

Farm Crime in England and Wales: A Preliminary Scoping Study Examining Farmer Attitudes¹

Kreseda Smith
Harper Adams University
Edgmond
Newport
Shropshire, TF10 8NB. UK.

Richard Byrne
Harper Adams University
Edgmond
Newport
Shropshire, TF10 8NB, UK

Contact author – Kreseda Smith: kresedasmith@harper-adams.ac.uk; +44 (0)1952 815113

Abstract

Farms stand apart from other rural businesses in the levels of crimes they experience, and the impact of farm crime reverberates far beyond the immediate rural community. However, there continues to be a lack of interest in farm crime as a research topic in both England and Wales. This study explores attitudes of farmers towards farm crime, crime prevention, the police, and potential predictors of farm victimisation². An online survey was completed by 71 farmers; a further 55 farmers partially completed the survey providing important additional data. An analysis of the survey results shows low levels of confidence in and reporting to the police, low levels of crime prevention usage, and varying potential predictors of victimisation.. This survey extends existing international farm crime research to the UK, and aims to establish an understanding of farmers' attitudes towards crime prevention and the police; and how these attitudes and farm characteristics relate to victimisation levels. This lays the foundations for further research and the introduction of behavioural science into the farm crime prevention arena.

Keywords: agriculture, farm crime, crime prevention



Introduction

Farming is the backbone of the countryside and influences the success of the rural economy (CPRE 2015). In England and Wales, the number of agricultural holdings tops 143,000, covering in excess of 10.6 million hectares (about 262 million acres) (Defra 2014a), with the total income from farming rising from £3.8 billion in 2012 to £4.3 billion in 2013 (Defra 2014b). With the increasing reliance of the UK on farming, it is a great surprise that one of the main factors negatively impacting on farm business continuity is not being adequately addressed by policy makers and academic researchers. But this is the case with farm crime. Despite the recent efforts of police forces across England and Wales to address the issues faced by rural communities, the continuing reality is that crime numbers in urban areas are much higher than in rural areas (Defra 2012), and as such, this is where police resources tend to be focused.

Farms stand apart from other rural businesses in the levels of crimes that they experience, and the impact of farm crime reverberates far beyond the immediate rural community, affecting employment, food prices and food traceability (Chalfin, Roman, Mears and Scott 2007). However, despite this, there continues to be a lack of interest in farm crime as a research topic, and a lack of consistency in the recording and tackling of farm crime in England and Wales, despite the inexorable increase in criminals "targeting farmers and their assets, both man-made and natural" (Crompton 2011).

The reporting of the cost of rural crime in the UK is currently carried out by unofficial sources. However, despite the latest NFU Mutual Rural Crime Survey putting the cost of rural crime in 2015 at an estimated £42.5m (NFU Mutual 2016), and the National Rural Crime Survey (NRCN 2015) reporting rural crime costing the UK an estimated £800m, rural crime, and in particular farm crime, remains a relatively neglected area of academic research in the criminological literature (Jones and Phipps 2012).

This paper is an exploration of the influence that being a victim of farm crime has on the adoption of crime prevention measures on farms, levels of victimisation and repeat victimisation among the farming community, and attitudes towards the police in England and Wales in comparison to other countries. Making steps towards understanding the attitudes, beliefs and culture of the farming community enables a discussion to be had around the role of behavioural science in on-farm crime prevention decision-making in light of the relative failure of other methods aimed at improving the uptake of crime prevention.

Literature Review

Farms stand apart from other rural businesses in the levels of crimes they experience, and the impact of farm crime reverberates far beyond the immediate rural community, affecting employment, food prices, and food traceability (Chalfin et al 2007).

Despite the latest NFU Mutual Rural Crime Survey (NFU Mutual 2016) putting the cost of rural crime in 2015 at an estimated £42.5million, farm crime remains a relatively neglected area of research in criminological literature (Jones and Phipps 2012), with rural crime research in the UK being carried out by a very small selection of criminological, geographical and sociological researchers. Not only are farmers affected financially when victimised, the crime can have physical and, indeed, psychological repercussions upon the farmer. The latter is clearly illustrated by research carried out by Booth, Brisco and Powell (2000) who stated that farmers are one of the professional groups at highest risk of suicide in England and Wales, accounting for approximately 1percent of all suicides, with crime arguably being one of a number of stressors.

Farm crime prevention

There is a lack of academic rigour underpinning advice that is provided to the farming community surrounding the protection of their property. This is confounded by the historic low levels of farm crime research which arguably leaves some rural residents continuing to perceive crime as an urban problem, and as a result communities surround themselves with a false sense of security (Yarwood and Edwards 1995). Such perceptions tend to result in lower levels of crime prevention activities in these communities, thus creating an attractive target for criminals. Farming communities have traditionally shied away from making use of crime prevention measures to protect their property and livestock, with Deeds, Frese, Hitchner and Solomon (1992) reporting that 80 per cent of the farmers they surveyed had spent nothing on either insurance or security on their farms in the past year. Skogan (1984) however states that crimes such as machinery theft were likely to be subject to an insurance claim which depended on prompt reporting to the police.

McCall and Homel (2003) report that, as with many things, if crime prevention is easy to set up and run, and is effective, then it is more likely to be adopted, noting that 64 percent of farmers locked their farmhouse, but did not take the same care securing other parts of the farm, and rarely used alarm systems, signage, or security lighting. When addressing FarmWatch type schemes, Barclay, Donnermeyer, Doyle and Talary (2001) found that only 14 per cent of participants reported being actively involved in a crime prevention programme.

An interesting perspective has been put forward by Armstrong (2005) in relation to the efficacy of crime prevention measures to tackle farm crime. Following the peace accords in Northern Ireland, a border county of the region experienced a resurgence of farm crime once the security forces were disbanded from the area in accordance with the agreement's protocol, which seems to suggest that the military provides a stronger deterrent for criminals than the police, and one wonders whether this is as a result of the level of response anticipated by the criminal fraternity from the local military in comparison to the response from an urban-based police.

