

# *The Impact of Crime on Farms*

**Presented at the International Rural Crime Conference  
September 27, 2017  
Royal Elephant Lodge and conference Centre  
Centurion, South Africa**

**Joseph F. Donnermeyer, Professor Emeritus  
School of Environment and Natural Resources  
The Ohio State University  
Columbus, Ohio, USA 43220**

## **Introduction**

There is an assumption among cultural anthropologists and historians that agriculture is the historical basis or root of religion. The standard way of thinking is that once humans made a transition from a hunter/gatherer way of life to one more sedentary, we had time to construct complex stories and belief systems about gods, creation, and salvation, and to build elaborate sites for ritualistic worship.

What really came first? – as that age-old rhetorical question asks – the chicken or the egg?

There is a Neolithic archaeological site in southwestern Turkey that says the opposite. It is called Göbekli Tepe. This site, over 12 thousand years old, contains various megalithic structures carved out of stone, with some pillars weighing as much as 20 tons, and various carved animal reliefs and other symbols and pictographs. Quite sophisticated!

By the end of the Neolithic period, about 4,000 years ago, farming as we know it today was in its infancy (perhaps still gestating). So, Göbekli Tepe, a site requiring a massive amount of coordinated labor, just like farming does, but came long before agricultural societies developed, and was likely built by nomadic hunter-gatherers (see article in National Geographic, June, 2011).

This evidence suggests that farming is the by-product of humans stopping long enough to create religious monuments and places of worship, not the other way-round.

The point is that agriculture has always been regarded as fundamental to the development of human civilizations. Somehow, it seems *more special* than other human activities, closer to the sacred than the secular jobs so many of us commute to everyday in the city. Today, many of my colleagues at The Ohio State University with a rural sociological background focus on the scholarly study of “civic” agriculture, that is, the positive contributions of agriculture to society. In many ways, agriculture has a religious quality, like no other vocation or job, and I believe it always will.

## **The Diversity of Agriculture**

In October, 2008, according to the United Nations (2010), the world became, for the first time in its history, a majority urban world. Yet, one-third of the world's population today are food producers, and nearly 40 percent of the world's landmass is devoted to agricultural production (The World Bank 2015). About half of these agriculturalists are women, but regardless of a farmer's sex, a large share of food producers are subsistence farmers. Hence, agriculture is essential to the health and well-being of their families and their communities.

Larger, more industrial-scaled agriculture that relies on machines, chemicals, and computer technologies, likewise an essential feature of many societies. These "big farms" are important to the food security of a nation, to low cost and healthy food for growing urban populations, and to the balance of trade between countries in a globalized economy.

All farms – the small and the large, the subsistence and the industrialized – today face the added risk of crime as a threat to their economic, psychological, family, and community well-being. Farming has and always will be risky, given the vagaries of weather and the uncertainties of raising animals and growing crops, fruits and vegetables.

And, there always was a threat of crime to farms. In bygone years, it frequently was accepted as part of a particular culture's customs that agriculturalists tolerated some pilfering by people who were hungry (see work by Bunei and Barasa, 2017; Chiwona-Karlton et al, 2017). Cattle rustling, from outright stealing as in the so-called "Wild West" days of the US, to raiding livestock in one community by another as a way to replenish herds after a drought in north-western Kenya – both, even though more serious than petty stealing by a hungry person, was simply another risk associated with the vicissitudes of agriculture (see Schilling, Opiyo and Scheffran 2012).

Nowadays, it seems different. Farming is far more global and far less local. The prices of everything associated with producing food has increased, but the ability to properly guard or secure the farm operation has not kept pace. The number of offenders and their motives for targeting farms, ranging from merely making money to terrorizing through brutal attacks farmers they see as privileged landowners, has increased as well.

## **Farm Victimization**

"A picture is worth a thousand words." Translating this idiom to the world of academics, let's keep in mind that a "victim's story is worth a thousand studies." For sure, this is an exaggeration, but there is value in an anecdote that encapsulates a single experience. This is one reason why this conference is important – to share stories and experiences. However, the research is likewise valuable because it allows us to examine what is happening in a variety of localities, and therefore, to gain a more global view.

