered that the Farm Safety Partnership receive an annual budget that would be divided between stakeholders in the partnership. An allocation of funding for IRL’s FSMP should be seriously considered by the DAFM.

### **7.3: Discussion Group Inclusion**

An important measure of the new Rural Development Programme 2014-2020 is the incorporation of supportive measures for suckler farmers through the Beef Geonomics Programme. The programme is delivered through knowledge transfer groups and a

mandatory element of the discussion in these groups will be farm safety. However farmers who do not meet the criteria for the Beef Geonomics Scheme are not permitted to enter the KTG's under the umbrella of the RDP. This paper believes that this will adversely affect the safety of farmers as the message of safety will not be passed face to face which this paper has shown has worked substantially in the pilot area. All farmers nationwide who have an interest in the KTG's should be accommodated as it will have positive effects on their safety but also socially and economically as it has been shown. The positive effect of discussion group inclusion in the Longford Purchasing Group has been clearly seen.

#### **7.4: Certified Safe Farm**

Looking at the aspects of the Certified Safe Farm programme in Iowa, it is believed that farms that are evaluated correctly and adhere to strict safety guidelines and conditions could be given a guaranteed safety status. Not only would the farmers see the positives in undertaking safety on their farm, there would also be a status that would accompany adhering to a high standard of safety such as a 'Certified Safe Farm'. Adding to this the farmer could be rewarded in the way the Bord Bia Quality Assured Scheme is set out receiving 1-3cent per kilo on top of their price received at market for animals going to slaughter or a per monthly premium for dairy farmers who are 'Certified Safe Farmers'. A rebate on insurance premiums for 'Certified Safe Farms' would be an incentive to continue a high level of health and safety on the farm. Not only would farmers certified by the programme be looked at as safety advocates in their areas it would make other farmers more aware of safety. It would also mean that farm walks on safety could be run on these farms where Irish Rural Link in conjunction with the DAFM could spread the "seed of change" in farm safety.

#### **7.5 Utilising Social Media**

The presence of farm safety campaigns on social media is quite strong and is an emerging method of engaging farmers to think about their health and safety while farming. Farmers have been singled out through the applications such as YouTube, Twitter, Facebook and Instagram quite often. The Youtube video and safety sign developed by IRL have been very successful and should be built upon in the future.

## **Appendix A**

## Expert Questionnaire

What are your thoughts on farm related deaths and injuries in Ireland in recent years and the significance of 2014.

In terms of attitudes and behaviours of farmers towards health and safety and farm safety, have you seen a change (positive or negative) in recent years? How? Why?

Have you seen a difference in young and old farmers adopting a change in attitude or behaviour?

What is the greatest challenge in making farmers think more about safety?

Do you think that farmers aspire or intend to work safely and take safety into consideration?

What do you think are the greatest factors that farmers face in their day to day work that influences their behaviour?

Do you think farm safety campaigns have worked?

What way do you think is the best way of getting the message of safety into the mind-set of farmers? One to one, discussion groups, champion for change, safety campaign, advertisement?

Do you think advisory or extension services are doing enough to promote farm safety or is it their remit?

Do farmers approach you stating they want to do health and safety training for the good of their health and knowledge or is it because of a scheme, policy, legislation?

If the Basic Payment Scheme was coupled with for instance a half day farm safety training before any farmer could apply, would it be positive/ negative/thoughts?

Is the farm safety partnership working? Are all members on the same wave length?

In terms of Food Harvest 2020, there are huge aspirations for growth of the industry by government and we have not even met these and there is talk of Food Harvest 2025. Do you think there is disconnect between policymakers and drivers and the farmers at grass root level who have severe pressure on them to provide the product? Has safety been emphasised as much as production? Do you see more deaths in the post quota era?

## Mentor Questionnaire

### Section 1

What County are you from? \_\_\_\_\_

Gender      Male                   Female

What age category are you in      20s  30s  40s  50s  60+

What is the best description of your farm system?

Dairy  Dairying and other       Beef – Sucklers

Beef – no Sucklers  Beef and sheep  Mainly Sheep

Mainly Tillage  Mixed Tillage/ Livestock  Other (specify) \_\_\_\_\_

How many hectares do you farm? \_\_\_\_\_ Ha

Describe the employment status of your farm?

Full-time      Part-time

### Section 1

What is your take on the events of farm deaths and injuries in recent years?

Do you think farmers have an intention to work safely?