Barclay et al (2001) noted from their research that 94 per cent of those who reported awareness of crimes in the local area had also been a victim of crime. However, it is argued that simply adopting crime prevention measures may not be enough to stop victimisation, and that this also requires a change in culture, routine, thought processes and decision making. This is illustrated by the reported increase in programmes aimed at making farms less attractive to criminals – 'target hardening' (Mears, Scott and Bhati 2007), including a focus on improving levels of guardianship on farms (Clarke and Felson 1993; Bunei, Rono and Chessa 2014), and by the amount of criticism levelled at such programmes including whether they are just too generalised to be able to apply them to individual farms with distinctive requirements, contextualised especially by the size of the operation, terrain, and vegetation, among other factors (Eck 2002). This seems to be supported by research undertaken in Australia for the National Farm Crime Survey (Anderson and McCall 2005), who found that the most commonly used crime prevention measures were traditional in nature, rather than new programmes or techniques: locks on the farm residence (67%), locks on barns/sheds (41%), and guard dogs or geese (39%). Furthermore, the use of traditional crime prevention methods was seen as instrumental in research undertaken in Scotland (George Street Research Limited 1999). They found that 76 per cent of Scottish farmers were more security conscious than five years previously, and the crime prevention methods preferred were those traditional methods; the use of farm dogs was seen as more effective than expensive security systems. Despite this, levels of property identification, including machinery and livestock, have been criticised by the police as too low (Donnermeyer and Barclay 2005; Chalfin et al. 2007).

Potential Predictors of Victimisation

The increase in farm crime has prompted discussion of the role of environmental criminology in the context of farm crime (Bottoms and Wiles 1997), especially discussions of Crime Opportunity Theory (Cohen, Kluegel and Land 1981), Routine Activity Theory (Cohen and Felson 1979) and Rational Choice Theory (Cornish and Clarke 1986).

As part of this, the idea of informal guardianship has become more recognised within farm crime prevention discussions, with Cohen and Felson (1979) arguing that the routine of daily life

farming can facilitate increased levels of victimisation. In particular, they hypothesised that crime is more likely where there is a motivated offender, a suitable target, and a lack of either formal or informal guardianship, with greater levels of all three at the same time producing a multiplier effect (Akers and Sellers 2004). Therefore, informal guardianship focuses around the idea of informal policing by the farmer, family members, farm workers, and neighbours and builds upon and develops established community networks. However, one thing that should be considered carefully is that guardianship will likely be more difficult on-farm due to the size of the property to protect (Weisheit and Donnermeyer 2000), and the location of expensive items and livestock over large areas makes them harder to surveil (Saltiel, Gilchrist and Harvie 1992).

Key physical predictors of victimisation for farmers include the size of the farm, and the distance of the farm from a main road and urban areas. Those researchers who have undertaken original research have found that larger farms, those farms located near a main road, and those located closer to towns and cities were more likely to experience crime, particularly theft (Barclay and Donnermeyer 2007; Mears et al. 2007; Bunei, Rono and Chessa 2013). Weisheit and Donnermeyer (2000) reinforce the effect of distance of the farm from a main road by identifying that improved road systems combined with more efficient vehicles jointly make rural areas increasingly more accessible for potential criminals. However, research undertaken by Anderson and McCall (2005) did contradict the findings relating to distance to towns by stating that those farms situated in remote areas had higher overall rates of victimisation. Perhaps this is a product of where their research, and the research of others they cite, has taken place, which is mostly in Australia, the United States and a few African countries. It is argued that it is difficult to apply these findings within England and Wales due to the differences in agricultural production systems seen in these countries and that seen in England and Wales. In addition, there are clear geographic and topographic differences between these countries and England and Wales. All of this supports the need for more research to be undertaken to assess potential predictors of victimisation in England and Wales.

Another feature that research shows may be a potential predictor of victimisation on farms is the time of the year. It has been reported that farms and farm equipment are more vulnerable to crime at peak seasons of activity during the year. Donnermeyer, Barclay and Mears (2010) noted in their review of existing farm crime literature that such peaks would include harvest, where expensive machinery is out in the fields for long hours during the day, and often left in the field overnight to allow for an early start the next day. The agricultural cycle is known to criminals who establish the best times to target farms and equipment when they are least likely to be securely stored. Related to this, research findings have often shown that crimes are much more likely to take place overnight, as thieves take the opportunity of the cover of darkness to conceal their activities (Hanson 2001; Bunei et al. 2013).

A final key factor in establishing the likelihood of farms becoming victims, concerns the surrounding geography of the farm. However, research addressing this issue as a potential predictor seems to be contradictory. On one hand, some research concludes that those farms with high levels of vegetation and a hilly terrain were more likely to be victims of crime (Barclay and Donnermeyer 2002). Whereas, other research has tended to show that those farms with a largely flat terrain adopted higher levels of guardianship as a result of higher rates of victimisation (Mears et al. 2007).

Attitudes towards the Police

In recent years, levels of confidence in the police among farming communities have diminished, partly as a result of the ongoing restructuring of the police forces in England and Wales and a focus on reactive policing meaning increasingly target driven policing focusing on crime hotspots (Gilling 2011). This move away from local policing to an urban-centric focus inevitably led to the closure of many rural police stations (Mawby 2004), and heralded a change in the relationship between the police and the farming community.

As a result of these changes, and the diminishing communication between the police and farming communities, the conviction rates of offenders decreased, partly as a result of the police not being able to identify the offender, but also because of the problems identifying the owners of property and the lack of understanding of farm crime and the surrounding issues within the criminal justice system (Barclay et al. 2001).

A key issue in understanding farm crime statistics is the confidence levels of the farming community in the police, and the lack of reporting of farm crimes. It is arguable that these two issues combined are key in establishing why it is almost impossible to ascertain a real perspective on the levels of farm crime across England and Wales. Low confidence in the police leads farmers to believe they are on their own in the battle against criminals targeting farms, that there is little they can do to protect their farm, and that it is impossible to protect their property (Barclay et al. 2001).

Whilst it is noted that any police response would take longer due to the relative isolation of many farms (Aust and Simmons, 2002), simple acts like regular news from the police about what they are doing and what has happened in the area may be enough to make farmers think more about securing their property, but also reassure farmers that the police are actually doing something about the problems (Barclay et al. 2001).

Despite attempts to quantify farm crime, such as the annual NFU Mutual Rural Crime Survey, non-reporting of crimes means that any calculations of losses produces an underestimate

of the real problem (Swanson 1981). In addition, inherent problems and inconsistencies in the recording of farm crimes by the police exacerbates the issue and makes regional comparisons near impossible (Jones 2010).

