

Agro-terrorism and bio-security, threat, response and industry communication

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Forward

The Nuffield experience has been fascinating, testing and exciting. It has given me opportunities to engage in things I never thought I would have opportunity to do, and to visit places and meet people in the pursuit of my study. My ideas and understanding of the issues relating to agroterrorism have shifted since I began this study. At the start I saw it as an issue which could be met by a 'simple' process response. Now I now see a need not only to plan and prepare for such eventualities but a greater need and understanding for the requirement of rural emergency planning in general. In addition the need to educate and communicate is very much at the core of my thoughts on this difficult issue. I also saw it very much as an international issue but it is clear now the threat from perpetrators comes not just from overseas but from within our own borders and from many political, ideological and even criminal standpoints.

It is easy to get lost in the rhetoric of politicised musings regarding the threat of terrorism. However, at when considering protection of the at the most 'basic' level – the family and the family business it is clear it is incumbent on all of us to take a degree of responsibility for the protection of our own resources as well as government. Agroterrorism is an issue, which needs to be taken ownership of. Whilst governments can legislate, advise and plan at the national level, only the industry truly understands the complexity of the agricultural economic system and as such is best placed to provide the solutions and to a large degree the actions required. From my experience in the US, industry based solutions within a soft governmental advisory framework appear to provide the robustness and security for most elements of the agricultural economy. The role of government is to provide the greater protective fabric and to assist in the mobilisation and co-ordination of resources. Emergency planning in this area is not so much about victim assistance but about community resilience.

At present in the UK this situation does not exist. Agroterrorism has become lost amongst the wider discussion of food security and usually (due to its complexity) has been pushed down the agenda in favour of discussions regarding food imports and the level of UK production. For a nation with a declining capacity to produce food and a growing population the need to maintain food security is increasing and therefore any issue that could dramatically alter the balance of food availability in a relatively short space of time needs proper clear and unambiguous consideration. Currently it would appear that agroterrorism is viewed as a food supply issue which through the use of imports any immediate impact could be alleviated. This approach, however, does little to address the economic and social issues resultant from any form of attack on UK agriculture as well as the long term health and well-being of the national agricultural system.

With this in mind it might be pertinent to adopt some of the methods currently in use in the US where their experience of planning for large scale natural disasters – hurricanes, tornados, forest fires etc has embodied the need to plan for extreme eventualities into the farm system. Adopting a 'resilience' stance may mean the difference between containment or loss of control of an

incident – the watchwords may therefore be ‘forewarned is forearmed¹’ and the key to this is to provide accurate, focussed information to the industry from which they can develop a response.

DISCLAIMER

The conclusions, opinions and recommendations contained in this report represent my own opinions and do not necessarily represent those of the Nuffield Farming Scholarships Trust, my employer or other organisations involved in this area of study.

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¹ Motto of the Royal Observer Corps (1925-1995)

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1.0 Introduction

I don't come from a farming family (unless you count my paternal grandfather who farmed in Ireland many years ago) and I grew up in a small south Cheshire town, not totally removed from rurality, and unlike most Nuffield scholars I was pretty removed from agriculture until became an undergraduate. I studied environmental science at university, progressing onto a masters in development agriculture and finally a PhD in rural geography. I spent my formative academic years in various university geography departments and in 2000 moved to Harper Adams University College where I am today. My principal research interests are in factors, which affect agricultural production – farm and rural crime being my main area. It was from this I developed an interest in agroterrorism, its potential use and impact. I did not come to this totally cold. In my past I had served as an observer in the Royal Observer Corps which was in the Cold War a civil defence agency allied to the Royal Air Force primarily responsible for the detection and monitoring of radiation. The ROC was officially disbanded in 1995 – an outcome of the end of the cold war. A period adrift ended when I joined the reserves in 2004 this time switching light blue for the dark blue of the Royal Navy. It is with the RN my interests in security and infrastructure has been greatly developed. Although a short time with the RN, it has been active. A short tour in the Southern Gulf in 2006 paved the way to moving to a specialist tri-service unit – the Military Stabilisation Support Group whom I deployed with as part of 3 Commando Brigade to Helmand, Afghanistan in September 2008. Very much this combination of military (in particular security training and awareness), academic interest and working within the rural and agricultural community has aided me in engaging with the issue of agroterrorism.

I first became aware of agroterrorism through a BBC wire report in 2004 where the outgoing US health secretary Tommy Thompson declared ' I for the life of me cannot understand why the terrorists have not attacked our food supply, because its so easy to do'. His comments were initially greeted with scepticism (on both side of the Atlantic) with more commentators seeking to disprove his disprove his statement than prove it. Many sought to categorise his statements as post 9/11 hype and US over reaction – looking for issues where no issue lay.

However, whilst many decried Thompson's assertions other commentators pointed out quite correctly that the US itself had for many years sought the capability to destroy and disrupt other nation's food supply as part of the cold war effort. It was therefore not unreasonable if superpowers had thought it a viable way of damaging an enemy that others might also consider it a possibility, in particular the non state actors –terrorists. As a not indirect result of Thompson's public comments the recognition of the vulnerability of the food production sector to outside influence, within government, law agencies and the food sector has slowly grown in the US. Indeed since 1999 the US congress has held five hearings specifically devoted to agro-terrorism or agricultural biosecurity. Initially these hearings were militarily focussed, after 9/11 the focus shifted to terrorist groups adopting the tactic. The fact that the US Congress has invested time and more importantly effort in gathering

information on this issue says something for the profile of this threat in the US. This is not a concern which is the preserve of radical survivalist organisations, doomsday enthusiasts or a dominated by one political party. Within the US and indeed Canada and Australia it is a recognised threat – one of many governments and industry are made aware of and seek to plan for.

Agroterrorism has many definitions, but for the purpose of this study I shall adopt that of Jim Monke an agricultural policy researcher of the Congressional Research Service. Monke is one of the most established researchers in this field and as such is well known as a source of credible and respected published information. Monke defines agroterrorism as ;

'The deliberate introduction of an animal or plant disease with the goal of generating fear over the safety of food, causing economic losses and/ or undermining social stability'²

It is interesting to note Monke does not see it as a way of killing or maiming vast numbers of people – although with some Zoonotic diseases this clearly is a possibility. Current opinion that agroterrorism presents the greatest threat to society as an economic impact weapon. As a vector for attacking a population with disease bioterrorism has many more efficient vectors of disease distribution than those offered by agriculture e.g. infecting people with a virus on a tube train. However, affecting a population's health cannot be ruled out.

² Monke, J (2008) in Ollington, J.T. (Ed) Agro-terrorism, Nova Science Publishers

1.1 Background

In 2006 I explored the potential of an agroterrorist attack on the UK's agriculture through a paper published in the International Journal of Rural Crime. This piece of work was incomplete in the sense that whilst it considered causes and outcomes it didn't explore the nature of the threat or the process of response. It was this aspect which I felt required attention if any scenario construction was to be placed into context – little point in hypothesising if there is no evaluation of responses. This interest coincided with an increase in policy and information available in the US regarding agroterrorism, which contrasted totally with the situation in the UK. Indeed a search of relevant UK agencies revealed no public mention of agroterrorism – indeed contact with such agencies either drew blank, denials of any issue or dismissal. This was in direct contrast to the US, which at this time was openly discussing agroterrorism, producing policies and most intriguingly funding public agencies, law enforcement and training in this area. UK commentators appeared to brush off these developments as solely a US fear. However, Canada, Australia, New Zealand also at this time raised the issue of agroterrorism and biosecurity. Indeed attending a Rural Crime Conference in Australia in late 2006 agroterrorism, biosecurity and the potential threat to the Australian sheep industry was a lively and seriously debated topic.

