

Desolation in the countryside: how agricultural crime impacts the mental health of British farmers

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Desolation in the Countryside: How Agricultural Crime impacts the Mental Health of British Farmers

Abstract

Agricultural crime is increasingly becoming a fact of life for British farmers. While no official figures exist for this type of crime, key rural stakeholders such as insurers publish regular indicators of the level of the problem. However, these figures, and much of the extant academic research focus almost exclusively on the financial impact of agricultural crime. To date, no research has examined how agricultural crime impacts the mental health of farmers. This research is the first to explore not only how agricultural crime impacts the mental health and wellbeing of farmers in Britain, but also how agricultural crime compares to other farming stressors in its impact on the mental health of British farmers.

An online survey was designed and administered to reach farmers across Britain to obtain quantitative data, but also qualitative data relating to stressors. The data showed that agricultural crime has a significant impact on farmer mental health, with numerous aspects of crime having a clear association with the experience of a number of mental health indicators. The research concludes that there is a clear research gap regarding crime as a farmer stressor and the direct impact this has on farmer mental health. It is argued that the findings of this research support the need for a wider discussion among key stakeholders to examine how farmers can be better supported to address the crime-related factors that are now known to directly affect farmer mental health.

Keywords: agricultural crime; farmer; stress; psychological impact

1. Introduction

Isolation, criminal use of technology, fear of violent repercussion, a lack of confidence in the police, and poor access to victim services means that the psychological impact of agricultural crime (AC) on British farmers may be more extensive than expected (Smith, 2018). It is suggested this may result in challenges to the traditional rural masculinity of the strong, stoic farmer (Connell, 1995), thus potentially leading to the use of other outlets by which farmers assert their masculinity.

No existing research addressing farmer stress in Britain has considered crime as a key factor influencing farmer stress. It is for this reason this paper will present findings on the role of AC

in the state of farmer psychological distress. The extent of the discussion surrounding the psychological wellbeing of farmers is limited in the UK to the media, both general media (BBC, 2019) and the farming press (Dean, 2019), neither of which consider the impact of AC on farmer mental health (MH) and wellbeing. Moreover, extant research relating to farmer stress in the UK has focussed efforts on the socio-economic stressors in farming (Booth & Lloyd, 1999; Deary et al., 1997; Parry et al, 2005).

This novel, world first research will extend the knowledge of farmer stressors and the impact upon farmer MH by exploring the psychological impact that AC has upon the farming community in Britain. Furthermore, this research explores how crime-related MH indicators fit with the experience of other, more recognised, stressors endured by the farming community. This paper presents key findings from the second tranche of data from a larger study. These findings relate to the extent and impact of AC on MH indicators within the farming community in Britain.

1.1 Impacts of Agricultural Crime

Economic Impact

Despite British farmers continuing to battle AC, inconsistent recording of these crimes by the police making it hard to track levels and provide regional comparisons (Jones, 2010). However, with ongoing issues of non-reporting, it is arguable that any police data may not present the full picture (Mawby & Jones, 2004).

As a result, those trying to address AC have to make use of non-official datasets to support the argument that more needs to be done to tackle AC and its' impacts. Such datasets in Britain include the annual NFU Mutual Rural Crime Report, based on client insurance claims, and a national survey undertaken by the National Rural Crime Network (NRCN). The main focus of these reports describes the economic impact of AC, and is often seen as the lead story among media reports of the same. Figure 1 illustrates the levels of AC-related insurance claims from clients of NFU Mutual over a period covering 2009-2019 (reports dated 2010-2020), with latest figures reported in August 2020 showing a 9% rise in claim costs based on the previous year, totalling £54.3m. Furthermore, the report indicates that following a review of claims data from the first half of 2020, livestock theft in April 2020 was already up by 15% based on data from the same time in 2019, a figure at least in part attributable to COVID-19 (NFU Mutual, 2020).

While the figures may be stark, they only tell part of the story. It must be borne in mind that these figures are based on insurance claims. While the largest rural insurer in Britain, NFU Mutual still only insure three quarters of British farmers. Moreover, research by Smith & Byrne (2017) found that only 40% of farmers are reporting AC to their insurers. This being the case, the figure of £54.3m is likely to be a gross underestimation of the true scale of the issue. Furthermore, while this data attempts to quantify the direct economic impact of AC, it does not account for the indirect economic impact experienced by farmers who have been victimised resulting from increased insurance premiums, insurance shortfalls, and loss of income (Smith, 2018), but also the increased costs of crime prevention measures (Mawby, 2014). Neither does it account for the economic impact for the farming sector as a result of reduced food security attributable to AC (Clack & Minnaar, 2018) resulting from livestock theft and illegal slaughter, nor the costs involved with the isolated nature of many farms (Barclay & Donnermeyer, 2007).

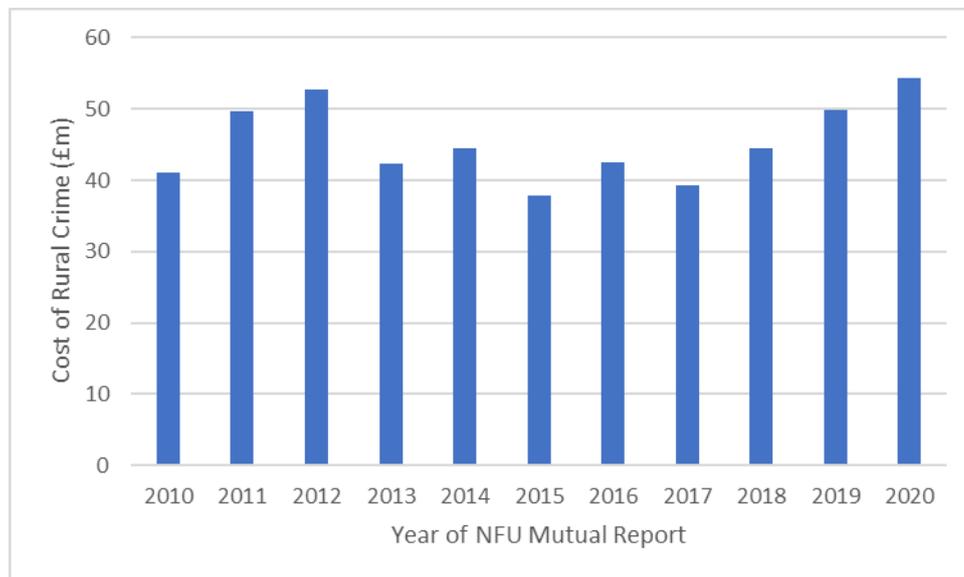


Figure 1: Cost of Rural Crime 2010-2020 (Source: NFU Mutual)