A key finding by Donnermeyer and Barclay (2005) shows that farmers are discouraged from reporting farm crimes, or even helping the police, due to the leniency of the courts, and the fact that prosecutions are too few and far between. Communities also feel that there seems to have been a change in the reliance of the police on the community, which may have been driven by the Crime and Disorder Act 1998 (HMSO 1998) in England and Wales, meaning that the community and the individual are seeing an increasing shift of responsabilisation with regards to crime prevention (Garland 1996).

Many reasons have been discussed for the non-reporting of farm crime, all of which contribute to research figures being often far higher than those quoted by the official statistics (Mawby and Jones 2004). Farmers may not be reporting these crimes as they feel they are too trivial, or they do not realise it has happened in the first place (Barclay and Donnermeyer 2009; Barclay, 2003).

By undertaking an analysis of the levels of crime prevention use among the farming community in England and Wales, potential predictors of farm victimisation, as well as farmers attitudes towards the police, it is possible to make initial steps towards understanding the culture of the farming community in England and Wales in relation to farm crime and on-farm crime prevention. Thus by understanding the attitudes and beliefs that the farming community hold, it may be possible to address the decision making and behaviour of this community and ‘nudge’ (Thaler and Sunstein 2008) them towards better decisions regarding the protection of their property.

Research Question and Research Aim

As a result of the background discussed, the Research Question and specific Aims of this study are as follows: Does the culture of the farming community in England and Wales create a barrier to the improved uptake of appropriate crime prevention methods on farm?

There are two specific aims: (1) to identify the underlying attitudes of farmers towards farm crime, crime prevention and the police, in order to make recommendations on the use of behavioural science to support crime prevention decision making among farmers; and (2) to identify the levels, and potential predictors, of victimisation among the farming community, and whether there are any key differences between agricultural sectors.

Methodology

This research forms part of a larger piece of mixed methods research. This survey represents the first tranche of data collection with the aim of obtaining quantitative data to identify baseline attitudes of farmers towards crime prevention and the police, along with an indication of levels of victimisation, repeat victimisation, and potential predictors of victimisation. The questions were partly based upon those used in the Australian Farm Crime Survey (McCall 2003), along with key questions needed to obtain the required information for this piece of research. The Australian Farm Crime Survey was identified as a source for a number of questions due to the robust methodology used by the researchers, and the useful data that was obtained from the survey. Furthermore, using part of an existing survey allows for direct comparison between that research and the current project. Once the questions were identified, they were grouped into thematic areas that reflected the extant research areas that have been identified.

To ensure this combination of questions worked, and the validity of the answers obtained, a pilot study was carried out. As the survey was likely to be seen by farmers with varying educational levels, it was essential to ensure that the questions were understandable without being simple to the point of being patronising. This research is addressing issues that have not been raised before in England and Wales, and so there is a need to collect original data and to ensure that the survey is capable of collecting the information required to progress the research. The pilot study also allowed the researcher to identify any required revisions to the questions that were needed prior to the survey being sent out to the target population.

The pilot study was completed by twenty people in total; sixteen completed the survey online who have knowledge of, or a background in, farming, but were not farmers by trade; a further four people completed the survey in a paper form who have a farming background. This allowed the researcher to obtain feedback from the target audience, and to ensure that all questions were clear to the participant.

Once all issues raised during the pilot study had been addressed, the survey was finalised, launched via an online survey tool, Bristol Online Surveys (www.survey.bris.ac.uk), and the details distributed to the farming community across England and Wales. In order to reach as many farmers as possible who would be representative of the victim demographics of farmers across England and Wales, but also representative of the wider farming community, the survey was conducted online, and a snowball sampling methodology was employed. The survey was promoted using social media including Facebook, Twitter and LinkedIn, regional NFU newsletters, Rural Services Network newsletters, farming press, Farmers' Club, the Organic Farmers and Growers Organisation, British Institute of Agricultural Consultants, Association of

Independent Crop Consultants, Crimestoppers via their rural crime campaign, and professional network including rural policing teams and Harper Adams University staff.

The survey was kept open for responses for 3 months. Whilst it is noted that this is quite a long time for a survey to be available, it allowed the survey to be promoted in a number of rural crime social media discussions in order to maximise the number of responses. In total, there were 126 participants who took part in the survey; 71 of these fully completed the survey, with a further 55 completing around two thirds of the survey providing enough useful information that they were included in the analysis. Responses were coded in Microsoft Excel, and imported into SPSS so that appropriate statistical analysis could be carried out. Four key statistical tests were identified, driven by the type of data obtained by the survey, and the analyses that were identified. These tests were established using guidance from Pallant (2013). According to West (1999), with 126 participants, this survey is statistically significant at the 90% level with a +/- 10% margin of error.

In order to examine the key variables of crime prevention addressed in the extant literature from a UK standpoint, a variety of statistical tests were employed in Tables 3 through 8. A significant chi-square (χ^2) analysis was used to test for statistical independence. Chi-square is appropriate when one or both of the variables are at the nominal level. A significant chi-square indicates that the two variables are not statistically independent, and therefore, are likely associated to some degree. However, chi-square cannot indicate the strength of the relationship, so other non-parametric measures must be employed. Both the Cramer's V and the Phi coefficients are non-parametric statistics that indicate the strength of the association between two variables. The Cramer's V statistic is useful when any one or both of the variables have more than two categories. The Phi statistic is used in cases whereby both variables contain only two categories (i.e., a 2X2) table. The Phi coefficient is equivalent to a Pearson's correlation coefficient under the conditions of a 2X2 analysis. Also used were three other statistics. One was the Kruskal-Wallis test. This is the test statistic for a one-way analysis of variance when the independent variable is nominal and the dependent variable is at least ordinal. Second, the Mann-Whitney is a non-parametric test of a possible difference between two groups (i.e., victim or not a victim) that does not require the assumption of normality. Finally, Spearman-Rho is a measure of an association based on the distributions of two variables where their categories can be ranked. Neither variable needs to be at the interval-level, hence, Spearman's Rho is appropriate for nominal and ordinal level data.

Results and Analysis

Table 1 presents descriptive statistics for the participants of the survey in comparison to the agricultural sector in the United Kingdom. These indicate that, with a few exceptions, the survey sample is generally representative of the wider farming community in the UK. It is worth noting

that whilst the age ranges of the survey sample show a different distribution than the wider population, it remains representative of the fact that the farming community in the UK is aging.