1.2 Study Objectives

Applying for a Nuffield Scholarship was the best way I could achieve my aim of exploring the issues surrounding agroterrorism. The US seemed the natural place to visit. This vast nation hosts ample examples of agricultural production and allied business as well as an established set of policies relating to agroterrorism.

Within the US the Department for Homeland Security (DHS) takes the lead and actively invests in research programmes relating to 'Agrodefence' in conjunction with the US Department of Agriculture. Additionally there is a Federal strategy relating to agroterrorism, which adopts a multi-agency approach to the prevention, detection and mitigation of such incidents. This allows a variety of interpretations and approaches to preparing for incidents to have been developed as each state has developed response plans under the federal umbrella which reflect local state agricultural conditions and requirements. Additionally the Federal Bureau of Investigation have an active focus on this area, and cascade down security information through state homeland security departments and agriculture departments to county and ultimately farm level.

I wanted to find out about the nature of the perceived threat and most importantly what could be done to mitigate against any eventuality, particularly at the farm level. I wanted to see what was being developed in terms of policy and training and I wanted to talk to those involved in these developments to establish where they considered the challenges were and how the industry could be involved in the protection process. Clearly from reviewing publicly available information sourced in the US, communication was important across

the whole sector and I wanted to explore the nature and form of that information.

1.3 Project Outline

In order to meet my project's aims I travelled to the agricultural heartland of the eastern United States- Georgia. From here I travelled to Washington DC to meet with key agencies and agricultural bodies. Returning to Atlanta, Georgia via Virginia I went on a road trip (by Greyhound) across Georgia, to Alabama and Florida. The information and perceptions gathered during this period was used to contextualise the UK situation and consider the threat and the UK's degree of preparedness for an agroterrorism incident.

2.0 The Origins of Agroterrorism

Of all the acts of 'terrorism', agroterrorism is one of the least studied and till recently little considered by contingency planners. Many nation states including the US, Russia, UK and France had all invested in a variety of biological agents in the 20th century. Deploying these bioweapons against agriculture had though been for most nation-states a theoretical consideration. In the early 1990s the threat from biological attack came to be accepted by many policy makers, (particularly in the US) as the probable form of terrorist attack on the human population. Although there was little physical evidence to support this, beyond some past localised use by radicals. This concern at the threat of biological attack agents grew in the 1990s and included the concern that anti-livestock, anticrop and antisoil agents could fall into the hands of non-state aggressors³.

Initial concern with agroterrorism began in the US where focus lay with firmly with biological agents including crop diseases, pests and animal diseases. The use of the latter raises further issues, as some may be transmittable to humans (Zoonotic). Whilst there are hundreds of potential pathogens, realistically only a few dozen are considered viable. When considering viability of an agent, livestock are considered to be more widely susceptible than crops to pathogens, principally because, livestock in industrialised countries – the UK, US, Australia, etc are generally considered disease free. They therefore make effective vectors of transmission, particularly, during live animal movements.

Anti-terrorism policy development in the US considered agroterrorism in very narrow context, Parker (2002)⁴, (as part of the Federal Strategy) described the risk specifically as being 'agricultural bioterrorism'. The biological stance was further reinforced by studies such as Kosel and Anderson (2004)⁵ who

³ Kohonen, A. (2000) Responding to the threat of agroterrorism: specific recommendations for the United States Department of Agriculture in Davis, J.A. and Schneider, B. (eds.) (2002) *The gathering biological warfare storm*, Alabama, USAF Counter proliferation Centre.

⁴ Parker, H.S. (2002) *Agricultural bioterrorism: a Federal strategy to meet the threat*, McNair Paper 65, Washington D. C. Institute for National Strategic Studies, National Defence University

⁵ Kosel, M.E. and Anderson, D.E. (2004) An unaddressed issue of agricultural terrorism: a case study on feed security, *Journal Animal Science*, Vol.82, p2284-3400

considered the vulnerability of feed stocks in US agriculture and more recently Ungerer and Rogers (2005)⁶ who assessed the vulnerability of Australian agriculture within the context of the introduction of disease.

2.1 The Present Terrorist Threat and Agroterrorism?

Recent British assessments of the terrorist situation both global and UK indicates a changing and expanding picture. Al-Qaeda is clearly committed to continuing to committing attacks, and as the conflict in Afghanistan continues the situation globally can only become more complex and dangerous meaning that the UK is now seen as a key target for Al-Qaeda⁷. The nature of the threat may also be seen to be changing, with the threat now including chemicals, bacteriological agents, radioactive materials and nuclear technology. Numerous assessments have indicated that Al-Qaeda is actively seeking these materials and knowledge relating to chemical, biological, radiological and nuclear (CBRN) weaponry⁸.

The potential for the use of CBRN materials with the ability to cause widespread economic disruption and are now seen as being very much part of the terrorist's portfolio.

In addition to the international terrorist actors there is an increasing militancy amongst environmental protestors as seen in actions taken against UK laboratories and allied companies. In addition there is the omnipresent threat from criminal organisations. Increasing profits – particularly from supermarket chains clearly makes the entire food sector and appealing sector for extortion attempts based around food safety concerns.

2.2 Should Agroterrorism be of Concern to the UK?

The UK's rural economy is diverse. There are distinct areas of agricultural production for example the south and eastern parts of the UK are largely cereal areas, the north, west and uplands of the UK are mostly livestock with the central part of the country a mixed farming economy and horticulture. UK farm production accounts for some 60% of all the raw food consumed in the country and some 73.3% of all indigenous food types eg potatoes. The risk to both supply of goods and the agri-food economy from tampering is acute. Additionally, the UK rural economy is highly diversified. For many years British farmers have been encouraged to diversify in the face of declining markets and Common Agricultural Policy reform. This has resulted in a high levels of farm diversification with approximately 46% of full-time farms engaged in some alternative enterprise and half of these gaining at least 25% of their total

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Ungerer, C. and Rogers, D. (2005) The threat of agroterrorism to Australia : a preliminary assessment, *Studies in Conflict and Terrorism*, Vol. 29: p147-163

Manningham-Buller, E. (2006) *The international terrorist threat to the UK*, speech by the Director General of the Security Service, Dame Eliza Manningham-Buller, at Queen Mary's College, London, 9th November 2006, available at <http://www.mi5.gov.uk/print/page568.html>, accessed 10th March 2007

income from that diversification⁹. Additionally, outside of agriculture there are many high value businesses such as hotels, recreation activities, tourism facilities, golf courses, racecourses and racehorse-training yards interspersed across the countryside.

Experience of the Foot and Mouth (FMD) in the UK in 2001 provides an insight in the potential costs to the countryside of an agroterrorist incident. During the period February 2001 to January 2002 when the last county was declared disease free, agricultural production lost some £355 million (approximately 20% of annual farming income). During the outbreak some 4m animals were slaughtered casting blight over the countryside as their carcasses were disposed of through mass burial or burning. The countryside was effectively closed down with the result that tourism and associated businesses lost between £2.7 and £3.2 billion¹⁰. Whilst not all the tourism losses were in the countryside many foreign visitors were put off visiting the UK because of the FMD outbreak, particularly over the lucrative summer months. During this period access to much of the countryside and the National Parks was restricted or prohibited. This also resulted in many rural sporting events and activities being restricted or suspended. The horse racing industry was particularly badly hit with many high profile events cancelled for example the cancellation of the 2001 Cheltenham festival resulted in the loss of £4.5m in ticket sales alone and upwards in £7.2m to the wider regional economy in hospitality etc. The resultant social cost was also high with businesses closing and redundancies damaging the viability of rural communities.