This focus on the economic impact of AC is reflected in the way the media presented the findings from the NRCN Rural Crime Survey, first conducted in 2015 and then repeated in 2018. The publication of the 2015 report (NRCN, 2015) led to headlines of rural crime costing £800m (BBC, 2015; NFU Online, 2015). While being a staggering number, this survey conflates AC with offences such as speeding and anti-social behaviour, as well as civic matters such as fly-tipping, and fails to explore the impact this has on farmer MH. The 2018 report (NRCN, 2018) and the media reports around its release were a little more tempered (Martin, 2018; Anon, 2018), however the economic impact was reported in the key findings of the report as having increased 13% since the previous report (NRCN, 2018). Similar focus on the economic impact of AC can be seen internationally in the way this issue is reported in the

media (Sheather, 2018), but also in academic research (Barclay & Donnermeyer, 2007; Swanson, 1981).

Social Impact

AC inevitably has an effect on the social aspect of the farming communities. Traditionally, farming communities have been seen as close-knit with high levels of density of acquaintance (Freudenburg, 1986). However, research has shown that AC can have a devastating effect on that feeling of community. The NRCN (2018) report points to crime contributing to an erosion of trust in society caused by the damage of personal confidence. These findings support academic research findings showing that AC has a significant impact on farmer trust, not just towards those they do not know, but importantly trust of people they do know (Smith, 2018).

The social impact of AC will be heightened in rural communities as a result of poverty, geographic and social isolation, and a lack of services within their own community available to victims (Deller & Deller, 2010; Public Health England, 2017). Despite the idea of the rural idyll persisting, these very real social issues seen within rural communities will contribute to the exacerbation of AC-related MH issues, and delay the seeking and accessing of help.

Impact on Confidence towards the Police

The 2018 NRCN report concluded that there is now a wholesale loss of trust in rural policing. Furthermore, the report found that a third of crimes are not reported to the police. This concurs with the findings of Smith & Byrne (2017) that only 68% of farmers report a crime to the police. This low level of crime reporting seems to be driven by the response the farmers have historically received when reporting AC. As rural police stations have continued to close (Smith & Somerville, 2013), farming communities have experienced reduced policing visibility which adds to reduced confidence in the police, despite weak evidence that police presence effects crime occurrence (Sherman et al., 1998). When reporting AC, poor communication, lack of police response, low conviction rates, and a lack of understanding of the issue among police (Smith & Byrne, 2017; Smith, 2019; Donnermeyer & Barclay, 2005) has led to the farming community being left feeling like second-class citizens (Smith, 2018), and creating a cycle of no confidence as illustrated in Figure 2.



Figure 2: Cyclic issues affecting the policing of farm crime in England and Wales (Source: Smith, 2019)

Psychological Impact

There has been much research over the last four decades exploring the issue of farmer stress (Walker et al. 1986; McGregor et al., 1995). However, this has revolved around business and social stressors, with much of the research concluding the things that farmers are most stressed about are finances, weather, government regulations, and family relationships (Kearney et al., 2014; Olson & Schellenberg, 1986). Moreover, numerous studies have shown that farmers have an increased tendency to suicidal behaviour (Booth, et al., 2000; Hounscome et al., 2012). This is coupled with the preponderance of the traditional rural masculinity (Brandth, 1995; Connell, 1995; Smith, 2018) leaving the level of help-seeking behaviour among farmers worryingly low (Roy et al., 2014; Yazd et al., 2019), although some research suggests female farmers display higher levels of psychiatric morbidity (Booth and Lloyd, 1999). Thomas et al. (2003) concluded that while rates of depression and depressive ideas were lower among farmers than the general population, their feelings of life being not worth living was higher, thus suggesting the interplay of rural masculinity, fatalism, and a lack of help-seeking behaviour.

Farmer MH practitioners have also overlooked the impact of AC on farmer stress. The Farm Safety Foundation (FSF) were established in 2014 to help farmers with advice relating to farm safety, including issues around MH. As a result of their work, the 'Little Book of Minding Your Head' was produced in 2019 as a guide for farmers struggling with MH issues. While addressing stressors involved in personal life changes and changes at work, there is no mention of AC as a farmer stressor.

This focus is replicated in UK media reports around farmer stress. When exploring aspects of farmer MH, media reports from both the general and farming press focus on similar stressors. Andersson (2020) reports long hours and isolation being key, and the impact these have on MH and farmer safety. Similarly, Levitt (2020) reports the experiences of a female shepherd and the challenges to her MH from severe weather, the 'anti-meat agenda', and the expectations of family. Where the media do consider the psychological impact of AC, the focus is mainly around the issue of fear of crime and repeat victimisation, which are already recognised as very real and significant issues in farming communities (Chalmers, 2020; Case, 2019).

Despite the recent drive to understand the wider impact of AC, the role it plays on farmer MH remains unexplored. These issues are compounded by the fact that, unlike most people, there is no distinction for the farming community between their place of work and their home. The psychological impact of AC may lead to a challenge of the traditional rural masculinity, possibly leading to farmers finding other ways to assert their lost masculinity, such as domestic violence, drug and alcohol abuse, or anti-social behaviour. It is indeed a possibility that, if left unchecked, AC may lead to wider public health challenges, including increased rates of farmer suicide, health and safety incidents, and NHS referrals and admissions of farmers due to physical health issues either directly or indirectly related to stress.