Table 1: Selected Participant Characteristics Compared to UK-Wide Farming Population

<i>Characteristics</i>	<i>United Kingdom (%)</i>	<i>Survey Participants (%)</i>
Gender		
Male	87.7	73.8
Female	12.3	26.2
Age Range (UK/Survey)		
<35 / <30	3	14
35-44 / 31-40	10	22
45-54 / 41-50	25	24
55-64 / 51-60	28	26
65+ / 61+	34	14
Employment Status		
Farmer & Family	61.9	82.5
Manager	2.3	2.4
Other Full-time/Permanent	13.5	11.1
Other Part-time/Temporary	8.4	2.4
Seasonal	13.9	1.6
Farm Size		
<20 hectares	44.8	5.6
20-49 hectares	19.3	11.1
50-99 hectares	15.6	23.8
100 + hectares	20.3	59.5
Agricultural Sector		
Arable	28.1	28.6
Upland Livestock	25.4	14.3
Lowland Livestock	28.3	24.6
Horticultural	2.7	3.2
Mixed	15.5	29.4

In addition to the above key characteristics of the participants taking part in the survey, the key data relating to victimisation levels of those participants can be seen in Table 2 below. Approximately 63 percent of participants reported being a victim of farm crime in the previous 12 months; and of those, over half (53.5%) reported being a victim more than once.

Farm crime prevention

From the analyses carried out, it can be seen that there are a number of key significant results obtained from the online survey.

The results from this survey show that among the farming community, crime prevention measures are not used as widely as possible. As indicated in Table 3, a chi-square (χ^2) test of independence analysis will indicate if there was a statistical significance difference between victimisation and the type of crime prevention measure used. Only when considering standard locks/padlocks and membership of a local Farm Watch scheme was the chi-square value statistically significant.

Table 2: Levels of Victimisation as Reported by Survey Participants: Past 12 Months

Victimisation	N	%
Been a victim?		
Yes	71	62.8
No	42	37.2
Repeat Victimisation		
1 time	33	46.5
2 times	17	23.9
3 times	14	19.7
4 times	3	4.2
5 times	2	2.8
7 times	1	1.4
10 times	1	1.4

The chi-square test of independence was further employed to address the reasons for using crime prevention measures, based on farmers' victimisation experiences. Results in Table 4 show statistically significance chi-squares between a number of crime prevention measures and consideration of how easy it is to access the farm, the participant having been a victim of crime, whether a crime had been committed on a neighbouring farm, and other crimes that had been committed in the local community. However, the strength of their respective associations with victimisation was small.

**Table 3: Analysis of Crime Prevention Measures Reported Used by Participants
on Their Farms**

What Crime Prevention Measures Used: Chi-square Analysis (N = 113)	F	df	χ^2	P	Cramers' V / Phi
Variables					
CCTV	35	1	0.00	1.00	.099
Entry Alarms	27	1	0.45	0.50	0.37
Boundary Alarms	9	1	0.69	0.41	0.23
Standard Locks/Padlocks	64	1	4.31	0.04*	0.23
Heavy Duty Locks	49	1	0.26	0.61	0.48
Signs	53	1	0.09	0.76	0.61
Locking Farmhouse	88	1	0.00	1.00	0.89
Secure Vehicle Storage	34	1	0.00	1.00	0.88
Fuel alarm	6	1	0.00	1.00	0.84
CESAR	27	1	2.50	0.11	0.07
Tracker	12	1	0.001	0.98	0.73
Recording serial numbers	27	1	2.50	0.11	0.07
Noisy animals	59	1	0.38	0.54	0.42
Smart water	9	1	0.01	0.91	0.64
Farm watch	44	1	2.74	0.09**	0.06
Other group	10	1	0.00	1.00	0.85
Gates	9	1	0.01	0.91	0.64
Natural barriers	1	1	0.00	1.00	0.44
Security lighting	1	1	0.00	1.00	0.44
Automated number plate recognition	1	1	0.07	0.79	0.19
Vehicle immobiliser	3	1	0.00	1.00	0.89
Microchipping	1	1	0.59	0.44	0.44

* Significant at the $p < 0.05$ level;

** significant at the $p < 0.1$ level

Table 4: Analysis of Reasons Crime Prevention Measures Were Used

Reasons: Chi-square Analysis	N	df	χ^2	P	Cramers' V / Phi
Variables					
Cost of farm machinery	113	5	4.03	0.55	0.19
Keeping the farm secure	113	3	1.44	0.70	0.11
Biosecurity	113	5	7.53	0.18	0.26
Tourists	113	4	3.23	0.52	0.17
How easy it is to get to the farm	113	4	9.28	0.05*	0.29
Newcomers to the area	113	4	6.38	0.17	0.24
Participant been a victim	113	4	34.46	0.00***	0.55
Neighbour been a victim	113	3	11.38	0.01**	0.32
Other local crime	113	4	9.10	0.05*	0.28
Insurance incentives	113	5	6.63	0.25	0.24
Government encouragement	113	5	1.42	0.92	0.11
Police encouragement	113	5	3.24	0.66	0.17

* Significant at the p<0.05 level;
 ** significant at the p<0.01 level;
 *** significant at the p<0.001 level

Potential Predictors of Victimization

When considering the part that key demographic and geo-physical factors have in determining likelihood of victimisation, results show that in England and Wales only two of these key factors play a significant part as potential predictors of farm victimisation (Table 5). Firstly, in terms of overall likelihood of victimisation, farm size was the only factor that

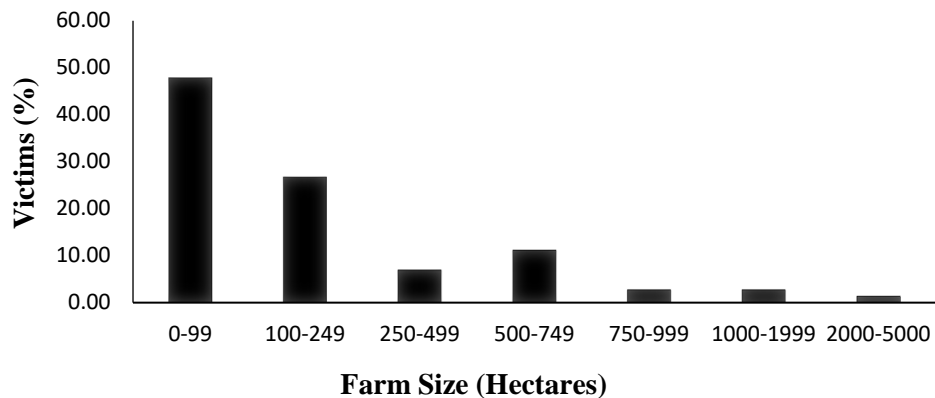


Figure 1: Percentage of Participants Who Were Victims of Crime by Farm Size

explained the significant difference between the likelihood of becoming a victim, and not becoming a victim when analysis was carried out using a Mann-Whitney U test. In addition, further analysis of this data using Spearman’s Rank test indicated that farms with less than 250 hectares in size were significantly more likely to be a victim of crime. This is also shown in Figure 1, below. The statistical analysis showed that there was an almost perfect negative correlation, with the size of the farm helping to explain 91percent of the variance in victimisation. This perfect, negative correlation reached statistical significance at the high $p < 0.001$ level.