3.0 Preparation and Planning for Agroterrorism – The US Approach

I began my exploration of the US's planning and preparation for a possible agroterrorism attack in the US State of Georgia. Georgia has one of the largest and most diverse rural based economies with sizeable sectors in cereals, livestock, horticulture, peanuts and fruit. It also has a large and varied diversified sector with a great emphasis on outdoor recreation (particularly) golf, which would be threatened by any agroterrorism incident.

My introduction to the both the US and Georgia system was facilitated by the British Consulate based in Atlanta, Georgia, which has amongst its responsibilities co-ordination of anti-terrorism work.

Initial meetings were held with staff¹¹ of the State of Georgia Agriculture Department and the Georgia Office of Homeland Security (OHS)¹².

Agroterrorism is seen very much as a real issue to agricultural authorities not just in the State of Georgia but in the other principal agricultural states as well.

⁹ DEFRA, (2006) *Diversification in Agriculture – January 2006*, London, Office of National Statistics and DEFRA

¹⁰ Thompson, D, Muriel, D. , Russell, D., Osborne, P, Bromley, A., Rowland, M., Creigh-Tyte, S. and Brown, C. (2002) *Revue Scientifique et technique de l'office Internatioanl des Epizooties.*, 21 (3) 675-687

¹¹ Due to the nature of the study unless pertinent job titles/ roles will be used in lieu of individual names

¹² Each state has an Office of Homeland Security which implements Federal strategies within the context of a State's economy and geography

They have all invested a great deal of money in staff, training and facilities to develop response plans. Politically and economically this is seen as a sound investment. It was considered that there was a genuine potential threat to agriculture from a variety of sources not just the actions of international terrorists. These included disgruntled employees, those acting against large corporations (many of Georgia's producers are linked to iconic foodstuffs such as McDonalds and KFC) and criminal extortionists – both seeking financial gain directly and being rewarded third party for de-stabilising a rival.

Vulnerability to attack by whatever means was seen as not just as a farm based threat although feed lots and ranches figured highly in risk, but the threat was also seen as being to input supply chains as well as outputs through stock marts. Also contributing to the risk were the state fairs and the many hobby farms around the state. Wildlife was also seen as a possible vector for the spread of any contamination across the state.

Biosecurity was seen as a key issue within the State. Georgia hosts the National Biosecurity Resource Centre which is a research led facility engaging in animal health research and the security of this facility is considered paramount. For the wider industry there are a variety of means of communication as is common to most Department's of Agriculture. Georgia promotes a multiplicity of information for agriculturists, hobbyists and horse keepers on biosecurity. Primary detection of illegal food imports etc at ports and points of entry is the responsibility of Federal agencies with whom they engage. As common in most agricultural economies there are great differences in uptake of biosecurity advice. As would be expected the poultry and pig sectors are highly biosecurity focussed and aware. Much of this has been driven by the processing industry and their assurance requirements. At the lower level of production, the picture is more fragmented with varying implementation of biosecurity arrangements.

3.1 The US State and Federal System and Agroterrorism Preparedness

The Georgia OHS and the Georgia Department of Agriculture work within a wider Federal Government framework. The Federal system works directly under the President and is co-ordinated by three Federal agencies – the US Department of Agriculture (USDA), the Department of Health and Human Services (DHHS) and the Department of Homeland Security (DHS). Under the Homeland Security Presidential Directive 9 (HSPD-9) – Defence of US Agriculture and Food the DHS has been designated the lead agency in ensuring that agriculture is protected. This directive compels the USDA, the DHSS and the Environmental Protection Agency to work together to develop preparedness plans.

The USDA has a broad mission statement to protect US agriculture from pests and diseases and enabling food safety. In order to do this it operates two lead agencies Animal and Plant Health Inspection Service (APHIS) and the Food Safety and Inspection Service (FSIS). Within APHIS there is a veterinary department with dual responsibility to both diagnose and prepare

the country for a foreign animal disease outbreak. There is also a Plant Protection and Quarantine department, which is charged with the monitoring and detection of plant health issues. APHIS can put a Foreign Animal Disease Diagnostician (FADD) anywhere in the US within 8 hours of a suspected animal disease outbreak. In the case of plant disease this is 24 hours. These Federal specialists make the final diagnosis but it is the individual state's responsibility to activate and enact a response plan and maintain quarantine.

The other two Federal agencies have broader roles in relation to 'terrorism' and as such may be seen to be more policy and guideline orientated – unless there is an actual incident. The DHHS operates the Centre for Disease Control (CDC) and the Food and Drug Administration (FDA). The CDC provides support to agriculture in terms of prevention and control strategies whilst the FDA is involved in prevention strategies in the food sector – that is all food (and cosmetics) apart from meat, poultry and eggs which are under the USDA's jurisdiction.

The third agency the DHS is the newest Federal agency established in 2002 and is directly involved in response planning to a terrorist attack. The DHS has three primary missions;

- Prevent terrorist attacks within the US
- Reduce the US's vulnerability to terrorism
- Minimise the damage from potential attacks and natural disasters

As the lead department the DHS operates a variety of strategies to combat potential terrorism incidents from sniffer dogs at airports tasked to inspect and intercept agricultural products at borders to the Emergency Preparedness and Response Directorate which helps the nation respond and prevent a variety of emergencies.

3.2 Chain of Response

Contrary to the dominant Hollywood image of emergency response the Federal Government does not immediately step into a crisis, indeed since Hurricane Katrina, States have worked greatly to assert their independence and capability to address issues within their borders. To this end States adopt the adage that 'all emergencies are local' and that the ability for first responders to grasp and deal with the situation is paramount. Initially the incident is dealt with at local level – which may be a county response. If the incident is large or expands State resources will be mobilised. In the case of agricultural incidents it is usual for a combination of the two to be initially deployed. The State Emergency Management Agency can if needed declare a State of Emergency which means that resources move from being 'usual and customary' eg limited assistance to the local level to the mobilisation of State resources – personnel, equipment, facilities etc. If the State's resources become stretched the 1984 Stafford Act can be invoked whereby a State can request assistance from Federal sources, if the emergency results in monetary loss of at least \$1 per head of capita, mass casualties or great threat to life or property.

If the incident involves a foreign plant or animal disease the procedure is slightly different. These pose a direct threat to US trade and therefore the US Government becomes immediately involved. The US Secretary of State for Agriculture can use Federal funds and if required can declare an 'Incident of National Significance'. If Zoonotic disease is involved, which may cause mass casualties this response may be further escalated by the issuing of a 'Presidential Disaster Declaration' This ramping up of response not only allows funds to flow but means animal and public health officials work together under a joint incident command structure.