Perhaps the first farm crime study was conducted in the US state of West Virginia by an agricultural safety specialist (see Bean 1978). It was conducted at a time when "victimization

surveys”, as an alternative source of data from official police statistics, had developed and had become quite popular for the study of crime. Bean’s (1978) survey of 99 farmers found 13 crime incidents reported in a single year, plus another 14 respondents who mentioned trespassing, many of whom said illegal entry on to their property was frequent. What is significant about this study is that the victimization rate in the US during that time was about 12 incidents per 100 households. The crime experiences of this small sample of farmers was higher!

Following this ground-breaking research, a spate of studies in the US took place, mostly during the 1980s and 1990s, but also including more recent research during the 21<sup>st</sup> century in the states of California, Hawaii, and Georgia. They too agree with the West Virginia study – amazingly high rates of victimization when calculated as the number of incidents divided by the relevant population (see citations to each of these studies in references below).

Crossing the Atlantic to England, Sudgen (1999) found similar results in the small county of Rutland. Not only was there a high percentage of farmers who experienced a crime (over a 2-year period), but many experienced multiple incidents. Often, these crimes occurred far from the farm homestead, where guardianship or surveillance was less easily maintained as part of the everyday routine of producing food for a living. Studies in Scotland (George Street Research , Northern Ireland (Armstrong 2005), Wales (Jones 2010; Holmes and Jones 2017), and Sweden (Ceccato 2016) also find the same thing. For example, Smith and Byrne (2017) recently conducted an online survey, and despite the generally low return rate from these kinds of surveys, also noted very similar results, with slightly over 60 percent of farmers indicating they experienced a crime within the past year (the survey was conducted in 2015).

Research in Africa and Australia will be more extensively reviewed by my colleagues – Emmanuel Bunei and Elaine Barclay – however, their results, along with the European and American studies point to two essential conclusions: (1) farm victimization is very frequent, despite the wide range of environments and countries in which these studies took place, and when compared to victimization research of the general population, if available, points to the farm population as being one of the most prone to experience a crime; and (2) the preponderance of farm crime is related to property, but with notable exceptions, such as the farm attacks documented and discussed in *Acta Criminologica* (see selected references below).

### **Routine Activities Theory**

Without a doubt, Routine Activities Theory (Felson 1998; Lilly, Cullen and Ball 2015) is very relevant for understanding farm crime in a variety of societies and more localized contexts. There are excellent applications of it by Bunei and Barasa (2017) and Clack (2015). The theory is simple in concept and unlike many other so-called criminological theories, generates propositions that are testable and applicable to real world situations.

Routine Activities theory begins with the straightforward idea that there must be an intersection or meeting up of a motivated offender with an attractive target under conditions that the offender perceives as opportunistic. The target may be a person or an object, the offender can be any member of society who has the desire to commit a crime, and the opportunity under which a crime is committed can vary greatly, depending on circumstances. It is opportunity, in my

opinion, and consideration of opportunity's diversity across a large range of ecological/environmental conditions that makes it relevant for an understanding of farm crime, and for the comparison of results across studies conducted around the world.

As well, I want to mention that the principles of CPTED (Crime Prevention Through Environmental Design) are very compatible with Routine Activities Theory. CPTED itself mostly prescribes actions associated with modification of the built environment to enhance guardianship.

## **Guardianship**

Two of the early studies that specifically examined the ecology of farm crime come from the US. The study from Arkansas noted that a farm is isolated in two different ways – from helpful neighbors and other people (and, by extension, law enforcement), and that there is often a physical separation of the farm homestead from the buildings, equipment and machinery (Farmer and Voth 1989). My own study in Ohio (Donnermeyer 1989) observed the same thing, but more statistically. While a breaking and entering to a farm homestead was near zero (dogs, guns and people/owners as deterrents), farm buildings exhibited burglary rates far exceeding anything found in Ohio's big cities.