When considering repeat victimisation, the only key factor significantly affecting the likelihood of being a victim more than once was the distance of the farm from a neighbouring farm, with repeat victimisation being higher on more isolated farms. Turning to Table 6, a Spearman’s Rank test showed that there was a moderate, positive correlation between the

Tables 5 a-c: Analyses of Key Factors Affecting the Likelihood of Becoming a Victim

a. Victimisation: Chi-square Analysis	N	df	χ^2	P	Cramers' V / Phi
Variables					
Gender	113	1	1.74	0.19	0.12
Agricultural Sector	113	4	0.92	0.92	0.09
Terrain	113	3	5.66	0.13	0.22
Tenure	113	2	1.08	0.58	0.10
Presence on farm	113	5	7.58	0.18	0.18
b. Victimisation – Mann Whitney U Test Analysis	N	U	Z	P	R
Variables					
Age Range	113	1255.0	-1.44	0.15	-0.14
Distance of farm to town	113	1326.5	-1.01	0.31	0.09
Distance of farm to Road	113	1251.0	-1.45	0.15	-0.14
Distance of farm to police	113	1408.0	-0.51	0.61	-0.05
Distance of farm to neighbour	113	1295.5	-1.19	0.23	-0.05
Farm Size	113	1102.5	-2.42	0.02*	-0.23
* Significant at the $p < 0.05$ level					
c. Victimisation – Spearman’s Rho Analysis	N	Rho	P	Variance (%)	
Variable					
Farm Size	71	-0.96	0.001*	91.2	
* Significant at the $p < 0.001$ level					

distance from the participant farm to a neighbouring farm and repeat victimisation, with the distance of the farm to a neighbouring farm helping to explain 6 percent of the variance in participant repeat victimisation. This moderate, positive correlation reached statistical significance at the traditional $p < 0.05$ level.

Attitudes towards the police

Two aspects that indicated participant attitudes towards the police were investigated: levels of reporting a crime to the police (Table 7), and participant satisfaction with the police (Table 8). The identified key demographic and geo-physical factors were analysed in relation to both of these variables.

Tables 6 a-c: Analyses of key factors affecting the likelihood of becoming a victim more than once

a. Repeat Victimisation – Kruskal Wallis Test Analysis					
	N	df	χ^2	P	
Variables					
Agricultural Sector	71	4	2.16	0.71	
Terrain	71	3	3.14	0.37	
Tenure	69	2	0.03	0.98	
Presence on farm	71	5	3.96	0.55	
b. Repeat Victimisation – Mann Whitney U Test Analysis					
	N	U	Z	P	R
Variable					
Gender	71	503.0	-0.64	0.52	-0.08
c. Repeat Victimisation – Spearman’s Rho Analysis					
	N	Rho	P	Variance (%)	
Variables					
Age Range	71	0.01	0.91	0.02	
Distance of farm to town	71	-0.08	0.49	0.67	
Distance of farm to road	71	-0.01	0.96	<0.01	
Distance of farm to police	71	0.01	0.94	<0.01	
Distance of farm to neighbour	71	0.24	0.04*	6.0	
Farm size	71	0.19	0.11	3.0	

* Significant at the $p < 0.05$ level

With regards to the effect these key factors have on the reporting of crimes in England and Wales, only the distance of the farm to the nearest main road explained the significant difference between the likelihood of reporting the crime to the police and not reporting the crime to the police when analysis was carried out using a Mann-Whitney U test. Further analysis, using Spearman’s Rank, showed that farms located closer to a main road – within 1 mile – are significantly more likely to report the crime to the police as shown in Figure 2. The statistical analysis indicated that there was a large, negative correlation, with the distance of the farm to the nearest main road helping to explain 57 percent of the variance in reporting of a crime to the police. This large, negative correlation reached statistical significance at the traditional $p < 0.05$ level.

Tables 7 a-c: Analyses of key factors affecting likelihood of victims reporting a crime to the police

a. Report to Police – Chi Square Analysis					
	N	df	χ^2	P	Cramers' V/Phi
Variables					
Gender	52	1	0.07	0.79	0.58
Agricultural Sector	52	4	5.26	0.26	0.32
Terrain	52	3	0.16	0.99	0.55
Tenure	50	2	2.38	0.30	0.22
Presence on farm	52	5	3.54	0.62	0.62
b. Report to Police – Mann Whitney U Test Analysis					
	N	U	Z	P	R
Variables					
Age Range	52	319.5	-0.26	0.79	-0.04
Distance of farm to town	52	304.0	-0.56	0.58	-0.08
Distance of farm to road	52	229.5	-1.95	0.05*	-0.27
Distance of farm to police	52	292.5	-0.78	0.44	-0.11
Distance of farm from neighbour	52	331.0	-0.05	0.96	-0.01
Farm Size	52	314.0	-0.39	0.69	-0.05
* Significant at the $p < 0.05$ level					
c. Report to the Police – Spearman’s Rho Analysis					
Variable	N	Rho	P	Variance (%)	
Distance of farm to road	52	-0.76	0.05*	57.3	
* Significant at the $p < 0.05$ level					