As a result, it is essential that academia, rural stakeholders, and MH service providers have a better understanding of how AC really impacts on the MH of farmers in Britain beyond fear of crime and repeat victimisation. This will enable a more connected approach to helping farmers who may already be in psychological distress prior to a crime event, and to ensure that the right questions are asked at the right time to try and aide British farmers before they take drastic action.

2. Methodology

This paper presents data from an online survey conducted with the aim of identifying baseline data to establish how AC compares with other, more recognised stressors affecting the farming community in Britain. The questions were, in part, based on research previously carried out by Truchot & Andela (2018) to ensure that the impact of AC as a stressor could be compared directly against already established farmer stressor criteria. The work by Truchot & Andela (2018) was identified as a key source of farming stressor questions due to the robust methodology used by the researchers, and the wide-ranging topics covered by the questions asked of farmers. Moreover, by making use of existing question sets in this research, it allows

direct comparison between that piece of research and the findings reported here. To obtain new data on the impact of AC on farmer stress questions were added, both within the general farming stressors questions, but also questions specifically relating to the direct impacts of AC. These crime-related questions were based on the findings of the author's previous research (Smith, 2018). The 12 indicators of MH issues were identified based on symptom information of Post-Traumatic Stress Disorder on the NHS website (NHS, undated). The questions asked were a mix of single option answers, multi-option answers, and Likert scale questions. The latter specifically related to the key questions around farmer stressors, masculinity traits, service provider interaction after victimisation, and crime-related impacts. Where the responses were used in the subsequent analyses, a Cronbach's Alpha analysis was carried out to assess internal consistency of the items within each set of questions. The results of this analysis are as follows:

Farmer Stressors	$\alpha = .95$
Masculinity Traits	$\alpha = .59$
Service Provider Interaction	$\alpha = .92$
Crime-related Impacts	$\alpha = .96$

The items addressed in the farmer stressor, service provider interactions, and crime-related impacts questions showed particularly high levels of internal consistency indicating the items measured the intended subject matter. While the α value for masculinity traits was not as high as the other three question sets, it should still be regarded as showing a moderate level of internal consistency (Hinton et al., 2014). It is suggested that, as this set of questions were based on masculinity traits identified by previous research as either representing the ideal, or being the opposite of what is considered to represent the traditional rural masculine, further consideration of this aspect should be undertaken in order to improve the internal consistency of this scale.

To obtain data across the range of key issues, questions were established and grouped into thematic areas that addressed the requirements of the research questions:

1. General demographic information
2. About the farm
3. Indicators of rural masculinity
4. Victimisation
5. Direct impacts of AC
6. General farming stressors

A short pilot study was conducted to confirm that each question was clear, and the instructions were easy to follow, as the target population of the questionnaire was wide ranging in educational levels. As this questionnaire was addressing issues that have not been researched before in Britain, it was essential to ensure the questions would yield the data anticipated. The pilot study also identified areas where revisions were required to make the questionnaire fit for purpose. The pilot study was conducted by eight people in total, all of whom were known to the researcher and had a knowledge of farming, but none of which were farmers. This allowed the researcher to obtain feedback from the pilot participants that would inform the questionnaire, without taking people directly from the target population.

Once all issues raised by the pilot study had been resolved, and technical checks had been made to ensure the survey worked as expected, it was then launched via an online survey tool, Online Surveys (www.onlinesurveys.ac.uk). The details of the survey were then disseminated to the farming community of Britain. To reach as many of the target population as possible, the survey was conducted online. It was anticipated this would enable data to be obtained from a sample representative of the target population. A stratified, self-selecting, convenience sampling method was employed. While random sampling was not employed, by stratifying the target population the research could be directed at those people to whom the subject area was most relevant, thus avoiding the issue of outliers often seen with convenience sampling (Parsons, 2017). By using an online survey, this allowed potential participants to choose whether or not they would complete the survey, although it was recognised this may introduce self-selection bias (Sharma, 2017). Furthermore, while a self-selecting convenience sample allows research to be conducted quickly, easily, and at low cost, it is recognised that such sampling methods easily introduce the potential for participant bias and thus draw conclusions that are representative of the target population (Etikan, et al. 2016; Leiner, 2016).

The survey was promoted across a range of social media platforms, including Facebook, Twitter, LinkedIn, and Instagram. In addition, details were circulated in the National Farmers Union (NFU) member newsletter, at the NFU annual conference, via the Rural Services Network newsletter, the farming press, national farmer MH charities, and various policing outlets including local force contacts, and the office of the Police and Crime Commissioner for North Yorkshire who is the current chair of the National Rural Crime Network.

The survey was kept open for a period of three months for responses. This ensured participants from a range of farming sectors could complete the questionnaire. A total of 1,570

people accessed the questionnaire, and complete results were obtained from 80 participants. This equates to a 5.1% response rate based upon total views of the questionnaire. Response rates for web-based questionnaires are recognised to be lower than other methods, averaging 6-15% (Lozar Manfreda et al., 2008; Van Mol, 2017). In addition, it is recognised that a low response rate may also be due to the general unwillingness of farmers to talk about these kinds of issues. However, it is arguable that despite this, the findings of this exploratory study gave a broad indication of the role of AC as a stressor, and may well be seen as an underestimate.

It is noted that, while the pool of potential participants in the total target population (farmers, spouses, workers across England, Wales, and Scotland) numbers approximately 358,000 (Defra, undated), it is difficult to establish a response rate based on this figure due to the nature of the non-parametric sampling methodology employed, the use of an online questionnaire method, and the nature of the dissemination of the questionnaire information. This makes it almost impossible to establish how many people within the target population actually saw the details of the questionnaire. As a result, and in accordance with the pragmatic approach to this research, this exploratory study made use of the methodology considered as the best way to obtain an approximation of the current position of how AC as a stressor compares to more well-established farmer stressors. However, while the demographics of the participants did generally reflect that of the target population (Defra, 2019), it is noted that by using an online only survey, some level of bias would inevitably be present in the sampling methodology. Tables 1-3 present the key demographic, and victimisation data provided by the participants.