4.0 The State of Georgia's Approach

The State of Georgia created the Georgia Agroterrorism Committee in 2003 as an extension of the State's Homeland Security Taskforce. This committee brings together the State's statutory departments of agriculture, defence human resources, transportation and the Georgia Emergency Management Agency with APHIS, and the USDA. It also includes the University of Georgia (various departments), the FBI and representatives from the Georgia Farm Bureau, Georgia Poultry Federation and the State's agribusiness council. The committee works to evaluate risks, gather information and communicate across the partners.

The State of Georgia sees education as being at the very core of making the State's agriculture safe and robust. At the core of dealing with this potential risk is the need to communicate and disseminate the information and also the requirement to have responsible disclosure. The Georgia OHS and agriculture departments as the key organisations hold the 'reins' on information, deciding what information is released and how it is to be used. They do this directly in terms of 'advice' to key professionals veterinarians, law enforcement etc but reach the wider community through involvement of Higher Education Institutions (HEIs) in particular the University of Georgia (UoG) and the development of a range of extension programmes. The principal aim of this work is to promote early response, the mnemonic RAIN neatly summarises the desired outcome of this work;

R- Recognise
A - Avoid
I - Isolate
N - Notify

Awareness education is seen as core to promoting preparedness and protection within the state. Involvement of the HEIs is an interesting way of promoting awareness, as the courses offered contribute to many rural professionals Continuing Professional Development (CPD) and therefore attendance and completion of courses counts towards career progression and development. Courses offered at the University of Georgia include 'Agrosecurity Awareness Training' which includes modules on US agriculture, the role of Federal Agencies, securing agriculture and food, food pathogens and pests, emergency management and training specific to Georgia's

agriculture. The courses are offered at a range of levels from the basic awareness to those suitable for professionals such as veterinarians. Courses can be built upon and range from a university certificate up to a Masters.

The University of Georgia sees the agroterrorism programme as fundamental to empowering first responders to an incident. These first responders may not just be veterinarians or state officials, but farmers, law enforcement officers and medical staff. He sees the real challenge at raising awareness of basic agricultural practices and diseases across a wide range of rural operating individuals. Clearly there is recognition that information and training cannot be solely focussed on practising agriculturists given the range of individuals engaging with the rural environment. There is also a acknowledgement that maintaining levels of awareness is an important facet of the programme. This they do by combining the courses with key skills for rural workers such as basic life support for animals and dealing with natural disasters. Support to the rural communities to help them maintain their skill base is not just confined to formal courses but is also available through e-mail updates, networking events and on-line training, (Figure 1).

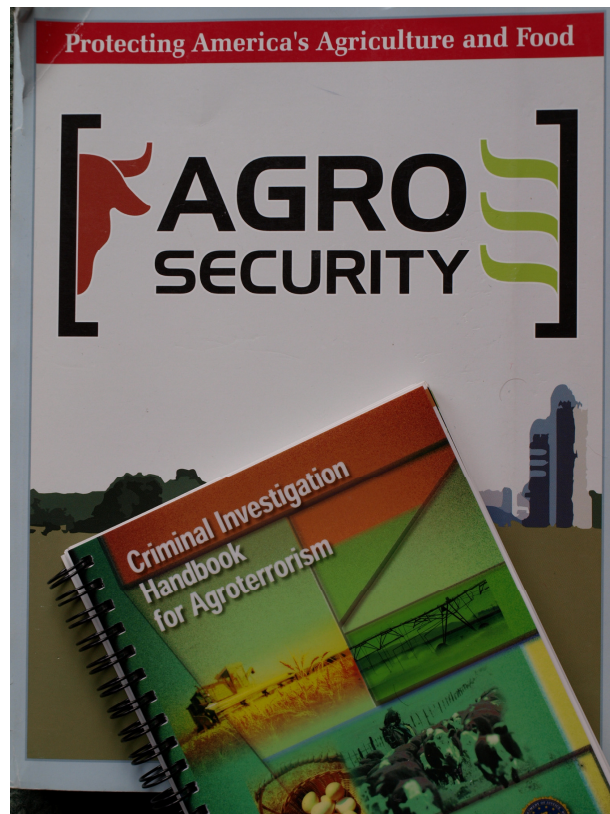


Figure 1 : University of Georgia training material and FBI Agroterrorism handbook

4.1 University of Tennessee – Extension and Education in Agroterrorism

The University of Tennessee runs a similar series of programmes relating to agrosecurity including a preparedness level course on agroterrorism which was the first to be certified by the DHS. The focus of this course is at the community level. Unlike the UoG programme which very much focuses on the individual business, the Tennessee programme views the rural economy as a series of interdependencies in which various sectors have vested interest – whether financial, physical or emotive. It utilises community level assessment to assess vulnerability. The assessment is formalised through the use of the Federal Government supported CARVER plus Shock methods.¹³

CARVER is an acronym for the following attributes used to evaluate the attractiveness of a target for attack:

- *Criticality* - measure of public health and economic impacts of an attack
- *Accessibility* - ability to physically access and egress from target
- *Recuperability* - ability of system to recover from an attack
- *Vulnerability* - ease of accomplishing attack
- *Effect* - amount of direct loss from an attack as measured by loss in production
- *Recognisability* - ease of identifying target

The *Shock* element is an assessment of the health, economic and psychological impacts of an attack on the rural sector. This assessment is fundamentally important as an agroterrorism attack may not just cause economic damage but most certainly would cause social and emotional damage to rural communities, which will require resources to mitigate against. The advantage of using CARVER + Shock is that it is replicable. A downloadable software tool ensures a common approach is made, and although it can take time to get used to it produces a permanent record which highlights areas of vulnerability within the system. Vulnerability is assessed by scoring an agricultural or food production system in such terms as its attractiveness to attack – eg icon food/ food for particular client), accessibility to points of input, the sort of pathogens which could enter the system and survive and how visible the process is – eg can access be gained without detection. In short the process asks the respondent ‘could you introduce material or adulteration at any stage of the process’.

5.0 Washington DC : Industry Vulnerability Assessment

CARVER + Shock was originally designed in the Second World War as an offensive targeting programme which used criticality and accessibility to determine targets. The USDA has turned this around to use it to assess vulnerability. It has been seen very much as a tool for the larger sectors of industry and as such it forms part of the Strategic Partnership Programme Agroterrorism (SPPA)¹⁴ which is a DHS, FDA, FBI, and USDA entity.

¹³ CARVER + Shock USFDA Introduction to CARVER + Shock plus software tool download <http://www.fda.gov/Food/FoodDefense/CARVER/default.htm#whatis>

¹⁴ <http://www.fda.gov/Food/FoodDefense/FoodDefensePrograms/ucm080836.htm>

The use of CARVER + Shock started as a low level, inexpensive method of identifying issues within a processing system. As a non-statutory, non-regulatory approach it was welcomed by the food industry and trade associations as well as state and federal level partners. The USDA sees CARVER + Shock as a key tool in identifying issues and producing 'vulnerability roundups' for generic processes and areas of industry. By doing this it is clear that the food industry has accepted Agroterrorism as a term and as a real risk to their business which is worthwhile investing in to countermand. The results of individual enterprise surveys are classified and so the output is removed from any Freedom of Information request – clearly a concern for industry utilising commercial patented processes. Additionally the information is not used to enforce legislation. These guarantees have ensured the systems adoption by industry and its growing use.