The essence of guardianship for a farm operation, and for that matter, any large property, is the presence of people, but not in such a straightforward way. It is the sense on the part of potential offenders that they might be seen or discovered. In that sense, then, a whole series of ecological factors are associated with guardianship, both as an effective presence and as a glaring absence. Beyond the size of the operation, there is first the physical arrangement of buildings in relation to the homestead, or the living quarters of other trusted guardians (neighbors, farm workers etc.). Independent of the actual arrangement is visibility of the buildings, and of equipment and supplies if they are stored outside. Terrain, density of vegetation, distance from urban centers and public roads, along with fencing at points of ingress and egress, plus security associated with actual buildings, all of these can be important for establishing the relative degree of guardianship on an individual farm property and across an aggregate of agricultural operations with similar characteristics and ecological/environmental conditions.

However, these factors, most of which have been examined in the literature on farm crime, have not been investigated in a more experimental, or at least, quasi-experimental way (Welsh and Farrington 2001). It is here we are missing a grand opportunity to provide scientifically-based evidence for what works and what does not work. We have much anecdotal evidence that various crime prevention tactics work, but they are not rigorously researched. However, we need to install security technology and other forms of crime prevention and monitor these effectiveness systematically. Yet, funding for this kind of research is difficult if not impossible because crime against farms is not a priority with funding agencies.

Yet, a recent news item shows the larger implications of farm crime. It comes from New Zealand, where avocado demand and prices are rising steeply (see Roy 2017, <https://www.theguardian.com/lifestyle/2017/aug/22/new-zealand-thieves-selling-stolen-avocados-on-facebook>). Avocados are “raked” from trees or hand-picked, and then driven away.

Regardless of the method, it represents a form of organized crime insofar as it takes the coordinated effort of two or more individuals. The avocados are either sold at roadside markets, but with greater enforcement, the sales are displaced to social media outlets. The point is that the lack of guardianship extends beyond the issues of security at a specific farm operation, to lack of guardianship on the complex system by which food is distributed and sold on the retail level. Even though the theft of avocados may seem like a small thing, even silly, the implications for food security are much larger (see work by Smith and McElwee, such as McElwee, Smith and Sommerville 2011; Smith and McElwee 2013; Smith and McElwee 2016).

## **Target**

The second element considered by Routine Activities Theory is the target. As the cost of farming has risen (as well as the price of food products), so too has the attractiveness of the target. It is under the guise of target that we may consider the costs of farm crime. For example, the work by Mears and associates from their study in central California shows the array of attractive targets for theft, from barb wire to welders, and everything in between, is quite large. The research from Hawaii says the same, as does research in England (see National Farmers Union Mutual Insurance annual reports) and Sweden (see Ceccato 2016).

Beyond the monetary costs, there are the psychological costs. One of the earliest studies of farmer perception of crime risks is the work of Saltiel, Gilchrist and Harvie (1992) in the US state of Montana. Their work is important because it reminds us that crime is highly situational, and that farming areas may generate risks and even fear that city people would find hard to understand. In the Montana research, distance from the police, views about the lack of an effective police response, and previous experience with crime were associated with higher perceived risk. Likewise, Ceccato's (2016) research in Sweden indicates that farmers not only are frequently the victims of crime, but experience crime vicariously by knowing about incidents that occurred to other farm families and farm operations. So much of the psychological costs of crime to the farm population is the general perception across studies in many countries that there is not much law enforcement can do to help, and of unsympathetic local, regional and national governments.

Then, there are other costs associated with the routine operation of a farm, and perhaps of specific farming practices that are changed in response to concerns about theft and about the safety of the farm family. Especially enlightening are examples from studies here in Africa (see research by Bunei, Clack and many others). Finally, perhaps the most profound cost of crime is the diminishment of trust by farmers of their neighbors and their own farm workers, some of whom may be family members.

Mentioned previously, there is little research that seeks to isolate in a cause-and-effect manner, the relationship of specific crime prevention measures and the occurrence of crime incidents. In fact, despite an emphasis on the ecological characteristics of crime, the amount of research on the "hot spots" (see Eck et al., 2005) of farm crime is nearly non-existent. Where precisely does a farm crime occur, and how can we use this information to design better prevention programs?