Characteristics	Survey Participants		
	n	%	
Gender	Male	40	50
	Female	40	50
Age Range	18-35	14	17.5
	35-44	10	12.5
	45-54	15	18.8
	55-64	27	33.8
	65+	14	17.5
Employment Status	Farmer	52	65.0
	Farm Worker, Full Time	3	3.8
	Farm Worker, Part Time	3	3.8
	Farmer Family Member	16	20.0
	Other	6	7.4
Agricultural Sector	Arable	42	52.5
	Beef (Suckler)	18	22.5

Beef (Finishing)	11	13.8
Dairy	6	7.5
Fresh Produce	2	2.5
Fruit	3	3.8
Pig	4	5.0
Poultry (Broiler)	2	2.5
Poultry (Laying)	3	3.8
Sheep	31	38.8
Other	24	30.0

Table 1: General characteristics of survey participants

		N	%
Victim	Yes	72	90
	No	8	10
Repeat Victimization	1	15	20.8
	2	19	26.4
	3	11	15.3
	4	5	6.9
	5	7	9.7
	6	3	4.2
	8	3	4.2
	10+	9	12.5

Table 2: Crime experiences of survey participants

Crime Type	N	%
Theft of tractor	1	1.4
Theft other large machinery	3	4.2
Theft quad bike/ATV/mule	6	8.3
Theft - other vehicle	5	6.9
Theft of tools	28	38.9
Criminal Damage	40	55.6
Trespass	48	66.7
Poaching/Lamping	23	31.9
Hare coursing	24	33.3
Theft Livestock	6	8.3
Livestock Worrying	14	19.4
Injury to livestock	7	9.7
In-field slaughter of livestock	1	1.4
Crop damage by vehicles	25	34.7
Theft agricultural chemicals	1	1.4
Fraud	2	2.8
Cybercrime	0	0
Threats of violence	19	26.4
Violence	4	5.6
Other	18	25.0

Table 3: Crime types experienced by survey participants

Results data were exported into Microsoft Excel, reviewed and cleaned where necessary. All qualitative responses to open-ended questions in the survey were saved in a separate file for separate analysis and inclusion as required. The coded quantitative data were then imported into SPSS to enable appropriate statistical analysis to take place. Using guidance from Pallant (2013), two key statistical tests were identified, driven by the data obtained by the survey. To establish how AC impacts upon British farmers, and how that compares to other stressors that they experience, the statistical tests used were a Mann Whitney U-Test, and Spearman's Rho. The first is a non-parametric test of difference between two independent groups based on a categorical independent variable and a continuous dependent variable. The second is a measure of association between two identified variables, where the data can be ranked.

According to West (1999: 66), with 80 participants, the results of this survey provide a 95% confidence level with a +/- 10% margin of error. While a larger sample size would have reduced the margin of error, thus enabling a higher level of confidence that the results were representative of the target population, given the time and cost restraints of the research, a higher level of statistical accuracy would have been hard to achieve. As such, from a pragmatic standpoint, it was decided that some meaningful, indicative data with the reported level of accuracy from this sample size would be sufficient for this exploratory piece of research.

In addition, a brief analysis of the qualitative data obtained from the open question (question 20) asking participants to list their top three AC-related impacts was undertaken. This examined the number of times each impact was mentioned to provide a top three reported crime-related impact list. A word cloud was created using www.wordcloud.com. All of the responses were collated into a word document with all capitalisation removed. All non-relevant words, such as conjunctions (and, but), as well as some adjectives (close, due) and some nouns and verbs (thought, look) were removed from the word lists used to create the word cloud so that the key words relating to the subject were included. This left a word list of 184 AC-related impact response words included in the analysis.

3. Results

3.1 Descriptive Analysis

An analysis of the descriptive statistics was conducted to evaluate the mean and standard deviation for each crime-related impact item included in this survey. The descriptive statistics are presented in Table 4. Furthermore, an analysis of the qualitative responses given to an

open question relating to participant rated crime-related impacts was undertaken to explore how crime is affecting farmer MH.

		N	Mean	Std. Dev.
Impact on business	Inconvenience/reduced business efficiency	72	4.68	1.208
	Loss of control	71	3.90	1.551
	Loss of staff	65	1.49	0.773
	Lost business	70	3.01	1.757
	Lost income	71	3.97	1.647
	Put off making decisions until later	68	3.24	1.487
	Thought of giving up farming	70	3.09	1.631
	Time lost	70	4.59	1.378
	Worry about additional paperwork	67	4.01	1.610
Direct crime effects	Additional costs for crime prevention/security	72	5.13	1.006
	Avoiding certain situations	70	4.56	1.211
	Fear of being a victim again	72	5.14	1.248
	Feeling abandoned by the police	71	4.31	1.536
	Feeling that I can't prevent being a victim	71	4.96	1.388
	Increased insurance premiums	71	4.13	1.594
	Use more crime prevention measures	71	5.03	1.108
Impact on farming practices	Damaged fences/gates/hedges	72	4.42	1.275
	Loss of crops	68	3.19	1.632
	Loss of fodder	69	2.09	1.269
	Loss of pedigree/blood lines	68	1.82	1.424
	Worry about not having anything to pass on to children	70	2.54	1.717
	Worry about replacing stolen/damaged items	70	4.41	1.646
Relationships with friends and family	Less likely to confide in family	70	2.53	1.462
	Less likely to confide in friends	70	2.54	1.369
	Loss of trust	71	3.61	1.728
	More arguments with family	70	2.76	1.469
	More arguments with friends	69	2.35	1.402
	Worry that family will see me as weak	69	2.20	1.378
	Worry that friends will see me as weak	70	2.17	1.383
Physical health	Change in alcohol intake	72	1.99	1.261
	Lack of sleep	72	4.24	1.524
	Repeated illnesses	70	2.49	1.412
	Worry about my physical health	71	3.37	1.667
Mental health impact	Angry outbursts	71	3.15	1.489
	Feeling anxious	72	4.11	1.400
	Feeling depressed	71	3.34	1.549
	Feeling vulnerable	71	4.34	1.473
	Feelings of being watched	70	3.89	1.490
	Flashbacks	68	3.01	1.625
	Frustration	71	4.86	1.302
	Isolation	69	3.74	1.531
	Loss of confidence	70	3.47	1.639
	Nightmares	70	2.37	1.553