Whilst CARVER + Shock has been rolled out across many sectors it clearly has some limitations. Whilst accepting that agriculture is highly interconnected, by concentrating on the large scale producers and suppliers it may be that the smaller scale and in particular the hobby farmers are overlooked, which may in the macro sense be the point of vulnerability. CARVER + Shock also does not fully react to the potential for an insider to cause damage or in labour intensive activities such as horticulture with large changes in workers for mitigation to be effective.

5.1 Farm Level Advice

The American Farm Bureau (AFB) represents the majority of US farmers and as such is a powerful and influential lobby group. The AFB unlike many of the government agencies operates at grass roots level and has the potential to be an accurate and efficient conduit of targeted information. However, it was felt that this information may not have been flowing from Federal agencies clearly enough, unlike with the food industry, and as such a key part of the business process wasn't being kept informed. The AFB currently works alongside the DHS, USDA and local law enforcement, however, some of this work may be seen as too top down by recipients. The AFB has a valuable part to play in outreach in particular to Hobby Farmers who may become associate members. The AFB has a key role to play in promoting biosecurity, which they estimate, in the commercial pig and poultry sectors to be very good but variable in the smaller operators. Whilst these systems are economically separated to a degree, geographically they may be very close. Good communication is all about the focus of message. An effective response to a crisis is assisted by sharing information, as well as help, and at its heart is efficient organisation and community leadership.

6.0 Evaluation of System Approaches

The US has created a detailed and comprehensive response framework. It clearly articulates procedure and due process and allows individual states to adapt and develop responses. There is much to be positively acknowledged – a clear recognition of the terms, an understanding of the threat and its

incorporation into professional responsibility and concomitant training development. However, much of this appears to serve either the food processing industry, the food distribution network or the larger producers. Given that the sector is so interdependent and geographically intermixed it would appear that the threat does not necessarily lie exclusively with the largest or most sophisticated organisation but the vulnerability lies as much as with the weakest link. It was therefore surprising that so little of the heightened awareness had 'officially' filtered down to farm level. Clearly by talking to FBA members and local officials they had concerns and awareness but they were often lacking in what they felt were the answers to their own questions. In short some felt marginalised by the issue and powerless. For the small producer CARVER + Shock may not be an appropriate system to adopt to identify their vulnerability and plan a response.

In terms of law enforcement Agroterrorism is now a recognised form of attack and as such the FBI has produced a Criminal Investigation Handbook for Agroterrorism. This document clearly identifies not only the procedure for investigating and partner organisations but also identifies measures for dealing with the crime scene and collecting and collating evidence.

It would appear that the potential threat is being managed in some States through a combination of risk management, law enforcement procedure and sectorial knowledge sharing which has not given much opportunity for the large numbers of potential individuals or businesses to be fully included. Terrorism is a worrying fact of modern life. For many in rural areas it is a distant thought, but post 9/11 for many it is a genuine fear but certainly not a certainty. Being given the chance to be part of a system though is often the key to turning a victim into a survivor and a survivor into a first responder.

7.0 The State of Florida - Integrated Disaster Management

Florida is a richly diverse agricultural state. Away from the beaches of the Peninsula the northern and central areas are home to a large number of varied enterprises from stock to fruit growing. Its geography and climate have led to the development of an approach to rural disaster management which is fairly unique in the US and into which the emerging threat of agroterrorism has been incorporated. The Office of Agricultural Emergency Preparedness (OAEP) which is in the Florida Department of Agriculture and Consumer Services is based in Tallahassee, Florida. OAEP's role is to provide a link between the Federal agencies and the agricultural industry. It is also responsible for analysing threats to the food industry at all levels including transportation and distribution. Formally known as the Office of Bio and Food Security Preparedness it changed its name in recognition of the wider variety of CBRN agents now potentially available for use against the food sector. It has close links to law enforcement and operates agricultural interdiction stations on main highways in order to stop, search and investigate movements of food and material into the state. As such it can effectively monitor 'imports' into the state. Indeed the Florida agricultural commissioner has the power to halt all movements of agricultural products into and out of

the state. This second line of defence after APHIS is seen as an important step in keeping Florida disease free.

As with other State emergency management systems the USDA would take charge in the case of major incidents, however, the Florida system bases its planning on a recognition of limited Federal capability to deal with multiple incidents or outbreaks. The Florida State system is therefore very proactive in promoting local responsiveness and raising awareness with local law enforcement.

A key part of this system is the State Agricultural Response Team (SART). Within the US there are a number of SARTs although there is no Federal definition of what constitutes the role. Florida SART has a clear remit to tackle both natural and man-made disasters. It emerged following Hurricane Andrew in 1992 and currently it employs some 150 personnel in its animal division and also has links to many volunteer and industry partners, (Figure 2).

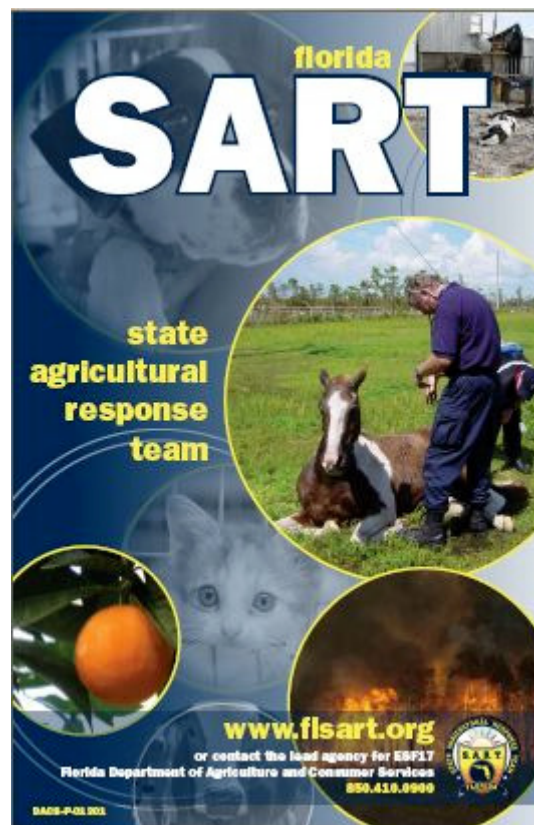


Figure 2 : SART information poster

Originally SART had a focus on post disaster companion animal health but subsequently encompassed agriculture and agriculturally related terrorism. It also has a strong remit to provide animal related educational information to the various sectors in the state. Until 9/11 its driving force was the hurricane season, flooding and illegal immigration from Cuba bringing in disease. Uniquely it also has to plan to incidents relating to the activities of NASA at the Kennedy Space Centre.

SART has close links to OEAP and DHS but has adopted a bottom up approach focussing its efforts on counties building up to the state. In the event of an outbreak this would complement the USDA's Federal approach. What this allows SART to do is have a clear organisational structure and to provide a centre for emergency management, which allows clear messaging to its communities. SART occupies one of the 18 Emergency Support Functions for the state (No 17 being Animals and Agriculture) which allows it to take the lead on incident control and make resource based decisions. For example post hurricane Strike teams made up of forestry workers can be sent into rural areas to open up highways and roads.

SART operates at both State and at county level. SART also takes on the role of a multi-agency co-ordination group, which encompasses both public and private associations, including public and private veterinarians, cattlemen associations, the Florida Horse Association and veterinary volunteers (para-veterinarians). Whilst State SART is a statutory organisation the county level SART is a voluntary body whose creation is actively encouraged to assist local citizens.