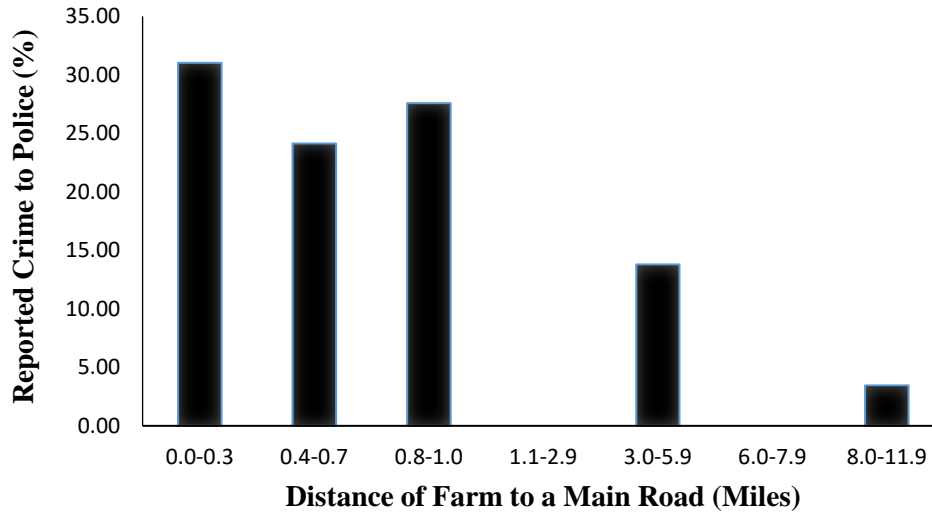


Figure 2: Percentage of Participants Who Reported Crimes to the Police Against Distance of the Farm to the Nearest Main Road

The last statistically significant result obtained from analysis of this data related to the satisfaction levels towards the police reported by the participants. Analysis using Spearman's Rank test indicated that those farms located closer to a main road were significantly more satisfied with the way the police are dealing with reports of farm crime and what the police are doing to tackle farm crime. The statistical analysis indicated a moderate, negative correlation, with distance of the farm to the nearest main road helping to explain 10.9% of variance in participant satisfaction of the police. This moderate, negative correlation reached statistical significance at the $p < 0.1$ level.

Discussion

It is noted that the number of participants who took part in the survey was relatively small. However, as seen in Table 1, the demographics of the participants was fairly representative of the wider farming community, thus allowing a level of generalisability. It is also noted that the survey could benefit from greater geographic granularity with regards to location of the farm to ensure that the same farm is not being talked about by different people. Furthermore, it is arguable that, by conducting the survey wholly online, a proportion of the farming community may have been excluded from taking part; particularly older farmers with little or no computer experience, and those who experience poor or intermittent internet signal. This could be addressed by employing a telephone, postal, and face-to-face survey methodology. For those who do wish to complete the survey online, it must be ensured that the online survey is optimised for a variety of devices including tablets and mobile phones.

Tables 8 a-c: Analyses of key factors affecting victim's satisfaction with the police

a. Police Satisfaction – Kruskal Wallis Test Analysis					
	N	df	χ^2	P	
Variables					
Agricultural Sector	27	3	1.29	0.73	
Terrain	27	3	3.00	0.39	
Tenure	27	2	0.06	0.97	
Presence	27	4	0.46	0.46	
b. Police Satisfaction – Mann Whitney U Test Analysis					
Variable	N	U	Z	P	R
Gender	27	48.0	-1.24	0.20	-0.24
c. Police Satisfaction – Spearman's Rho Analysis					
Variables	N	Rho	P	Variance (%)	
Age Range	27	0.09	0.64	0.9	
Distance of farm to town	27	0.05	0.80	0.25	
Distance of farm to road	27	-0.33	0.09*	10.89	
Distance of farm to police	27	-0.16	0.42	2.56	
Distance of farm to neighbour	27	-0.06	0.75	0.36	
Farm size	27	-0.19	0.32	3.96	

* Significant at the $p < 0.1$ level

In relation to crime prevention, this survey has shown that crime prevention measures are not used widely in England and Wales, and supports the previous findings of McCall and Homel (2003). Despite the large range of products available to farmers to protect their property, the most used were standard padlocks – those with no additional security features such as enclosed shackles and padlock shackle brackets, and membership of the local Farmwatch group. However, one would question how useful either of these would actually be, as standard padlocks can be picked or broken by a determined criminal, and the success of Farmwatch is only measurable by the number of active members registered. As with many things, it can be argued that success is very localised and therefore, rather than using a broad-brush approach, it may be more useful for farmers to consider what is appropriate crime prevention for their farms, rather than simply using the cheapest option which may then fail. For example, Farmwatch may well be a success in some areas and not in others, but such success is reliant on neighbours and communities getting along with each other.

When considering the reasons why participants were using crime prevention measures, a key factor was how easy it is for people, including criminals, to access the farm. This would include the general road network, but also access points on the farm and gateway security. However, the main driver for use of crime prevention measures was the crime itself; whether the farmer was a victim, a neighbouring farm, or indeed just crime in the local community. This would tend to suggest that despite the low levels of crime prevention used, such security steps are more likely to be taken where crimes have occurred, even if the participant was not personally targeted. Furthermore, despite various attempts by police forces across England and Wales aimed at creating a more proactive approach towards on-farm crime prevention, these results would tend to suggest that whilst the farming community may be making the right noises to the police, they remain generally reluctant when it comes to employing security measures on their property.

The presence of a capable guardian on farm does not, on its own, reduce the likelihood of victimisation. The results have shown that there was no significant correlation between presence on farm and whether or not a participant became a victim ($p=0.18$). Of those who were victims, there was no significant difference in the number of times they were victimised ($p=0.55$). In light of this, it is arguable that, of the four contributory factors that affect the likelihood of victimisation, as discussed in Crime Opportunity Theory (Cohen, Kluegel and Land 1981) – target attractiveness, proximity between offender and target, exposure, and lack of guardianship – improved guardianship on farms may have less of an effect in isolation. This goes some way to support the findings of Weisheit and Donnermeyer (2000) relating to guardianship of large areas, however it should be considered whether guardianship is more likely to succeed in combination with one or more of the other contributory factors.

Previous research has shown, in relation to physical predictors of farm victimisation, that it is predominantly larger farms near main roads and urban centres that are more likely to experience crime (Barclay and Donnermeyer, 2007; Mears et al, 2007; Bunei et al, 2013). However, these pieces of research were carried out in Australia, the United States, and Kenya where agricultural systems are very different to England and Wales. This research has shown that the likelihood of becoming a victim on a farm in England and Wales was more likely in cases where the farm is small, less than 250 Hectares. In contrast, proximity to main roads, urban centres or neighbouring farms did not have a significant impact. It is arguable that in England and Wales there are a larger number of farms that fall within this size category, and therefore more opportunity for victimisation. Also, it may well be the case that offenders target smaller farms because the key items they are targeting are more likely to be located over a larger area on larger farms, thus increasing the potential for the offender to be apprehended; smaller farms may offer more cover from buildings and the target property is more likely to be located close together making it easier to steal them in a short period of time.