The research already conducted indicates limited adoption of crime prevention hardware and practices by farmers (see especially the work by Barclay). The likely reason is related to two kinds of costs – the actual price of purchasing alarms, installing extra lighting etc., and the personal/work-related costs of changing farm practices/routines. Despite changing times, farmers around the world continue to rely on dogs, guns and other family members/trusted farm workers. These are actions that help, but we need to think about other things that can be done.

## **Offenders**

As food production becomes more specialized, more expensive, and more difficult to police (both the operation itself and the system by which food is processed, distributed and sold at the retail level), it is hard to imagine nothing but more vulnerability for farmers.

This brings us to the third part of Routine Activities Theory – the motives (desire) of potential offenders. Bunei and Barasa's work (2017) provides a breakdown of offender motives for agricultural crime in Kenya. Their excellent analysis shows how Routine Activities Theory is more than a "micro" approach to crime, but can account for broad changes in society that increase the desire of some people to victimize a farm or farm family. Likewise, the thesis by Armstrong (2005) show how the political realm affects farmers. In his study of a single county in Northern Ireland that borders the Republic of Ireland, the peace accords resulted in the withdrawal of security forces along the border, which in turn, increased the risk of crime for farmers in the area.

More troubling and intractable to solve is documented in the series of articles that can be found in *Acta Criminologica* on farm attacks. It shows how farmers everywhere in the world, not just South Africa, are located in social class systems of economic and political inequality that potentially can create unusually high levels of risk to violent crime for farm families and farm workers. Even though farm crime research around the world shows a preponderance of property crime victimization, the potential exists that with economic and social change can come the kind of crime that imperils not only the means by which food is made, but who makes it (still today, the farm family), and by extension, therefore, the whole "food and fiber" system.

## **Conclusion**

Aside from the bigger society-level issues of inequality and justice, we must affirm that all farm families have a right to protect themselves and their property!

The bottom line is that farm crime is highly situational, yet, there two things that must be done. First, at the level of an individual farm operation, both Routine Activities Theory and CPTED dictate a "zone" approach to security planning and educational programming, with or without police and governmental cooperation. Generically, farms have 4 zones: the farm homestead and the area immediately surrounding the house; the central work area, usually an area that includes out-buildings and yard space where preparation for field work and maintenance of machinery and equipment takes place; outlying buildings that are frequently not within easy surveillance of the farm homestead; and outlying fields (including pastureland) and tracts of timber/brush/non-

tillable land where a farmer's presence is less frequent, depending on may be, depending on the season of the year and what planting and cultivating activities occur there.

Even though a zone approach appears to be property-oriented, one thing must be kept in mind, especially in relation to the first two zones. There is a type of spill-over effect by which the protection of property also benefits the protection of the farm family. Greater protection does not involve two mutually exclusive forms of security – one for property and one for the person. They are complimentary.

Further, approaching an understanding of farm crime in terms zones allows for the organization of more focused research associated with identifying security hardware and practices that are the most effective, based on evidence.

Second, indeed, governments at all levels across planet earth simply must begin to pay greater attention to the security challenges of farmers. This can only come about through a combination of rigorous research and well-planned collective actions of farmers and all who support the farming community that bring attention to the vital issue of farm safety.