What SART has achieved is the creation of a community of rural individuals who are prepared to act (and have acted following natural disasters) in order not only to preserve their way of life but that of others. For example some cattlemen have offered land for the quarantine of livestock while others have volunteered to be spokespeople for the industry/ county. A key part of the SART set up is the inclusion of volunteers. They bring to the table a number of things. Firstly credibility within the wider community, they help with the dissemination of key messages, they also bring core skills. Indeed in the case of humane slaughter, the use of rural organisations/ local individuals can often bring this element to a community. Indeed humane treatment of all post disaster is a key element in promoting recovery.

The development of a large and diverse network does not happen over night nor does it occur without management. SART uses exercise and conferences to bring people together both individually and in-groups. Developing levels of trust particularly between organisations is important.

In terms of tackling the threat from agro-terrorism the SART team recognise there is a higher level of awareness of the issue within the agricultural leaders (FBA, Cattlemen's Association etc) than at the farm level. Raising awareness and getting unusual incidents reported is seen as a key step in developing the grass roots organisation to be more prepared. Indeed a key message of the Florida disaster management system is promoting self-protection and self help. A great deal of effort goes into assisting people in planning for eventualities whether that be maintaining a reserve supply of generator fuel or a quantity of animal medicines.

In contrast to much of what I had seen and been reported on in the US the SART model seemed very much to be reflecting the needs of the community- albeit being guided by State and Federal requirements. There clearly was a

long term strategy in place within the OAEP and SART with staff being allowed to stay in roles in order to develop relationships with often disparate and geographically isolated groups. Indeed for a government agency there was real passion and commitment to the work, which was reflected by the responses of the rural population who in turn reflected this with their enthusiasm and commitment and most importantly involvement.

As SART moves more into agroterrorism and biosecurity training it is in an ideal position to deliver key information direct to the community. Utilising key leaders and informants already established in the system will allow them to disseminate information with less chance of creating fear or scepticism and place it firmly within the boundaries of measured and tempered fact. Indeed the message has been re-focussed from one of anti-terrorism to protecting ones self and business through implementation of agro-security measures. Familiar words like biosecurity and farm security are more amenable to populations and such advice offers real and tangible benefits.

7.1 Evaluation of SART

The SART model outwardly appears to tick many of the boxes in relation to dealing with emerging issues. It has successfully galvanised many parts of the rural community and promotes leadership, which would be a core requirement in the event of a major disaster. However, the State of Florida is quite unusual in its exposure to natural disasters and as such many of its residents are disaster focussed and highly aware. For many of them to add to that list of possibilities another issue may not be a major hurdle.

SART's focus on the method of delivery through local contacts is re-enforced by a series of conferences and presentations over the year. It is through these the key message on biosecurity is delivered. The focus is very much at the farm level – indeed the home, ranch and the field are considered fundamental. Participants are asked to consider their own situation and the emphasis is on practical actions and advice. Further emphasis is placed on the individual to consider the creation of an action plan to deal with disasters – man made and natural. Again guidance is offered on this through both conference format and on the internet where work books, examples and self-extracting presentations are offered. All this combines to empower the community. They have ownership of the issue and can develop community and individual responses to meet their needs within a framework.

8.0 Summary of Findings

The US Government's stance on agroterrorism demonstrates a clear recognition of this as an issue, which poses a threat to the US economy and population. Whilst agriculture may not be terrorists' first choice it is certainly an attractive secondary target¹⁵. Additionally the scope of possible perpetrators is potentially larger than immediate concerns would indicate, and so planning

¹⁵ Monke (2008) Agro – Terrorism threats and preparedness, in Ollington, J (Ed) (2008) Agro-terrorism, Nova Science Publishers

has had to encompass the domestic terrorist, the lone perpetrator as well as those with plans for extortion.

To respond to this the US has adopted a three pronged strategy for countering the threat of agroterrorism;

- Deterrence and prevention
- Detection and response
- Recovery and management

All three of these areas have required investment in training and the development of a flexible and motivated workforce at both Federal and State level across many sectors.

The legislative and policy system established post 9/11 places a great deal of emphasis on detection and monitoring of potential pathogens within the environment. The involvement of the law enforcement and intelligence community in the collection and detection of information regarding biological weapons in particular which may be used to attack agriculture informs preventative security methods and heightens industry awareness. To aid this APHIS has now established offices in some 27-host countries to look for intentional threats as well as unintentional contaminants in imports.

The role of law enforcement in the process is clear. Whilst agroterrorism comes under the umbrella term of terrorism its special geographical and economic characteristics have made it a sub-specialism with concomitant development of procedures and training to meet the need.

To support these developments the US has created a number of centres of excellence across the country including diagnostic laboratories for plant and animal material, veterinarian research and food safety inspection. Speed of diagnosis is seen as essential in order to first mobilise resources effectively in order to counteract developing issues and secondly to clearly demonstrate action to support the industry and maintain consumer confidence.

The US appears to suffer the same issues relating to biosecurity awareness as other western economies. The industry is very much aware of the need to maintain it and is indeed legislatively and commercially driven to maintain it. However, like in the UK there is disparity in its full adoption across the sector. This clearly has implications for the success of wider agroterrorism prevention strategies.

Industry involvement in the preparedness planning process appears to be variable beyond the large scale producers and processors. The food processing and large scale agri-business sector are arguably easier to engage with and account for the greatest proportion of income, jobs and investment in the US agricultural sector. The engagement of this sector by the Federal agencies has established the requirement for and practice of a system based approach. However, the applicability of the CARVER + Shock approach outside of these large-scale production systems is unclear.

CARVER + Shock works well within a regular processing framework but does not reflect accurately the nuances of smaller scale agricultural systems. The important field use of CARVER + Shock has come through its adoption by the University of Tennessee's Center for Agriculture and Food Security and Preparedness. This approach brings CARVER + Shock into the community and allows impacts and vulnerabilities within geographical areas not just businesses to be established. Identifying vulnerabilities within the wider industry is key to ensuring wider safety.

The use of HEIs to provide a range of education and information services is widely accepted in the US. Most agricultural university faculties either offer an extension service or are linked to the state's extension service. Communities often see them as providers of sound, impartial advice. Increasingly they are offering DHS approved courses, which can lead to accreditation and demonstration of core competency – particularly within the feed industry, law enforcement and extension services. Whilst some of the courses are very policy driven and equip the participant with regulatory and legal advice others have a more practical focus. For example Tennessee offers a course to train 'First Responders' which covers the following¹⁶;

This 4 day course will provide a participant with specific skills to support a response to an agricultural disaster. It is a practical, hands on, exercise based course. At the conclusion of the course, the participant will be able to:

- Describe agroterrorism and its effects on humans, animals and the economy
- Identify chemical, biological, radiological, nuclear and explosive hazards and relate them to potential agroterrorism
- Demonstrate knowledge of agricultural-related epidemiology
- Identify zoonotic diseases that may be used by terrorists
- Identify foreign animal diseases that may be used by terrorists
- Describe response actions for an agroterrorism event, including the role of the responder within the Incident Command System
- Describe various methods of animal restraint and euthanasia that may be used in an agricultural incident
- Describe various methods of animal carcass disposal
- Demonstrate how to utilize personal protective equipment in an agricultural incident
- Demonstrate how to perform decontamination procedures in an agricultural response
- Demonstrate how to perform a post decontamination survey and maintain crime scene preservation

By offering these courses to extension officers, students of agriculture, law enforcement officers etc the ability of 'the industry' to prepare is greatly enhanced, as the population of informed and aware individuals is increased. Crucially these courses are centrally funded and so participation is not limited by affordability. Additionally by accrediting these courses within a credit system, participants can enter into further educational experiences which can enhance their learning.