Do you think farm safety campaigns are working or do you think that there is an alternative that would work better? (one to one, discussion groups)

Have you yourself ever had a farm accident?

### Section 2

Why did you become a farm safety mentor?

Have you seen a change in your own behaviour towards safety since the programme started?  
How?

Have you seen a change in farmer's behaviour since the programme began?

Are farmers interested and welcoming of the message of safety?

Where would you normally meet or talk with the farming community?

Would this be on a daily, weekly or monthly basis?

Is there an expectation amongst the farmers in the programme that they all must work safely?

What would you say were the strengths and weaknesses of the programme?

# Farmer Questionnaire

## Section 1

What County are you from? \_\_\_\_\_

Gender      Male                   Female

What age category are you in      20s  30s  40s  50s  60+

What is the best description of your farm system?

Dairy       Dairying and other  Beef – Sucklers

Beef – no Sucklers  Beef and sheep       Mainly Sheep

Mainly Tillage       Mixed Tillage/ Livestock       Other (specify) \_\_\_\_\_

How many hectares do you farm? \_\_\_\_\_ Ha

Describe the employment status of your farm?

Full-time      Part-time

## Section 2

On a scale:

How would you rate your intention to work safely?

Very poor       Poor       Strong       Very Strong

How would you rate your ability to work safely?

Very unable       Unable       Able       Very able

Do you feel you have control over your safety when farming?

No Control  Some Control  Mostly in Control  Always in Control

What would influence this control?

---

---

1) Would you take risks while working on the farm

Never  Rarely  Monthly  Weekly  Daily

2) Have you had a farm accident in the last 10 years? Yes  No

Do you think it was preventable? Yes  No

3) Have you changed anything on your farm in the last five years that is beneficial to your health and safety?

---

---

---

4) How often do you undertake a farm risk assessment on your farm?

Never  Monthly  Every 6 month's  Yearly  2-5 year's

5) Have you applied for the farm safety scheme/grant? Yes  No

6) Have you any farm safety signage erected? Yes  No

7) Have you ever undertaken any farm safety training? Yes  No

8) Have safety campaigns influenced your behaviour or attitude towards safety? Yes

No

9) Have you been stressed due to farming? Yes  No

What in the working environment would be the greatest contributors to stress?

---

---

---

---

### Section 3

1) Would you say your attitude or behaviour towards farm safety has changed since you were involved in the FSMP? Yes  No

If yes, how?

---

---

---

2) Have you spoken to other farmers in your locality about farm safety? Yes  No

3) What were the strengths of the programme?

---

---

---

---

4) Have you been injured on the farm since you have been aware of the programme?  
Yes  No

5) Would you say you are more safety orientated now than before? Yes  No

6) Do you think other farmers expect you to farm safely? Yes  No

7) Do you expect farmers to farm safely? Yes  No

### **General**

1) If the Basic Payment Scheme was coupled with for instance a half day farm safety training before any farmer could apply, would it be positive/ negative/thoughts?

## **Bibliography:**

Arcury, T., Quandt, S. and Russell, G. (2002) Pesticide safety among farmworkers: perceived risk and perceived control as factors reflecting environmental justice. *Environ Health Perspect.* Volume 110, Suppl 2, Pages 233–240.

Arcury, T., Quandt, S. and Russell, G. (2013) Causes” Of Pesticide Safety Behavior Change in Latino Farmworker Families. *American Journal of Health Behaviour.* 2013 Jul; 37(4): 449–457

Atkin, C. (2011) New CAP, Old Hat? Some thoughts on the EU's Common Agricultural Policy 2014-2020. *International Journal of Agricultural Management*, Volume 1, Number 2, Pp. 7-10.

Avery, A. Crowe, S. and Cresswell, K. (2011) The case study approach. *BMC Medical Research Methodology* Vol 11, No. 100.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211

Beedell, J and Rehman, T. (2000) Using social-psychology models to understand farmers' conservation behaviour. *Journal of Rural Studies*, Vol. 16, No. 1, Pp. 117-127.

Bell. S. (2009) *Mental Maps*. Blackboard. Pages 70-75.

Berg, R. Pickett, W. and Marlenga, B. (2005) Do parents' perceptions of risks protect children engaged in farm work? *Preventive Medicine*. Vol. 40, No. 6, Pp. 860-866.

Blackstock, K., Brown, K. and Burton. R. (2007) *Good Practice Guide: Influencing environmental behaviour using advice*. Principles of Good Practice Countryside and Community Research Institute & Macaulay Institute, Pp.5, 6.