## References

### Farm Crime

- Anderson, K.M. and McCall, M. 2005. *Agricultural crime in Australia* Canberra: Australian Institute of Criminology.
- Armstrong, N. 2005. *The Impact of Crime in Rural Fermanagh*. Belfast: Queens University, M.S. Thesis.
- Bean, T.L., and Lawrence, L.D. (1978) *Crime on farms in Hampshire County, West Virginia*. Morgantown: West Virginia University.
- Barclay, E. (2001) *A review of the literature on agricultural crime*. New South Wales, Australia: University of New England.
- Barclay, E.M. (2003) The determinants of reporting agricultural crime in Australia. *International Journal of Comparative and Applied Criminal Justice*, 27: 131-151.
- Barclay, E.M. (2016) Farm victimisation: The quintessential rural crime. Pp. 107-115 (chapter 11) in *The Routledge International Handbook of Rural Criminology* (J.F. Donnermeyer, ed.). London: Routledge.
- Barclay, E., and Donnermeyer, J.F. (2002) Property crime and crime prevention on farms in Australia. *Crime Prevention and Community Safety: An International Journal*, 4: 47-61.
- Barclay, E.M. and Donnermeyer J.F. (2009) Crime and security on Agricultural Operations. *Security Journal*, 24:1-18.
- Barclay, E.M. Donnermeyer, J.F and Jobes, P.C. (2004) The dark side of *gemeinschaft*: Criminality within rural communities. *Crime Prevention and Community Safety: An International Journal*, 6: 7-22.
- Bunei, E., Auya, S., and Rono, J.K. (2016). Agricultural crime in Africa: Trends and perspectives. Pp. 117-125 (chapter 12) in *Routledge International Handbook of Rural Criminology* (J.F. Donnermeyer, ed.). London: Routledge.
- Bunei, E., and Barasa, F.O. (2017) Farm crime victimization in Kenya: A routine activities approach. *International Journal of Rural Criminology*, 3: 224-249.

- Carcach, C., 2002. *Farm Victimization in Australia*, Trends and Issue in Crime and Criminal Justice, [e-journal] 235, Canberra: Australian Institute of Criminology. Available at: (<http://www.aic.gov.au/publications/current%20series/tandi/221-240/tandi235.html>)
- Ceccato, V. (2016) *Rural Crime and Community Safety*. London: Routledge. (many parts of this book is about farm and environmental crime)
- Chiwona-Karlton, L., Lemenih, M., Tolera, M., Berisso, T., and Karlton, E. (2017) Crop theft and soil fertility management in the highlands of Ethiopia. *International Journal of Rural Criminology*, 3: 176-190.
- Clack, W.J. (2013) The extent of stock theft in South Africa, *Acta Criminologica: Southern African Journal of Criminology*, 26: 77-91.
- Clack W.J. (2015) The role of social media in livestock theft: A case study. *Acta Criminologica*, 28(1), 112-127.
- Clack, W. (2015) Environmental Criminology theories: An analysis of livestock theft cases. *Acta Criminologica*, 28(2): 92-106.
- Cleland, C.L. (1990). *Crime and vandalism on farms in Tennessee: Farmer opinions about and experience with*. Knoxville: University of Tennessee.
- Deeds, J., Frese, W., Hitchner, M., & Solomon, M. (1992) *Farm crime in Mississippi*: Starkville: Mississippi State University.
- Donnermeyer, J.F. (1987) *Crime against farm operations*. Columbus: Ohio State University, Department of Agricultural Economics and Rural Sociology.
- Donnermeyer, J.F., and Barclay, E. (2005) The policing of farm crime. *Police Practice and Research*, 6: 5-19.
- Donnermeyer, J.F., Barclay, E.M., and Mears, D. (2011). Policing agricultural crime. Pp. 193-204 (chapter 17) in *Rural Policing and Policing the Rural: A Constable Countryside?* Surrey, England: Ashgate.
- Dunkelberger, J.E., Clayton, J.M., Myrick, R.S., and Lyles, G.J. (1992) *Crime and Alabama farms: Victimization, subjective assessment, and protective action*. Auburn, AL: Auburn University, Alabama Agricultural Experiment Station.