¹⁶ University of Tennessee's Center for Agriculture and Food Security and Preparedness Agriculture Emergency Responder Training <http://www.vet.utk.edu/cafsp/AGERT/>

The community-based approach is most evident in Florida. Here empowerment through structured training and the provision of a framework within which to operate allows individuals to plan and train to meet their unique needs. Whilst many in the UK would interpret this approach as an abdication of authorities' responsibilities, it would seem a rational approach to create first responders rather than re-enforce traditional roles of victims and rescuers.

Communication at farm level appears to be an issue (as in the UK). Any preparedness plan is only as strong as its weakest link and farm level communication regarding this issue appears patchy, and in some cases overly technical. The use of technical language or large volumes of documentation generally switch people off to the message and 12 page A4 documents about farm biosecurity whilst technically accurate cannot hope to meet large audience requirements. Clearly its not the message but the form which needs addressing.

It is within the Florida example any criticism of 'government' not communicating effectively with the community can be seriously tackled. Whilst most of the USDA type material and even some of the material produced by extension services and HEIs can be cited as being policy driven and macro in nature, SART is very much focussed at the small business. What is particularly encouraging is the language, which is used which is clear concise and meaningful within the small business context. It also does not involve any unduly onerous surveys or special equipment and seeks to explain the benefits of undertaking actions not just as a precaution against agroterrorism, but also against natural disasters and general farm security.

9.0 Reflecting on The UK situation – Current UK Government policy and planning

The UK does not have a formal agroterrorism policy to deal with the contingency effects of a deliberate agroterrorist attack. Indeed the principal authority for dealing with Chemical Biological Radiological and Nuclear (CBRN) attacks/ events (under which agroterrorism falls) in the rural environment DEFRA, has no mention of agroterrorism on its website.

Planning for a CBRN event is led through the Radioactive Substances Division who are DEFRA's lead agency for this area with the Government Decontamination Service (GDS) providing information and advice in this area. In terms of the collection of information and advice relating to animal health and disease (Zoonotic and no-Zoonotic) a group of authorities (including the Food Standards Agency, the Department of Health and the UK regional executives for the UK) led by DEFRA co-ordinate this through their 'Zoonoses' report which is published periodically, the last being in 2004. Additionally since FMD 2001 movement of livestock has been more closely controlled and monitored largely through the employment of an Animal Health and Welfare Strategy which operates a veterinary surveillance programme, which alerts the state veterinary service to potential outbreaks of disease.

The UK Government has a number of organisations dealing with terrorist and emergency preparedness backed by legislation – the Civil Contingencies Act (2004) which supports local and regional government's action. The key advisory body for the public is UK Resilience run by the Civil Contingencies Secretariat again this organisation has no information directly relating to agroterrorism. Only one document deals in detail with the rural situation, which is a set of guidance for local government dealing with the 'decontamination of open environment exposed to CBRN substances or material. However, this does not relate directly to agriculture but to the urban and rural environments in general and mostly details the responsibilities of local government and other agencies in terms of decontamination, rather what a landowner could or should be doing following an attack.

This type of advice is left to the document 'Preparing for Emergencies' a booklet that was sent to all UK households post 9/11. This booklet advises the population to 'Go in, stay in and Tune in'. Whilst this may be appropriate advice and for many in the population guidance they can follow, for agriculturists, equine units etc this is not always practical as many livestock managers will maintain their husbandry even under difficult conditions. Indeed this document can be said to have rather an urban focus, reflecting the belief that that is the key area of vulnerability.

The UK picture is one of much information regarding CRBN issues disseminated amongst many organisations with very little focus and a general non-recognition of agroterrorism as being a distinct threat. There is also limited acknowledgement of the issues of dealing with geographically disparate rural communities, many of which are economically tied to their property more than a 'normal' householder. As a result of this broad grouping of CRBN issues, there is no information available to farmers, landowners or rural business advising them of risks or measures they could take to enhance their business security. For example few are aware that they themselves are liable to meet the costs of dealing with a CRBN incident on their land as noted in the 2004 DEFRA publication - Strategic national guidance – the decontamination of the open environment exposed to chemical, biological, radiological or nuclear (CBRN) substances or material.

10.0 What Agents Could a Terrorist Employ in the UK Rural Environment?

Within the realm of CBRN materials there are a number of agents whose availability or ease of manufacture make them more likely materials of terrorist choice. The UK's agricultural system is still highly dependent on the use of pesticides and insecticides, which are considered to be an effective prophylactic against, introduced crop diseases. Therefore the use of a foreign plant disease is unlikely. The UK climate is also a factor in limiting the impact of foreign plant pest and diseases.

In 2004 the UK's Department of the Environment Farming and Rural Affairs (DEFRA) produced guidance for local authorities on the decontamination of the open

rural environment following exposure to CBRN materials. Within this document a number of materials were singled out as examples (Table 1), these provide a useful insight into the range of potential agents under consideration and the importance of recognising the persistence of these materials in the environment. This impacts on the length of time the contamination is a risk and the degree to which de-contamination can be employed (if at-all).

Table 1 : Rural CBRN Contamination

	Type of Agent		
	Chemical	Biological	Radiological
Persistent environmental behaviour	Mustard or VX	Anthrax	Cobalt –60 or Iridium-192
Non-Persistent environmental behaviour	Sarin or Cyanide	Plague or Ricin	N/A

Adapted from DEFRA 2004¹⁷

10.1 Radiological Agents

The use of radioactive elements or compounds has often been dismissed as being too difficult to obtain or construct. Whilst a nuclear device is a complex weapon a ‘dirty bomb’ or Radiological Dispersal Device (RDD) is a simple mix of conventional explosive and radioactive material. Allan and Leitner (2006)¹⁸ argue that conventional wisdom would dictate that RDDs are best suited to urban environments, which makes them ideal for use against rural environments where surveillance is least.

Much discussion has centred on the availability of radiological materials. Whilst it is often cited that material may be obtained from former Soviet installations, however, domestic sources are far more easily obtainable from hospitals, university research centres, construction and industrial sites. It is often reported that these materials are ‘lost’ or stolen from facilities. Although many of these sources are not useful for a RDD, thefts of material such as Iridium-192 are of concern.

RDDs have a number of advantages over chemical and biological agents in that radiation causes damage to all living tissue not just the target host. The long-term effects on the human body and the potential for delayed illness, particularly cancers may make this a more frightening incident for those in the affected area. Furthermore, radiological contamination cannot be neutralised or destroyed so contaminated material can only be removed and stored. Contamination damages the very basis of the agricultural production as well as damaging land values. Many radio-isotopes are soluble or easily absorbed by plant and soil material. The Chernobyl legacy in North Wales clearly

¹⁷ DEFRA, (2004) *Strategic national guidance – the decontamination of the open environment exposed to chemical, biological, radiological or nuclear (CBRN) substances or material*, London, Department of Environment, Food and Rural Affairs

¹⁸ Allan, S. M, and Leitner, P., (2006) Attacking agriculture with radiological materials – a possibility? *World Affairs*, Winter 2006, Vol. 168, No.3, p 99-112

indicates the potential impact of an isotope entering the environment and being re-cycled affecting both plant and animal communities with large scale economic consequences.