	Suicidal behaviour	70	1.24	0.770
	Suicidal thoughts	70	1.47	1.032
Impact on safety	More cautious	72	4.57	1.298
	Worry about my safety	72	4.18	1.357
	Worry about safety of my family	72	4.49	1.482
	Worry about securing firearms	71	2.92	1.895
	Worry of lone working	72	3.72	1.612
	Worry about using large/heavy machinery	72	2.65	1.646

Table 4: Descriptive statistics for responses to impact of AC items

When considering the mean responses, there are three items that show a mean over 5.00, and sixteen items with a mean between 4.00 and 4.99. These mean scores reflect response categories of 'Very Often' and 'Quite Often' respectively when asked how often they experience these items daily due to being a victim of AC. Furthermore, another fifteen items scored between 3.00 and 3.99 ('Sometimes'). This equates to 34 out of 51 items (67%) being seen as a worry at least sometimes after being a victim of crime.

It is unsurprising that the top three items scoring above 5.00 relate to direct impacts of being a victim of AC. The top scoring item was fear of being a victim again ($\bar{x} = 5.14$), followed by worry about additional costs for crime prevention/security ($\bar{x} = 5.13$) and use of more crime prevention ($\bar{x} = 5.03$). All other direct crime impacts have a mean of between 4.00 and 4.99, indicating that they are considered a worry quite often after being a victim of crime.

Other items with a mean score of 4.00 to 4.99 fall in several categories. Business Impacts show three out of the nine items were a worry quite often, the highest being inconvenience/reduced business efficiency ($\bar{x} = 4.68$). Farming practices show two out of six items being indicated, with the highest being damaged fences/gates/hedges ($\bar{x} = 4.42$). When looking at physical health, one of the four items was noted as impactful, lack of sleep ($\bar{x} = 4.24$). When addressing safety, half of the items were seen as a worry quite often, the highest being participants being more cautious ($\bar{x} = 4.57$).

When considering the impact of AC on farmer MH, three out of the twelve items were a worry quite often, the highest being frustration ($\bar{x} = 4.86$). However, it should be noted that a further six items reported means between 3.00 and 3.99, indicating they were experienced 'sometimes' by participants. Interestingly, the lowest two items in terms of mean rating were that of suicidal thoughts and suicidal behaviour ($\bar{x} = 1.47$ and 1.24 respectively). However, it is argued that this does not reflect the true impact of AC alone without further exploring the impact on levels of AC-related MH in relation to other key factors as shown below.

3.2 Inferential Analysis: Crime-Related Mental Health Impacts

A Mann Whitney U test was used to explore the impact gender had on responses relating to AC-related MH (Table 5). This analysis shows that women are more likely to experience a number of MH indicators as a direct result of crime. While not being ranked highly in the descriptive statistics, this analysis found that the greatest effect sizes were found in feelings of being watched ($md/n = 4.5/34$ (female), $3/36$ (male), $U = 358.0$, $z = -3.048$, $p = .002$, $r = .36$), flashbacks ($md/n = 3/32$ (female), $2/36$ (male), $U = 341.5$, $z = -2.935$, $p = .003$, $r = .36$), loss of confidence ($md/n = 4/34$ (female), $2.5/36$ (male), $U = 341.0$, $z = -3.235$, $p = .001$, $r = .39$), and nightmares ($md/n = 3/34$ (female), $1/36$ (male), $U = 340.5$, $z = -3.329$, $p = .001$, $r = .40$).

	N	U	Z	P	R
Feeling anxious	72	407.5	-2.765	.006	.33
Feeling vulnerable	71	435.0	-2.314	.021	.27
Feelings of being watched	70	358.0	-3.048	.002	.36
Flashbacks	68	341.5	-2.935	.003	.36
Loss of confidence	70	341.0	-3.235	.001	.39
Nightmares	70	340.5	-3.329	.001	.40

Table 5: Impact of gender on crime-related mental health indicators

The same test was used to explore AC-related MH indicators in relation to different farming sectors that participants reported being involved with. Only two of the reported sectors showed any significant differences as reported in Table 6. The greatest effects were seen in two MH indicators in the beef suckler sector, with those who work in the sector ($md = 6$, $n = 14$) feeling more vulnerable than those who do not work in the sector ($md = 4$, $n = 57$), $U = 191.0$, $z = -3.115$, $p = .002$, $r = .37$), and those who work in the sector ($md = 5$, $n = 15$) experiencing greater loss of confidence than those who do not work in the sector ($md = 3$, $n = 55$), $U = 202.0$, $z = -3.061$, $p = .002$, $r = .37$). While the differences in the pig sector were small, it is key to note that participants did report a small, significant difference in suicidal behaviour between those who work in the sector ($md = 1.5$, $n = 4$) and those who do not ($md = 1$, $n = 66$), $U = 81.0$, $z = -2.123$, $p = .034$, $r = .25$.