- Dzimba, J. and Matookane, M. (2005) *Stock Theft and Human Security: A Case Study of Lesotho*. Pretoria: Institute for Security Studies.  
(<http://dspace.africaportal.org/jspui/bitstream/123456789/31446/1/Mono113.pdf?1>)
- Farmer, F.L., and Voth, D.E. (1989) *Ecological correlates of farm victimization in Arkansas*. Fayetteville: Arkansas Agricultural Experiment Station.
- Fahchamps, M. and Moser, C. (2003) Crime, isolation and law enforcement. *Journal of African Economics*, 12: 625-671.
- George Street Research (2001). *Crime and the farming community: The Scottish farm crime survey, 1998*. Edinburgh: The Scottish Office Central Research Unit.
- Haefele, B. (1999). Violent attacks on farmers in South Africa: Is there a hidden agenda? *Acta Criminologica*, 11: 8-17.
- Harkness, A. (2017) Crime prevention on farms: Experiences from Victoria, Australia. *International Journal of Rural Criminology*, 3:131-156.
- Holmes, T. and Jones, J. (2017) Farmers' experiences as victims of crime: An exploratory study on the Isle of Anglesey. *International Journal of Rural Criminology*, 3: 114-130.
- Hornschuh, V. (2007) A victimological investigation of farm attacks with specific reference to farmers' perception of their susceptibility, the consequences of attacks for farmers and the coping strategies applied by them after victimization. Pretoria: University of Pretoria, MA-dissertation.
- Jones, J. 2010. The neglected problem of agricultural crime: An exploratory study. *Safer Communities*, 9:36-44.
- Manu, I.N., Andu, W.N., Tarla, D.N., and Agharib, W.N. (2014) Causes of cattle theft in the North West region of Cameroon. *Scholarly Journal of Agricultural Science*, 4: 181-187.
- McIntyre, R.N., Prine, R.K., and Knowles, F. (2017). An exploratory assessment of agricultural crimes in Georgia. *International Journal of Rural Criminology*, 3, 157-175.
- Mears, D.P., Scott, M.L., and Bhati, A.S. (2007) A process and outcome evaluation of an agricultural crime prevention initiative. *Criminal Justice Policy Review*, 18: 51-80.

- McElwee, G., Smith, R., and Somerville, P. (2011) Theorising illegal rural enterprise: Is everyone at it? *International Journal of Rural Criminology*, 1: 40-62.
- Moolman, N. (1999a) Explaining farm attacks in South Africa. *Acta Criminologica*, 12: 30-34.
- Moolman, N. (1999b) Research findings on farm attacks in South Africa. *Acta Criminologica*, 13: 27-34.
- Moolman, N. (2000) Farm attacks. Are there any ulterior motives? *Acta Criminologica*, 12: 64-74.
- National Farmers Union Mutual Insurance (2017) *Rural Crime Report 2017*. Tiddington, England: National Farmers Union Mutual Insurance. (see NFU's annual reports on costs of claims due to crime on farms)
- Olivier, J. and Cunningham, P. (2006) Victims' perception of attacks on farms and smallholdings in the Eastern Cape, South Africa. *Acta Criminologica*, 19: 115-126.
- Olowa O. W. (2010). The effect of livestock pilferage on household poverty in developing countries: theoretical evidence from Nigeria. *Bangladesh e-journal* 7 (1) 42-46.
- Opiyo, FEO., Wasonga, O.V., Schilling, J., and Mureithi, S.M. (2012) Resource-based conflicts in drought-prone Northwestern Kenya: The drivers and mitigation mechanisms, *Wudpecker Journal of Agricultural Research*, 1: 442 – 453.  
(<http://www.wudpeckerresearchjournals.org>. ISSN 2315-7259).
- Osamba O. J. (2000) The Sociology of Insecurity: Cattle-rustling and banditry in North-Western Kenya, *African Journal on Conflict Resolution*, 1 (2) 10-37.  
(<http://www.accord.org.za/publications/ajcr/downloads/94-publications/ajcr/343-ajcr-volume-01-no-2-2000>)
- Peale, K.O. (1990) *Crime and vandalism on farms in Kentucky*. Frankfort: Kentucky State University.
- Pelser, E. Burton P. and Gondwe, L. (2004) *Crimes of Need: Results of the Malawi National Crime Victimisation Survey*, Institute for Security Studies, Pretoria.  
(<http://www.issafrika.org/pubs/Books/CrimesOfNeed/Contents.htm>).
- Prinsloo, J., Naudé, B., Ladikos, T., Snyman, R., and Kimane, I. (2000) The International Crime (Victim) Survey in Maseru, Lesotho. *Acta Criminologica*, 13: 39-45.