Blackstock, K., Brown, K. and Burton. R. (2010) Understanding and influencing behaviour change by farmers to improve water quality. *Science of The Total Environment*, Volume 408, Issue 23, Pp. Pages 5631–5638.

Blackstock, K., Brown, K. and Burton. R.(2012) Triggering change: towards a conceptualisation of major change processes in farm decision-making. *Journal of Environ Management*. Volume 15, Number 104, Pages 142-51.

Boch, B and Shortall, S. (2006) Rural Gender Relations: Issues and Case Studies. *Rural Health and Well Being*, Pages 323-324.

Bogue, P. (2013) Impact of Participation in Teagasc Dairy Discussion Groups. Teagasc Publications, pp.5. Available: [www.teagasc.ie](http://www.teagasc.ie)

Borch, K. (2007) Emerging technologies in favour of sustainable agriculture. *Futures*, Volume 39, Issue 9, Pp. NPN.

Bosco FJ. and Moreno CM. (2009) Fieldwork. Blackboard. Pp. 120-124.

Boulanger,P. and Philippidis, G. (2015) The EU budget battle: Assessing the trade and welfare impacts of CAP budgetary reform. *Food Policy*, Volume 51, Pp. 120.

Brandth, B. (2003) Gender Identity in European Family Farming: A Literature Review. *Sociologia Ruralis*, Volume 42, Issue 3, Pp. 184.

Braun, V. and Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, Volume 3, Issue2. Pages 77-101.

Burton, R. (2004) Reconceptualising the ‘behavioural approach’ in agricultural studies: a socio-psychological perspective. *Journal of Rural Studies*, Volume 20, Issue 3, Pp. 359-371.

Burton, R. and Wilson, G. (2015) Neo-productivist’ agriculture: Spatio-temporal versus structuralist perspectives. *Journal of Rural Studies*, Volume 38, Pages 52–64.

Cantor, M. (2011) Development for the Past, Present, and Future: Defining and Measuring Sustainable Development. Senior Honors Projects. Paper 305, Page 4.

Casey, M. C., Robertson, I. and Lang, B. (2014) Farm-related trauma in the west of Ireland: an occupational hazard. *Irish Journal of Medical Science*, Vol. 183, No. 4, Pp. 601-604.

Charlwood, C. and Byard, R. (2014) Potential dangers of hay bailing. *Journal of Forensic and Legal Medicine*, Volume 21, Pp. 58.

Clay, L., Hay-Smith, E.J. and Milosavljevic, S. (2015) Unrealistic optimism, fatalism, and risk-taking in New Zealand farmers' descriptions of quad-bike incidents: a directed qualitative content analysis. *Journal of Agro medicine*. Volume 20, Issue 1, Pages 11-20.

Cleary, A., Feeney, M. and Macken-Walsh, A. (2012) Pain and Distress in Rural Ireland A qualitative study of suicidal behaviour among men in rural areas. Teagasc Publications, Pages 1-12.

Clifford, N., French, S. and Valentine, G. (2010) *Key Methods in Geography*. SAGE, London Chapter 2, Page 16-17.

Cole, H. P. (2002) Cognitive-Behavioural Approaches to Farm Community Safety Education: A Conceptual Analysis. *Journal of Agriculture Safety and Health*, Vol. 8, Pp. 145-159.

Colemont, A. and Bourke, S, V. d. (2008) Measuring determinants of occupational health related behaviour in Flemish farmers: an application of the Theory of Planned Behaviour. *Journal of Safety Research*, Volume 39, Issue 1, Pages 55–64.

Cope, M. (2009) *Transcripts (Coding and Analysis)*. Blackboard 350-354

CSO (2010) *Agricultural Results*. Available: <http://www.cso.ie/en/media/csoie/releasespublications/documents/agriculture/2010/Commentary.pdf> Accessed: 13/06/15

Curry, L. (2009) Qualitative and Mixed Methods Provide Unique Contributions to Outcomes Research. *Circulation*. Vol. 17, No. 11, Pp. 1442-52.

Daugberg, C. (2003) Policy feedback and paradigm shift in EU agricultural policy: the effects of the MacSharry reform on future reform. *Journal of European Public Policy*, Volume 10, Issue 3, Pp. 422-424.

Daugberg, C. (2009) Sequencing in public policy: the evolution of the CAP over a decade. *Journal of European Public Policy*, Volume 16, Issue 3, Pp. 395-396.