	N	U	Z	P	R	
Beef Suckler	Feeling anxious	72	230.0	-2.815	.005	.33
	Feeling depressed	71	280.0	-2.006	.045	.24
	Feeling vulnerable	71	191.0	-3.115	.002	.37
	Feelings of being watched	70	217.0	-2.858	.004	.34
	Loss of confidence	70	202.0	-3.061	.002	.37
Pig	Feelings of being watched	70	45.0	-2.248	.025	.27
	Flashbacks	68	37.0	-2.416	.016	.29
	Suicidal Behaviour	70	81.0	-2.123	.034	.25

Table 6: Impact of sector on crime-related mental health indicators

A Spearman’s Rho analysis was undertaken to establish whether there are any correlations between participant experiences of AC-related MH indicators and repeat victimisation, age, and ideal farmer character traits. Feelings of being watched show a small, negative correlation with age ($r = -.251, n = 70, p = .036$), suggesting older victims of AC were significantly less likely to experience this MH indicator than younger victims. With regards to participant thoughts on farmer character traits, it is notable that small to medium negative correlations were seen across traditional masculinity traits such as ‘dirty’ and ‘rugged’, as well as non-traditional masculinity traits such as ‘easy-going’ and ‘gentle’. However, although a small effect, there is a statistically significant positive correlation between experience of suicidal thoughts and the idea that farmers are insecure ($r = .248, n = 68, p = .041$) and weak ($r = .291, n = 67, p = .017$), indicating that those participants who identify with these two contra-masculinity traits are more likely to experience suicidal thoughts as a direct result of being a victim of AC.

Characteristic	MH Indicator	N	Rho	P	
Repeat victimisation	Feeling vulnerable	71	.241	.043	
	Frustration	71	.289	.014	
Age	Feelings of being watched	70	-.251	.036	
Masculinity traits	Dirty	Feeling depressed	68	-.248	.042
		Feelings of being watched	68	-.250	.039
		Loss of confidence	68	-.275	.023
		Nightmares	68	-.439	.000
	Easy-going	Flashbacks	68	-.241	.048
	Gentle	Nightmares	68	-.242	.047
	Insecure	Suicidal thoughts	68	.248	.041
	Professional	Feelings of being watched	69	.307	.010
		Feelings of isolation	68	.255	.036
		Loss of confidence	69	.249	.039
	Rugged	Angry outbursts	68	-.245	.044
	Weak	Suicidal thoughts	67	.291	.017

Table 7: Impact of repeat victimisation, age, and masculinity traits on crime-related mental health indicators

A Spearman’s Rho analysis was conducted to explore relationships between satisfaction with service providers after being a victim of AC, and experiences of AC-related MH indicators. It is notable that, in all cases, a positive experience with a service provider is significantly correlated with a lower experience rate of MH indicators. This is particularly notable when considering results showing a medium, negative correlation between satisfaction with a

General Practitioner and suicidal thoughts ($r = -.315, n = 63, p = .012$), and the medium, negative correlations between suicidal behaviour and satisfaction with charity workers ($r = -.300, n = 64, p = .016$) and national MH charities ($r = -.314, n = 64, p = .012$).

Service Provider	MH Indicator	N	Rho	P
Agricultural policy advisor	Flashbacks	66	-.322	.008
	Nightmares	67	-.310	.011
Bank manager	Flashbacks	64	-.353	.004
Charity worker	Suicidal behaviour	64	-.300	.016
Farmer charities	Feelings of being watched	64	-.286	.022
General Practitioner	Flashbacks	63	-.249	.049
	Suicidal thoughts	63	-.315	.012
Grain merchant	Feelings of being watched	64	-.248	.048
Insurer	Flashbacks	67	-.335	.006
	Loss of confidence	68	-.258	.034
Livestock breeding advisor	Suicidal behaviour	64	-.248	.049
Local mental health charities	Feeling vulnerable	63	-.274	.030
	Feelings of being watched	64	-.305	.014
	Flashbacks	64	-.318	.010
	Frustration	64	-.303	.015
	Loss of confidence	64	-.299	.017
	Nightmares	64	-.279	.025
	Suicidal behaviour	64	-.290	.020
	Suicidal thoughts	64	-.254	.043
National mental health charities	Feelings of being watched	64	-.260	.038
	Flashbacks	64	-.296	.018
	Frustration	64	-.282	.024
	Loss of confidence	64	-.250	.046
	Suicidal behaviour	64	-.314	.012
National Farmers' Union	Flashbacks	67	-.268	.028
	Loss of confidence	67	-.308	.011
	Nightmares	67	-.248	.043
Veterinarian	Flashbacks	64	-.348	.005

Table 8: Impact of helpfulness of service providers after victimisation on crime-related mental health indicators

A Mann Whitney U test was used to explore the differences between those participants who had been a victim of a particular crime type, and their experiences of AC-related MH indicators (Table 9). Due to the low number of participants experiencing certain crime types, the mean rank ($\bar{x}R$) is reported here rather than the median. While all statistically significant results show a small effect, it is noteworthy that statistical differences relating to suicidal thoughts and behaviour are limited to those crimes involving some kind of violence; for example, victims of

injury to livestock ($\bar{x}R = 45.57, n = 7$) were more likely than non-victims ($\bar{x}R = 34.38, n = 63$) to report experiences of suicidal behaviour ($U = 150.0, z = -2.27, p = .023, r = .27$).

Crime Type	Mental Health Indicator	N	U	Z	P	R
Theft other large machinery	Feelings of being watched	70	16.5	-2.49	.007	.30
	Nightmares	70	29.5	-2.42	.035	.29
Theft other vehicle	Feelings of being watched	70	72.5	-2.09	.037	.25
Criminal damage	Flashbacks	68	358.0	-2.62	.009	.32
Poaching/Lamping	Frustration	71	364.5	-2.43	.015	.29
Hare coursing	Frustration	71	375.0	-2.29	.022	.27
Injury to livestock	Suicidal behaviour	70	150.0	-2.27	.023	.27
Infield slaughter of livestock	Suicidal thoughts	70	.500	-2.13	.029	.25
Threats of violence	Angry outbursts	71	334.5	-2.11	.035	.25
	Suicidal thoughts	70	334.0	-2.28	.023	.27

Table 9: Influence of crime type on mental health indicators

Two additional analyses were undertaken using Spearman's Rho, with significant results found in Supplementary Data Tables 1 and 2. Table 1 explores the relationships between worries around general farming stressors and the experience of AC-related MH indicators. There were four general stressors which did not provide any significant correlations with AC-related MH indicators: having to contract loans; lack of services nearby; very complicated and complex hygiene standards; and reduction in subsidies. Of the remaining 38 general stressors, a minimum of 1 and maximum of 11 AC-related MH indicators were significantly correlated, with an average of 6.45 MH indicators associated with each general stressor item.