10.2 Biological Agents

Biological agents figure highly in deployment potential. At the lowest level there is contamination with biological agents such as salmonella and E-coli. Such contamination is localised and may generally contaminate a single property or enterprise. However, most of the potential agents are more likely to be deployed with the aim of maximising the coverage of the impact. Whilst the DEFRA review notes plague and ricin these are more likely to be resultant from contamination from an urban incident ‘spilling’ over into the rural hinterland. Of much greater concern are the Zoonotic diseases, in particular Anthrax and Highly Pathogenic Avian Influenza (eg. H5N1). The former is capable of being manufactured and the latter is present in wild bird populations in Eastern Europe. Key pathogenic agents with the potential to be deployed as anti-livestock and or anti-rural economy agents are outlined in Table 2.

Table 2 : Key Pathogenic Agents

Disease	Host(s)	Zoonotic
Foot and mouth disease (FMD)	Cloven footed domestic and wild animals – cattle, sheep, pigs etc	X
Anthrax	All warm blooded animals	√
Brucellosis	Mainly cattle, but also sheep, pigs, dogs and goats	√
Highly pathogenic avian influenza (HPAI) in particular H5N1	Poultry and bird species	√
Glanders	Mainly horses	Some strains can affect people
Swine vesicular disease	Pigs	X
Rinderpest	Cloven footed domestic and wild animals – cattle, sheep, pigs etc	X
Newcastle disease	Poultry	X

Adapted from Centre for Disease Control¹⁹

Sourcing material presents similar problems to obtaining other agents. Many of the pathogens are available in the environment, particularly in less developed countries. Ungerer and Rogers (2006)²⁰ explored the mechanism of collecting and transporting the FMD virus. The concerning aspect of this process is the simplicity of the operation and the ability of a perpetrator to visit a number of farms to spread and cultivate the infection. Ungerer and Rodgers also raise the spectre of the terrorist purchasing their own livestock to actively culture the disease. Having a pool of infected beasts would allow outbreaks to

¹⁹ CDC (Centre for Disease Control) (2005) Division of bacterial and mycotic diseases, frequently asked questions, available at <http://www.cdc.gov.ncidiod/dbmd/diseaseinfo>, accessed 2nd June 2009

²⁰ Ungerer, C. and Rogers, D. (2005) The threat of agroterrorism to Australia : a preliminary assessment, *Studies in Conflict and Terrorism*, Vol. 29: p147-163

occur in various locations (as in the UK's experience of FMD in 2001) resulting in a stretching of the response capability of authorities.

11.0 Risk and Vulnerability in the UK's Agricultural Sector

The UK's agriculture has a number of features, which heighten its vulnerability to terrorist attack, these principally relate to its mode of operation, its workforce and its openness. The main points of vulnerability are considered to lie within the livestock and horticultural sectors.

The UK livestock sector agriculture is highly dependent on inputs, particularly of feed. Studies by Kosel and Anderson (2004)²¹ have identified that this is potential route for contamination. Livestock also are transported long distances in the UK, for fattening or slaughter, again exacerbating the risk of disease transfer. This route was clearly influential in the 2001 FMD outbreak in the UK. During the FMD outbreak bio-security restrictions were imposed nation-wide, with controlled entry to farms, and the widespread use of disinfectant mats and wheel washes. In the subsequent years much of this procedure has been eroded and vehicles move regularly between properties with little or often no precautions. Poor biosecurity may also be exploited through the many 'hobby-farms' in the UK. Outside of the normal agricultural system, they potentially could become centres of unmonitored infection or contamination. Other points of vulnerability stem from farm water systems, boreholes, abstraction points, ring mains, reservoirs and header tanks are all vulnerable to tampering, which could act as a conduit for disease or bacteria. The September 2006²² outbreak of E-coli in the US linked to contaminated irrigation water although accidental illustrates how easy it would be for deliberate contamination to take place, particularly of salad crops.

The changing nature of the labour force may also pose a risk. The UK rural economy benefits greatly from migrant workers, many employed under legitimate European union schemes. Most of the workers come with references and provenance. However, agriculture and horticulture are often seen as an 'easy' work environment for those entering illegally with no formal papers. Not knowing the background of employees clearly poses a risk in any business.

Finally, the openness of the British rural environment could also act as a point of entry for terrorists, as well as the spread of any disease or the dissemination of radiological contamination. Public footpaths and land designated as open access land under the Countryside Rights of Way Act (2000) offers large-scale unhindered access to land where livestock are kept or water is sourced.

²¹ Kosel, M.E. and Anderson, D.E. (2004) An unaddressed issue of agricultural terrorism: a case study on feed security, *Journal Animal Science*, Vol.82, p2284-3400

²² BBC, (2006) Spinach blamed in US E.coli scare, available at <http://www.newsvote.bbc.co.uk/mpapps/pagetools/print/news.bbc.co.uk/1/hi/world/america.html>, accessed 18th July 2009

12.0 Conclusions

From my study tour my ideas about this issue have shifted. At the outset my view of preparedness was very much focussed on intervention policies eg sending in first responders and dealing with the problem from there. Having spoken with the practitioners and met members of the FBA and farming communities I am more convinced about the need to train and develop grass roots responders within a wider emergency planning type framework for that initial response. The reason being these are the people who know the area best, who know the practices, who can describe and collate information for other agencies and fundamentally have an investment in the issue as its there livelihoods. Clearly this is not a function for all members of a rural community but rural leadership and community resilience is what very much sets apart these communities from more fractured typically urban ones. The phrase Community Resilience should not be over looked as mere buzzwords.

Communication has clearly taken place between the Federal Government and the States and between the Federal agencies and the industry at large. By the fact that agri-business has signed up to programmes such as CARVER + Shock it is clear they recognise the threat to their business. All governments do top-down better than bottom up – it's the very nature of their bureaucracy which is why the synthesis of the message as distributed through the States via extension, HEI involvement, FBA and State agricultural services has been effective.

Education has a key role to play, not just within the farming community but those who work and live in it. Most importantly the role of the local law enforcement officer is crucial, for they are the ones who are most likely to be first notified of an incident or come across it in the execution of their duties. The same could be said for the rural paramedic, doctor etc. Professionalising courses relating to this topic and incorporating them within wider programmes or career pathways ensures not only uptake but continuing development and recognition of the dynamic nature of this area.

Biosecurity is clearly part of the preparedness plan – good biosecurity is essential for a healthy system - which goes without saying. The incorporation of biosecurity within the wider framework of agro-security is a convenient method of exposing issues to a wider audience. Biosecurity is everyone's business in a rural community as is general security and effective messaging is core to raising awareness.

12.1 Recommendations

There is every indication that agroterrorism presents a real and potential threat to agricultural systems. Therefore in order to better prepare the following are proposed based on experience within the US;

- Recognition of agroterrorism (in all its possible manifestations) as a distinct threat to UK agriculture
- Wider promotion of biosecurity as the first line of defence

- Production of a preparedness strategy which engages key sectors of the industry with the aim of promoting deterrence, resilience and recovery
- Development of appropriate training packages for rural professionals, law enforcement, businesses and communities.
- Greater promotion of rural emergency planning as a distinct entity requiring particular engagement and management
- Promotion of rural business and community resilience planning
- Development of agro-security packages for the UK environment as a way of businesses protecting themselves and their communities from damaging external influences.

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