Davidova, S. and Thompson, K. (2013) *Family Farming: a Europe and Central Asia Perspective*. Fao, *Regional Dialogue on Family Farming: Working towards a strategic approach to promote food security and nutrition*, pp. 3. Available: [www.fao.org](http://www.fao.org)

DeRoo, L. A. and Rautian, R. H. (2000) A systematic review of farm safety interventions. *American Journal of Preventative Medicine*, Vol. 18, No. 4, Sup. 1, Pp. 51-62.

Donham, KJ., Lange, JL .and Rautiainen, R. (2007) Injury and illness costs in the Certified Safe Farm study. *Journal of Rural Health*. Vol 23, No.4, Pp 348-55.

Dosman, J., Hagel, L. and Pahwa, P. (2013) Economic worry and the presence of safety hazards on farms. *ACCIDENT; ANALYSIS AND PREVENTION*, Volume 53, Pages 156-60.

Dwane, A., Blake, J. and Hanlon, A. (2013) Farmers' self-reported perceptions and behavioural impacts of a welfare scheme for suckler beef cattle in Ireland. *Irish Veterinary Journal* , Volume 66, Issue 1 .

Dyrborg, J., Lipscomb, H. and Olsen, O. (2015) Safety Interventions for the Prevention of Accidents in the Work Place: A Systematic Review. Available: The Campbell Collaboration, Pp. 1-12. Available:

Eklof, M., Torner, M. and Stave, C. (2007). An intervention method for occupational safety in farming — evaluation of the effect and process. *Applied Ergonomics*, Volume 38, 357–368.

Elkind, P. D. (1993) Correspondence between knowledge, attitudes, and behavior in farm health and safety practices. *Journal of Safety Research*, Vol. 24, No 3, Pp. 171-179.

Farrell, M., Mahon, M. and McDonagh, J. (2008) Agricultural Extension Advisory Services: The Challenge of Implementing a Multifunctional Advisory Programme. *The Rural Economy Research Centre Working Paper Series*.

Farrell, M., Mahon, M. and McDonagh, J. (2010) New opportunities and cautionary steps? Farmers, forestry and rural development in Ireland. *European Countryside*. Volume 2, Issue 4, Pages 236–251.

Farrelly P. (2014) Environmental Analysis Report Prepared on behalf of Food Harvest 2020. Dublin, DAFM, Pages 1-3. Available: <http://www.agriculture.gov.ie/> Accessed: 20/06/15

Feola, G. and Binder, C. (2010) Towards an improved understanding of farmers' behaviour: The integrative agent-centred (IAC) framework. *Ecological Economics*, Vol.69, No.12, pp.2323-2333.

Fereday, J. and Muir-Cochrane, E. (2006) Demonstrating Rigor Using Thematic Analysis: A Hybrid Approach of Inductive and Deductive Coding and Theme Development. *International Journal of Qualitative Methods*. No. 5, Pp. 1-11.

Fraser, C.E., Henderson, A. and Humphreys, JS. (2005) Farming and mental health problems and mental illness. *INTERNATIONAL JOURNAL OF SOCIAL PSYCHIATRY*, Volume 51, Issue 4, Pages 340-9.

Glasscock, D. J., Rasmussen, K. and Carstensen, O. (1997) The West Jutland Study Of Farm Accidents: A Model For Prevention. *Safety Science* Vol. 25, No. 1-3, pp. 105-112.

Glasscock, D. J., Rasmussen, K. and Carstensen, O. (2003) Prevention of farm injuries in Denmark. *Scandinavian Journal of Work Environment Health*, Vol. 29, No.4, Pp. 288-296

Glasscock, D. J., Rasmussen, K. and Carstensen, O. (2007) Psychosocial factors and safety behaviour as predictors of accidental work injuries in farming. *Work & Stress: An International Journal of Work, Health & Organisations*, Vol. 20, No. 2, Pp. 173-189.

Goffin, A. (2014) Farmers' mental health: A review of the literature. Report prepared for the Farmers' Mental Wellbeing Stakeholder Group by the Accident Compensation Corporation. Pages 7-13.