The majority of correlations with a large effect size were seen between direct effects of AC and AC-related MH indicators. The greatest effect size was seen between fear of becoming a victim of crime and feeling vulnerable ($r = .749, n = 70, p = .000$), followed by worry about how to best protect my farm from crime and feeling vulnerable ($r = .731, n = 71, p = .000$). All other correlations between direct effect of AC as a general stressor and AC-related MH indicators showed a medium effect size except worry about leaving my family alone and angry outbursts ($r = .298, n = 71, p = .012$) and worry about increased insurance premiums due to crime claims and feelings of frustration ($r = .293, n = 71, p = .013$). One other large effect size was noted between lack of time to rest and feelings of being watched ($r = .545, n = 70, p = .000$).

All significant correlations relating to fear of having to find a successor outside the family show a small, negative effect size, indicating that increased worry about succession is associated with lower levels of AC-related MH indicators. Correlations with a medium effect size relating to suicidal thoughts and behaviour are only seen in relation to general stressors about interpersonal relationships and worries about isolation. As an example, the highest correlations are seen with worries about family members not sharing professional values and suicidal behaviour ($r = .480, n = 70, p = .000$) and suicidal thoughts ($r = .462, n = 70, p = .000$).

Supplementary Table 2 presents significant correlations relating to associations between the impact of AC and experiences of AC-related MH indicators. Of the 39 AC impacts, all have between 2 and 12 MH indicator correlations. There were no AC impacts that had a negative correlation with a MH indicator. The average number of MH indicators reported in this case is 8.92. AC impacts with two MH indicators were loss of staff, and loss of crops. However, a total of seven AC impacts reported significant correlations with all twelve MH indicators addressed covering thoughts of giving up farming, relationships with friends and family, physical health worries, and safety worries. In terms of frequency of MH indicators, the top four correlations were seen in feeling vulnerable (37), feeling anxious and loss of confidence (both 36), and feeling depressed (34).

There were a large number of correlations with a large effect size seen in this analysis. The three highest were associations between worry about physical health and feeling anxious ($r = .763, n = 71, p = .000$), lack of sleep and feelings of being watched ($r = .736, n = 70, p = .000$), and worry about my safety and feeling anxious ($r = .736, n = 72, p = .000$). The top ten MH indicators with significant correlations in terms of effect size were feeling anxious, feeling of being watched, feeling vulnerable, nightmares, and feeling depressed. A medium effect size was seen in eighteen correlations between AC impacts and the most severe MH indicators. Again, the greatest effect sizes were seen in relationships with friends and family: more arguments with friends and suicidal thoughts ($r = .466, n = 69, p = .000$); and less likely to confide in friends and suicidal behaviour ($r = .458, n = 69, p = .000$).

4. Discussion and Implications

This research extends both existing AC research, but also knowledge about farmer stressors and the impact on farmer MH. This exploratory study has shown that there are significant links between the direct impact of AC on farmers, and the effect this has on their mental health. Previous research has identified the economic and social impact of AC (NFU Mutual, 2020; NRCN, 2018), and the factors that affect farmer mental health (Deary et al., 1997). However,

the psychological impact of AC and the role it plays in farmer mental health has, to date, been overlooked.

The qualitative aspect of this study seems to imply that ~~clearly illustrates the role that~~ AC may be a key stressor ~~playing in~~ farmers' lives, with 88% of participants reporting that AC has harmed their MH in some way, with farmers talking about feelings of depression, helplessness, and suicide. Notably, female participants were more likely to report experiencing a range of MH issues as a result of AC, ranging from anxiety to nightmares. However, it is recognised that much more detailed qualitative research is needed to explore these issues further and draw conclusions based on a more in-depth study.

Sectoral analysis shows that those farmers working with animals are often more likely to experience AC-related MH issues. This includes participant reports of anxiety, depression, and flashbacks. However, more worrying is the link seen to suicidal behaviour which, it is argued, may be partly due to the isolated nature of the work, attachment to the animals, but also due to the lack of diversification options often available to these types of farms, which may lack the space to expand their farming capabilities. As such, the income from the animals raised is often the only income obtained from farming activities and proves a huge loss, both financially and through loss of pedigree lines, if those animals are stolen or injured. In addition, as results show an association between repeat victimisation and anxiety and frustration, further exploration should be undertaken to establish what is leading to these feelings. It is possible that this may partly be due to the lack of support these participants feel they have after victimisation (Smith & Byrne, 2017), but also more challenging aspects, such as the inability to protect the farm from AC, or the geographical location of the property (Barclay & Donnermeyer, 2007). Moreover, this is reinforced when looking at the impact crime type has on MH indicators. Again, it is the experience of violent crime, both towards themselves or their livestock that leads to participants experiencing the most severe MH issues. Both sets of results indicate a clear personal and emotional toll that AC is having on farmers, which is concerning given the rising incidences of livestock worrying and reports of offenders threatening violence.