- Robertshaw, L. and Mtani, L. (2001) Crime Profile: Theft of Crops, Livestock and farm equipment in *Crime in Dares Salaam: Results of a city victim survey*. Pretoria: Institute for Security Studies, United Nations Centre for Human Settlements, Pretoria. (<http://ww2.unhabitat.org/programmes/safercities/documents/darcrime.pdf>).
- Saltiel, J., Gilchrist, J., and Harvie, R. (1992) Concern about crime among Montana farmers and ranchers. *Rural Sociology*, 57: 535-545.
- Schilling, J., Opiyo, FEO, and Scheffran, J. (2012) Raiding pastoral livelihoods: motives and effects of violent in north-western Kenya. *Pastoralism: Research, Policy and Practice*, 2, 25 (<http://www.pastoralismjournal.com/content/2/1/15>).
- Sidebottom, A. (2013) On the application of CRAVED to livestock theft in Malawi. *International Journal of Comparative and Applied Criminal Justice*, 37: 195-212.
- Smith, K., and Byrne, R. (2017) Farm crime in England and Wales: A preliminary scoping study examining farmer attitudes. *International Journal of Rural Criminology*, 3: 191-223.
- Smith, R., and McElwee, G. (2013) Confronting social constructions of rural criminality: A case story of “illegal pluriactivity” in the farming community. *Sociologia Ruralis*, 53: 112-134.
- Smith, R., and McElwee, G. (2016) Criminal farmers and organized rural crime groups. Pp. 127-136 (chapter 13) in the *Routledge International Handbook of Rural Criminology* (J.F. Donnermeyer, ed.). London: Routledge.
- Sudgen, G. (1998) In defence of farms: An agrarian crime prevention audit in Rutland. Pp. 83-94 in *Crime at Work, Volume 2, Increasing the Risk for Offenders* (M. Gill, ed.) Leicester, UK: Perpetuity.
- Sudgen, G. (1999) Farm crime: Out of sight, out of mind: A study of crime on farms in the county of Rutland, England. *Crime Prevention and Community Safety: An International Journal*, 1: 29-36.
- Swanson, C.R. (1981) Rural and agricultural crime. *Journal of Criminal Justice*, 9: 19-27.
- Swanson, C.R., and Territo, L. (1980) Agricultural crime: Its extent, prevention and control. *FBI Law Enforcement Bulletin*, 49: 8-12.

Swart, D. (2003) Farm attacks in South Africa – Incidence and explanation. *Acta Criminologica* 16: 40-44.

USDA, Hawaii Field Office (2006) *Hawaii Agricultural Theft and Vandalism Incident Rates 2004*. Honolulu: USDA, Hawaii Field Office.

Zwane, A.A. van Marle-Köster, E. Greyling, B.J. and Mapholi, N. (2013) A review: Forensic DNA technology to meet the stock theft challenges in South Africa'. *Applied Animal Husbandry and Rural Development*, 6: 36-47

## **Other references**

Crowe, Tim. (2000) *Crime Prevention Through Environmental Design*. 2<sup>nd</sup> edition. Boston: Butterworth – Heinman.

Eck, J., Chainey, S., Cameron, J., and Wilson, R. (2005). Mapping crime: Understanding hotspots. Washington, D.C.: National Institute of Justice.

Lilly, J.R., Cullen, F.T., and Ball, R.A. (2015) *Criminological Theory: Context and Consequences*. Los Angeles: Sage.

National Geographic (2011). The birth of religion. June. Washington, D.C.: The National Geographical Society.

The World Bank (2015) *Data: Agriculture and Rural Development*. Washington, D.C.: International Bank for Reconstruction and Development, World Bank. (available at: <http://data.worldbank.org/topic/agriculture-and-rural-development>).

United Nations (2010). Urban and Rural Areas 2009. New York: Department of Economic and Social Affairs, United Nations.

Welsh, B.C. and Farrington, D.P. (2001) Toward an evidence-based approach to preventing crime. *The Annals of the American Academy of Political and Social Science*, 578, 158-173.