Griffin, P. (2013) Farming - a hazardous occupation – how to improve health & safety? *Safety and Health in Agriculture*, Pp. 6. Available: <http://www.europarl.europa.eu/>

Griffin, P., Murray, P. and Denton (2014) Determining underlying psycho-social factors influencing farmers' risk-related behaviours (both positively & negatively) in the Republic of Ireland. Available: [http://www.ttl.fi/partner/nmaohs/programme/scientific/Documents/Griffin\\_2\\_NMAOHS2014.pdf](http://www.ttl.fi/partner/nmaohs/programme/scientific/Documents/Griffin_2_NMAOHS2014.pdf) Accessed: 24/05/15

Hanrahan, K., Kinsella, A. and Hennessy, T. (2014) Teagasc National Farm Survey Results 2013. Galway: Agricultural Economics & Farm Surveys Department Rural Economy and Development Programme.

Hardwick, S. W. (2009) Case Study Approach. Blackboard, Pp. 440-445.

Harrell, A. (1995) FACTORS INFLUENCING INVOLVEMENT IN FARM ACCIDENTS '. *Perceptual and Motor Skills*, Volume 81, Pp. 592-594.

Hemsworth, P., Coleman, G. and Barnett, J. (2002) The effects of cognitive behavioural intervention on the attitude and behaviour of stockpersons and the behaviour and productivity of commercial dairy cows. *American Society of Animal Science*, Volume 80, Pp. 69.

Hennessy, T. and Moran B. (2015) Teagasc National Farm Survey 2014. . Galway: Agricultural Economics & Farm Surveys Department Rural Economy and Development Programme, Pages 1-12.

Hennessy, T., Kinsella, A. and Moran, B. (2013) National Farm Survey 2012 Preliminary Estimates. Galway: Agricultural Economics & Farm Surveys Department Rural Economy and Development Programme.

Hovden, J., Albrechsten, E. and Herrera, I. (2010) Is there a need for new theories, models and approaches to occupational accident prevention? *Safety Science*, Volume 48, Issue 8, Pages 950–956

Howley, P., O'Donoghue, C. and Hennessy, T. (2012) Does the single farm payment affect farmers' behaviour? A macro and micro analysis. *International Journal of Agricultural Management*, Volume 2, Issue 1. Available: <http://t-stor.teagasc.ie/>

Howley, T., Hynes, S. and O'Donogue, C. (2011) Measuring public preferences for the conservation of the traditional farm landscape. Department of Economics National University of Ireland, Galway, Working Paper No. 0174

HSA (2012) Farm Safety Action Plan 2013- 2015. Publications, Farm Safety Partnership, Pages 1-6. Accessed: 04/06/15. Available: <http://www.hsa.ie/>

HSA (2015) Agriculture and Forestry. Accessed: 20/05/15. Available:[http://www.hsa.ie/eng/Your\\_Industry/Agriculture\\_Forestry/](http://www.hsa.ie/eng/Your_Industry/Agriculture_Forestry/)

ICP (2015) Cognitive Behavioural Therapy. Available: <http://www.psychotherapy-ireland.com/disciplines/cognitive-behavioural-therapy/>. Accessed: 13/07/15

Joffe, H. (2012) Thematic Analysis. *Qualitative Research Methods in Mental Health and Psychotherapy: A Guide for Students and Practitioners*. Chichester: Wiley-Blackwell, Chapter 15, Pp. 213-214.

Kinsella, A., McNamara, A. and McNamara, J. (2009) Disability on Irish Farms-A Real Concern. *JOURNAL OF AGROMEDICINE*, Volume14, Issue 2, Pages 157-63.

Larsen, B., Petersen, B. and Philipsen, P. (2014) Sun exposure and Protection Behavior of Danish Farm Children: Parental Influence on Their Children. *Photochemistry and Photobiology*, Volume 90, 1193–1198.

Lee, B. Jenkins, L. and Westaby, J. (1997) Factors influencing exposure of children to major hazards on family farms. *Journal of Rural Health*, Vol. 13, No. 3, Pp. 206-215.

Lukas, A. (2010) *The Psychology of Changing Farmer's Behaviours*. SRUC. Available: [file:///C:/Users/Windows%207/Downloads/Amanda\\_Lucas.pdf](file:///C:/Users/Windows%207/Downloads/Amanda_Lucas.pdf)

Macken-Walsh, A. (2009) *Barriers to Change: a Sociological study of Rural Development in Ireland*. Teagasc Rural Economy Research Centre, Pages 38-50.

Madsen, L.M., Adriansen, H.K., 2004. Understanding the use of rural space: the need for multi-methods. *Journal of Rural Studies*, Vol. 20, No 4, 485–497.

Marsden, T. and Ploeg, V. D. (2008) *Unfolding Webs: The Dynamics of Rural Regional Development*. Towards a framework for understanding rural regional development, Pp. 1-52.