Older farmers seem to report lower feelings of being watched after AC, possibly as a result of their past experiences. This may also suggest some level of fatalism towards AC (Smith, 2018). Moreover, this may be an indicator of the persistence of the traditional rural masculinity (Brandth, 1995) in older British farmers, leaving them with a feeling of resignation or stoicism towards AC events. This is partly reinforced by the links seen between masculinity traits and AC-related MH issues. Traditional rural masculine ideals, including 'dirty' and 'rugged', show

lower levels of reported MH issues after an AC event. However, contra-masculinity traits (Smith, 2018), including 'easy-going' and 'gentle' show the same pattern. What is most concerning is the clear association between other contra-masculine ideals and the experiences of MH issues. The 'professional' ideal shows association with several MH indicators, however it is the link between the traits 'weak' and 'insecure' and suicidal tendencies that is particularly noteworthy. This would suggest a negative link between challenges to the traditional rural masculine and more severe experiences of MH issues following victimisation. However, it is hard to establish which variable drives which: did deviation from the traditional rural masculine come first, or did the significant AC-related MH issues. In contrast, what is striking from the analysis relating to gender differences, is that half of the MH indicators did not show a significant difference between male and female participants. It is arguable that this suggests all participants are just as likely to experience those MH issues resulting from AC, including the most severe indicators – suicidal thoughts and behaviour. This seems to support the findings of Booth and Lloyd (1999), given the range of MH issues that female participants are reporting.

More positive results were found when looking at the association between the satisfaction in service provider interaction following victimisation, and experiences of AC-related MH issues. Across all significant results, there is a clear association between a good response from service providers, and a reduction in the experience of AC-related MH issues, most notably in relation to the reduction in the experience of suicidal tendencies. Key to this is the role that charities play for farmers, both locally and nationally. This suggests there is a clear and urgent role for farmer service providers of any kind to play in the fight to reduce the incidence of AC-related MH issues of all types. Moreover, it may be incumbent upon those who show the positive benefit of the services they are providing to act as exemplars of good practice in tackling the impact of AC on farmer mental health, as it is possible that these service providers help because they are not closely connected to the farmers like friends and family are, making the act of seeking help (Yazd et al., 2019) easier.

The most important results from this research relate to the links between what are acknowledged to be farmer stressors (Walker et al., 1986; Kearney et al., 2014), AC, and AC-related MH issues. When considering the links between general stressors and AC-related MH, it is not surprising that the strongest correlations were seen with the direct impacts of AC. However, more importantly, it may be general stress among farmers around personal relationships, and isolation that may be key in identifying susceptibility to suicidal tendencies directly resulting from victimisation. While interventions could be put in place to help with conflicts with family and other farmers, it would be more challenging to address the issues

around isolation. While isolation is not considered a farmer stressor (Deary et al., 1997), it does seem to have an effect on AC-related suicidal tendencies and so should be considered further.

When considering the links between AC and MH issues, the most impactful variables are relationships with friends and family, thoughts of giving up farming, worries about physical health, and safety worries. Vulnerability, anxiety, loss of confidence, and depression are the MH issues most frequently reported by participants, however the relationship between friends and family and suicidal tendencies is the strongest, but one that can be addressed with the right support from service providers.

This research clearly shows that AC is having a real effect on farmers, and furthermore is causing significant negative impacts on farmer MH. The word cloud provides a visual representation of the key issues discussed by participants when asked to list the top three impacts of AC, with clear emotive responses being used. This research has shown that AC is significantly affecting farmer mental health, with suicidal tendencies being reported across a range of analyses. However, it is possible that the right guidance and assistance from key service providers can have a huge effect on reducing the negative effects of AC on farmer MH, and this should be the challenge for all service providers and key rural stakeholders going forward in an attempt to avoid an AC-related public health crisis.

5. Conclusions

This research is the first to explore the psychological impact that AC has on farmer mental health. These results show that there is a direct link between AC and farmer MH, and there is a clear need for further examination of this issue given the number of links between AC and MH indicators seen in this piece of exploratory work. This survey has shown that several variables affect the level of psychological impact that AC has on participants, with the key findings showing extensive links between the direct impact of AC and the presence of a range of MH indicators, including substantial links to suicidal tendencies among the British farming community. There are clear links between how stressed farmers are about the daily running of their business, how AC is adding to this mental strain, and the opportunity for farming service providers to better aid farmers after victimisation. Moreover, this research suggests that farmer MH will not improve until concerted effort is made by all interested parties to tackle the rising incidence of AC across Britain, and that if little or nothing is done, farmer MH will continue to deteriorate to the point where they either give up farming, or take their own life as a direct result of the impact that AC is having on an already stressed farming community.

6. Limitations of the Research

While this research has provided some interesting and compelling preliminary findings, it is recognised that there are limitations to the study that should be addressed by any future research into this novel subject.

Firstly, it is recognised that the sample size was small. As such, this makes it difficult to draw conclusions from this study to the wider population. While the sample size did allow for statistical analysis at the 95% confidence level, a larger sample would have reduced the margin of error and thus provide results that would be representative of the target population.

There are, of course, inherent issues with running an online only survey. However, this method was chosen for its low cost and easy dissemination. This does lead to a non-parametric sample and the possibility of bias. If possible, this may be addressed by somehow conducting a random sample selection and employing a different survey methodology, should time and finances allow.

Finally, this research was predominantly quantitative in nature. While this does provide a starting point for investigation, this survey did not explore the usefulness of qualitative data to its full potential in order to examine the attitudes and behaviours of the sample to its full extent. It is anticipated that a qualitative approach would enable much richer data to be obtained and examined.

7. Recommendations for Further Research

It is acknowledged that this piece of research was exploratory in nature, with the aim of gaining some initial understanding of the psychological impact of AC among the farming community, and how crime compares as a stress factor to other, more widely researched stressors. As such, it is essential that more research be undertaken to extend these preliminary findings, and to provide clear guidance for policy makers and service providers within the field of mental health care.

It is recommended that further work be carried out to extend this research to a larger sample so that the data created can be extrapolated up to the target population of farmers across Britain. Furthermore, it would be useful to replicate this research in Northern Ireland to establish whether there are any similarities or differences to experiences of farmers on the mainland.

In addition, it is suggested that more research takes place to extend the understanding of how crime related MH indicators compare to similar MH indicators when related to other general stressors. Furthermore, more research is required to establish greater knowledge on how crime acts as a stressor in comparison to those other stressors identified both here and in other research.

By addressing these recommendations, it is anticipated that rural crime and rural MH researchers will be able to better understand the needs of the farming community and how farming related stressors impact upon their MH.

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