With regards to repeat victimisation, being a victim more than once was only significantly affected by the proximity of the farm to a neighbouring farm, with such repeat victimisation becoming more likely the more isolated a farm was. Such isolation may mean that it is less likely that the offender will be seen or caught in the act by a neighbour. Despite the risk to the offender of having to travel further distances, often on more exposed roads, this is clearly an example of the offender employing Rational Choice Theory (Cornish and Clarke, 1986) and weighing up the costs and benefits of targeting this type of property.

It is interesting to note that, whilst size and distance from towns and main roads have been considered by many of the researchers undertaking original research to establish these indicators of victimisation, none of these projects have considered the impact of the distance of the farm from the nearest police station on the likelihood of becoming a victim. Whilst this research did not show that this variable had a significant impact on victimisation or attitudes towards the police, with the continued closure of rural police stations across England and Wales (Mawby, 2004), it may be something that changes in the near future.

When considering the impact that these geo-physical factors have on the attitudes of the participants towards the police, these results are quite interesting. In relation to the reporting of crimes to the police, only the distance of the farm to a main road was seen as having a significant impact; and those farms within one mile of a main road were more likely to report a crime to the police. Despite the distance of the farm to a main road not having a significant effect on the likelihood of victimisation and repeat victimisation, perhaps there is a perception among the farming community that being closer to a road makes them more vulnerable, which may well relate back to the ease of access to the farm being a significant reason for the use of crime prevention measures on farm. In addition, it may be the case that those farms located closest to a main road feel that the police are more likely to respond to the report of a crime, as directing responding officers to the farm may be easier than if the farm was located along a series of narrow, unmapped lanes, which many farms across England and Wales still are. These aspects require further exploration to understand the reasoning behind these results.

This latter point is partly supported by the fact that this research shows that only those farmers located close to a main road who reported a crime were significantly more satisfied with the way the police are addressing farm crime. These particular results suggest that farmers located closer to main roads are more likely to have a positive attitude towards the police. As such it is perhaps the case that the police could focus their efforts on improving the situation between themselves and farmers who are more isolated and those who farm larger areas in order to improve reporting rates and satisfaction levels. This could be addressed by ensuring that when crimes are reported, they are handled in an appropriate manner from the outset.

Conclusion

From this research, it can be concluded that crime prevention levels among farmers in England and Wales continues to be low, despite an inexorable rise in farm crime. Police need to try and identify a different approach to encouraging the adoption of crime prevention, potentially by employing behavioural science in their methods. By using key concepts of behavioural science, and understanding the reason behind decision to use, or indeed not to use, crime prevention along with the key geo-physical characteristics that influence the likelihood of victimisation, repeat victimisation, reporting of crimes, and overall satisfaction, the police and crime prevention advisers can begin to tailor advice that is specific to an individual farm, creating an individual crime prevention choice architecture for each farm, enabling the nudging of farmers towards more beneficial crime prevention decision making.

This research takes the first step in identifying the underlying attitudes, beliefs and culture of the farming community in England and Wales, in order to move towards the use of behavioural science to enable improved crime prevention decision making among the farming community.

Endnotes

¹The authors would like to acknowledge the help and guidance provided by Professor Rob Mawby in relation to this research.

²Victimisation is defined as the unwarranted singling out of an individual or group for subjection to crime (BusinessDictionary.com. 2016).

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Appendix: Frequency Distributions for Tables 4 through 8

Frequency Distributions for Table 4:

Reasons Crime Prevention Used	Victim?	Much more important	Somewhat more important	Neither Important nor Unimportant	Somewhat less important	Much less important	No Opinion
Cost of Farm Machinery	Y	27	31	9	2	1	1
	N	12	23	7	0	0	0
Keeping the farm Secure	Y	31	34	5	0	0	1
	N	15	24	3	0	0	0
Biosecurity	Y	5	25	22	14	2	3
	N	8	17	12	3	0	2
Tourists	Y	4	11	31	20	5	0
	N	4	7	22	6	3	0
How easy it is to get to the farm	Y	9	17	33	7	5	0
	N	6	19	16	1	0	0
Newcomers to the area	Y	14	23	23	10	1	0
	N	6	7	23	5	1	0
Participant been a victim	Y	37	26	4	1	0	3
	N	7	26	4	3	0	4
Neighbour been a victim	Y	23	40	7	1	0	0
	N	9	17	14	2	0	0
Other local crime	Y	8	48	13	0	1	1
	N	8	18	16	0	0	0
Insurance incentives	Y	6	14	38	11	2	0
	N	2	13	19	4	2	2
Government Encouragement	Y	4	5	40	11	8	3
	N	1	3	27	6	3	2
Police Encouragement	Y	7	16	26	13	6	3
	N	7	13	14	5	2	1

Frequency Distributions for Tables 5a-5c:

Victimisation	Victim	Not Victim
Gender		
Male	48	34
Female	23	8
Agricultural Sector		
Arable	22	13
Upland Livestock	8	7
Lowland Livestock	17	9
Horticulture	3	1
Mixed	21	12
Terrain		
Flat	17	5
Slightly Uneven	33	19
Quite Hilly	13	15
Very Hilly	8	3
Tenure		
Owned Outright	43	28
Mortgaged	9	7
Leased	17	7
Presence on farm		
All of the time	17	15
Most of the time	32	23
Some of the time	7	2
Occasionally	12	2
Never	2	0
Don't Know	1	0
Victimisation	Victim	Not Victim
Age Range		
<18	0	1
18-20	1	4
21-30	9	2
31-40	15	11
41-50	17	10
51-60	16	13
61+	13	1

Frequency Distributions for Tables 5a-5c, continued:

Distance of farm to town (Miles)		
0.0-0.49	1	2
0.5-0.9	3	1
1.0-3.9	20	11
4.0-6.9	18	17
7.0-9.9	10	5
10.0-14.9	14	4
15.0-20.0	5	2
Distance of farm to Road (Miles)		
0.0-0.3	15	8
0.4-0.7	15	5
0.8-1.0	14	6
1.1-2.9	14	12
3.0-5.9	10	6
6.0-7.9	1	3
8.0-11.9	2	1
12.0-20.0	0	1
Distance of farm to police (Miles)		
0.0-0.5	1	0
0.6-1.5	4	1
1.6-3.0	9	7
3.1-7.0	23	18
7.1-10.0	18	7
10.1-15.0	8	6
15.1-20.0	7	2
20.1-25.0	1	1
Distance of farm to neighbour (Miles)		
0.0-0.29	10	3
0.3-0.59	22	9
0.6-0.89	2	1
0.9-1.5	17	19
1.6-2.4	11	2
2.5-3.9	5	6
4.0-5.9	4	0
6.0-9.0	0	2
Farm Size (Hectares)		
0-99	34	11
100-249	19	12
250-499	5	8
500-749	8	5
750-999	2	1
1000-1999	2	2
2000-5000	1	3