Matthews, A., Newman, C. and Thorne, F. (2007) *PRODUCTIVITY IN IRISH AGRICULTURE*. Teagasc Publications, Centre of Rural Development, Pages 117-120.

McGuire J., Morton, L. W. and Cast, A. D. (2013) *Reconstructing the good farmer identity*. Springer: *Agriculture Human Values*, Pp. 1-13.

Mckendrick, J. H. (2009) *Mixed and Multiple Methods*. Blackboard

McNamara, J. (2012) *Farm Injuries rise by 35% -Teagasc National Farm Survey*. Teagasc, Publications. Available: [www.teagasc.ie](http://www.teagasc.ie)

McNamara, J. Ruane, D. and Connolly, L. (2007) *Journal of International Agricultural and Extension Education*. Vol. 14, No. 2, Pp. 22-25. Available: <http://digitalcommons.ilr.cornell.edu/>

Meredith, D., Mc Namara, J. and Grant, J. (2010) *Occupational fatalities amongst farm workers in Ireland, 1992 – 2008*. The Rural Economy Research Centre, Working Paper Series, Pp. 1-20.

Mitchell, R. Franklin, R. and Driscoll, T. (2002) Farm-related fatal injury of young and older adults in Australia, 1989–1992. *Australian Journal of Rural Health*, Volume 10, Issue 4, pages 209–219.

Myers, J., Layne, L. and Marsh, S. (2007) Injuries and Fatalities to U.S. Farmers and Farm Workers 55 Years and Older. *The Conference on the Aging Farm Community: Using Current Health and Safety Status to Map Future Action*, Pp. 7-10. Available: [agsafetyandhealthnet.org](http://agsafetyandhealthnet.org)

Myers, J., Layne, L. and Marsh, S. (2009) Injuries and fatalities to U.S. farmers and farm workers 55 years and older. *American Journal of Industrial Medicine*, Vol. 52, No. 3, Pp.189-192.

O'Connor, D. and Kane, M. (2014) Future Expansion of the Dairy Industry in Cork: Economic Benefits and Infrastructural Requirements. CIT, Report prepared for Cork County Council, Page 17.

Oireachtas Report (2015) Seanad Public Consultation Committee Report on farm Safety. Accessed: 16/06/15 Available: <http://www.oireachtas.ie/parliament/media/Farm-Safety-Report---Final-Version.pdf>

Pfortmueller, C. A., Kradofler, D. and Kunz, M. (2013) Injuries in agriculture – injury severity and mortality. *Swiss Medical Weekly*, Department of Emergency Medicine, University Hospital Bern. Available: [www.researchgate.net](http://www.researchgate.net) Accessed: 13/05/2015

Philip, L.J. (1998) Combining quantitative and qualitative approaches to social research in human geography—an impossible mixture? *Environment and Planning*, Vol. 30, Pp. 263.

Pickett, W., Brison, R. and Chipman, M. (1995) Nonfatal farm injuries in Ontario: A population-based survey. *Accident Analysis & Prevention*, Volume 27, Issue 4, Pp. 430-439. *Psychology*, 3, 77-101.

Rasmussen, K., Carstensen, O. and Glasscock, D. (2003) Prevention of farm injuries in Denmark. *Scandinavian Journal of Work, Environment & Health*, Volume 29, Number 4, Pp. 294.

Reed, D. (2004) The Risky Business of Production Agriculture- Health and Safety for Farm Workers. *AAOHN*, Vol. 52, No. 9. Pp. 401-409. <http://web.ebscohost.com/>

Rosenblatt, P. and Karis, T. (1993) Family Distancing Following a Fatal Farm Accident. *JOURNAL OF DEATH AND DYING* Volume 28, Issue 3, Pages 183-200.

Saugeres, L. (2002) Of Tractors and Men: Masculinity, Technology and Power in a French Farming Community. *Sociologia Ruralis*, Volume 42, Number 2, Pp. 144-146.

Sulemana, I. and Harvey, S.J.J. (2014) Farmer identity, ethical attitudes and environmental practices. *Ecological Economics*, Vol. 98, Pp. 49-61.

Willock, J., Deary, I. J. and McGregor, M. Farmers' attitudes, objectives, behaviors, and personality traits: The Edinburgh study of decision making on farms", *Journal of Vocational Behavior*, Vol. 54, pp. 5-36.

Yin, R. (1994). *Case Study Research: Design and Methods*. Thousand Oaks, CA: Sage Publishing.