Frequency Distributions for Tables 6a-c:

Repeat Victimisation	1	2	3	4	5	7	10
Agricultural Sector							
Arable	10	4	5	1	1	0	1
Upland Livestock	5	1	2	0	0	0	0
Lowland Livestock	9	5	2	0	0	1	0
Horticulture	1	1	0	1	0	0	0
Mixed	8	6	5	1	1	0	0
Terrain							
Flat	5	5	6	1	0	0	0
Slightly Uneven	16	8	4	1	2	1	1
Quite Hilly	6	4	2	1	0	0	0
Very Hilly	6	0	2	0	0	0	0
Tenure							
Owned Outright	21	8	10	2	1	1	0
Mortgaged	4	3	1	0	1	0	0
Leased	7	6	2	1	0	0	1
Presence on farm							
All of the Time	7	3	4	1	1	0	1
Most of the Time	17	8	4	1	1	1	0
Sometimes	3	3	1	0	0	0	0
Occasionally	4	2	5	1	0	0	0
Never	1	1	0	0	0	0	0
Don't Know	1	0	0	0	0	0	0

Repeat Victimisation	1	2	3	4	5	7	10
Gender							
Male	24	9	12	2	2	0	1
Female	9	8	2	1	0	1	0

Repeat Victimisation	1	2	3	4	5	7	10
Age Range							
<18	0	0	0	0	0	0	0
18-20	1	0	0	0	0	0	0
21-30	4	2	3	0	0	0	0
31-40	7	5	2	1	0	0	0
41-50	5	5	3	1	2	0	1
51-60	10	4	2	0	0	0	0
61+	6	1	4	1	0	1	0

Frequency Distributions for Tables 6a-c, continued:

Distance of farm to town (Miles)							
0.0-0.49	0	0	0	0	0	0	1
0.5-0.9	1	1	1	0	0	0	0
1.0-3.9	8	5	5	1	1	0	0
4.0-6.9	10	6	1	0	0	1	0
7.0-9.9	4	2	3	1	0	0	0
10.0-14.9	8	3	1	1	1	0	0
15.0-20.0	2	0	3	0	0	0	0
Distance of farm to road (Miles)							
0.0-0.3	5	6	2	0	1	0	1
0.4-0.7	7	3	3	2	0	0	0
0.8-1.0	10	0	3	1	0	0	0
1.1-2.9	7	4	3	0	0	0	0
3.0-5.9	3	3	2	0	1	1	0
6.0-7.9	0	1	0	0	0	0	0
8.0-11.9	1	0	1	0	0	0	0
Distance of farm to police (Miles)							
0.0-0.5	1	0	0	0	0	0	0
0.6-1.5	1	2	0	0	0	0	1
1.6-3.0	2	3	2	1	1	0	0
3.1-7.0	15	5	2	1	0	0	0
7.1-10.0	6	5	6	0	1	0	0
10.1-15.0	3	2	1	1	0	1	0
15.1-20.0	5	0	2	0	0	0	0
20.1-25.0	0	0	1	0	0	0	0
Distance of farm to neighbour (Miles)							
0.0-0.29	5	3	0	1	1	0	0
0.3-0.59	14	4	3	0	1	0	0
0.6-0.89	1	1	0	0	0	0	0
0.9-1.5	7	5	5	0	0	0	0
1.6-2.4	3	3	2	1	0	1	1
2.5-3.9	1	1	2	1	0	0	0
4.0-5.9	2	0	2	0	0	0	0
Farm size (Hectares)							
0-99	19	6	8	0	1	0	0
100-249	9	5	2	1	1	1	0
250-499	0	3	1	1	0	0	0
500-749	3	2	1	1	0	0	1
750-999	0	1	1	0	0	0	0
1000-1999	1	0	1	0	0	0	0
2000-5000	1	0	0	0	0	0	0

Frequency Distributions for Tables 7 a-c:

Report to Police	Yes	No
Gender		
Male	21	15
Female	8	8
Agricultural Sector		
Arable	12	6
Upland Livestock	4	1
Lowland Livestock	6	7
Horticulture	0	2
Mixed	7	7
Terrain		
Flat	6	5
Slightly Uneven	14	12
Quite Hilly	6	4
Very Hilly	3	2
Tenure		
Owned Outright	16	16
Mortgaged	6	2
Leased	7	3
Presence on farm		
All of the Time	10	5
Most of the Time	12	10
Sometimes	4	2
Occasionally	2	4
Never	1	1
Don't Know	0	1
Report to Police	Yes	No
Age Range		
<18	0	0
18-20	1	0
21-30	2	5
31-40	7	5
41-50	8	4
51-60	7	4
61+	4	5
Distance of farm to town (Miles)		
0.0-0.49	1	0
0.5-0.9	2	1
1.0-3.9	8	7
4.0-6.9	8	6
7.0-9.9	4	3
10.0-14.9	5	4
15.0-20.0	1	2

Frequency Distributions for Tables 7 a-c, continued:

Report to Police	Yes	No
Distance of farm to road (Miles)		
0.0-0.3	9	4
0.4-0.7	7	3
0.8-1.0	8	3
1.1-2.9	0	9
3.0-5.9	4	3
6.0-7.9	0	1
8.0-11.9	1	0
Distance of farm to police (Miles)		
0.0-0.5	0	1
0.6-1.5	1	3
1.6-3.0	5	1
3.1-7.0	11	6
7.1-10.0	9	5
10.1-15.0	2	3
15.1-20.0	0	4
20.1-25.0	1	0
Distance of farm to neighbour (Miles)		
0.0-0.29	5	4
0.3-0.59	10	7
0.6-0.89	0	1
0.9-1.5	7	6
1.6-2.4	4	4
2.5-3.9	3	0
4.0-5.9	0	1
Farm size (Hectares)		
0-99	16	10
100-249	5	7
250-499	2	2
500-749	3	3
750-999	0	1
1000-1999	2	0
2000-5000	1	0