Department
for Environment
Food & Rural Affairs

Chalara and the Social Amplification of Risk

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Introduction and Objectives

As part of the tree health and plant biosecurity work, Defra needs to better understand the reasons behind the changing levels of concern (eg by the public and other stakeholders) as experienced during the recent ash dieback (Chalara) outbreak. A short review of academic literature on the social amplification of risk was requested to help inform Defra's response to Chalara and more widely as plans for improving tree health develop. This evidence will be used in conjunction with an evidence review of public values for trees, woodlands and forests and wider nature undertaken by Forestry Research and Defra, and a planned media and social network analysis specific to Chalara. The specific brief that Defra provided requested an exploration and summary of three issues:

1. The wider processes underlying the social amplification of risk and what might be learned here?
2. What drives scepticism amongst specialist and practitioner communities towards levels of public concern?
3. What questions could usefully be asked to establish a proper empirical understand of the wider public's concerns, and what their responses have been since the start of the outbreak?

In order to address these objectives we have structured relevant material as follows:

- The issue and why the policy interest in this
- The Social Amplification of Risk Framework (SARF) and what it tells us
- Implications for Defra
- Suggestions for future research on public and stakeholder understandings of Chalara

These issues are illustrated, where possible, with example cases from the Social Amplification of Risk literature.

Chalara Fraxinea: what is the issue and what is its significance?

The confirmation in 2012 of several significant sites of infection of native ash trees in the UK by the fungus *Chalara fraxinea* generated extensive media comment, followed very rapidly by a series of government initiatives and a range of actions and interventions by citizens and other concerned stakeholders. Chalara is a significant cause of 'ash die back' in woodlands across continental Europe, affecting areas of forestry and the forestry industry in a number of countries. As such Chalara was not an unknown risk. Over the preceding 10-15 years it had been spreading westwards from eastern European forests, eventually to infect woodlands in countries and areas bordering the North Sea. What was new in late 2012 was the sharp realisation that the UK's borders (geographical or

institutional[1]) no longer provided sufficient barriers to ensure biosecurity for the native ash forests.

Although the outbreak can be counted a very serious threat to the long-term health of the large UK ash tree population, the configuration of the rural landscape and associated wood-product industries, Chalara is not the only emerging threat to UK tree biosecurity, and amongst those that there are Chalara is possibly not the most severe threat of all. Notwithstanding this, some of the media reporting of this issue in October and November 2012 is instructive. The following are typical:

> *'The Forestry Commission has declared a national emergency after it found a disease which has devastated ash trees in Europe has spread to the British countryside. Ash dieback has been found in the wider environment at sites in East Anglia, and there are fears it could wreak the same kind of damage as Dutch elm disease in the Seventies.' (Mail Online, 25th October 2012)*

> *'Britain's 80 million ash trees are at deadly risk from ash dieback, a virulent fungal disease that has swept across Europe. But as the fight to save our native stock intensifies, could more have been done to avert the catastrophe?' (Guardian, 30th October, 2012)*

> *'The Ash Dieback crisis is now beyond containment and will have a greater impact than Dutch Elm Disease, experts have claimed.' (Daily Telegraph, 7th November, 2012)*

> *'Ash dieback has now been confirmed at seven sites across Scotland with its spread posing a real threat to the landscape, ecosystem and the timber trade.' (The Scotsman, 8th November 2012)*

> *'Who are we without our trees?' (Front page headline, The Big Issue, Cymru, November 12-18th, 2012)*

It would be entirely wrong to criticise all of the media reporting as 'uninformed' by the science, or simply sensationalist. Many of the articles, including some of those cited above, did incorporate sound information about the current state of scientific knowledge and uncertainties about Chalara. However, one is struck by the tone in many of the headlines in this initial reporting, which stress the development of a major crisis/emergency for the responsible agencies, irreversible catastrophe for a valued part of the UK tree population, often use the example of Dutch Elm disease in the 1970s as an analogy, and ask questions about whether anybody might be held to account for this state of affairs?

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[1] Use of 'geographical' and 'institutional' reflects the main routes for spread by air (across the geographical barrier afforded by the sea) or alternatively through the extensive European trade and movement of plant and associated products.

The current government response to the outbreak has been extensive, including expert panels rapidly set up by Sir John Beddington as well as the Chief Scientist at Defra Professor Ian Boyd, a ban on imports of ash saplings, and at least one meeting of the Cabinet Office crisis committee (COBR). On the ground the relevant forestry agencies in England and the devolved administrations have been involved in rapid attempts to identify the precise extent of infection, also successfully mobilizing many citizens to try to help identify infected trees in their local areas.

If one went back only 12 months from the 2012 events one would have found a very different story. Chalara itself did not appear on the national risk register, tree and plant biosecurity as a whole had a very low priority within government, and the media commented rarely about tree health issues. Regarding the general public, research under the Rural Economy and Land Use Programme (RELU) demonstrated that levels of public awareness regarding tree disease threats were very low prior to 2010, with a corresponding lack of willingness to pay for control measures[2] - indeed, the RELU authors specifically recommended that public awareness needed to be raised. Since this time, and in the specific context of Chalara, public awareness and knowledge will have changed, with informal evidence suggesting that this has taken the form of rising public concern.

So how could such a situation arise - where a risk issue initially of very low priority for government becomes, almost overnight, a major focus of public concern, institutional activity, extensive media comment, and accusations of institutional impropriety? The argument that we wish to make in this short review is that this situation is not a new one – from mad-cow disease (BSE), to radiation hazards, to public health (eg the MMR affair), to child protection, there are many similar examples of such rapidly developing risk crises. In many of these cases what is changed is not so much the risk itself – rather, it is the social context and institutional dynamics that have rapidly evolved. Although such cases do typically lead to close analysis by scientists over the medium and longer terms, almost by definition they also involve significant uncertainty which is difficult to resolve fully during the crisis, compounded by competing claims from interested parties about what the true nature and framing of the risk should be. For current purposes, it is sufficient to note that lessons can be learned from the ways in which such risk issues develop, are handled and communicated about. The dynamics of these social processes are described by researchers under the broad label of 'social amplification of risk'.

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[2] http://www.relu.ac.uk/news/policy%20and%20practice%20notes/25%20Potter/PPN25.pdf

The Social Amplification of Risk Framework and what it tells us for Tree and Plant Biosecurity

The basic theoretical ideas for SARF were first developed in the late 1980s by Roger and Jeanne Kasperson and colleagues[3]. The ideas arose out of an attempt to overcome the fragmented nature of the risk perception and communication fields in an integrative theoretical framework capable of accounting for findings from a wide range of studies. It is also used, more narrowly, to describe the various dynamic social processes by which certain hazards and events seen to be relatively low in risk by experts can become a particular focus of concern and socio-political activity within a society (risk intensification), while other more serious hazards receive comparatively less attention (risk attenuation). Examples of significant societal hazards subject to social attenuation of risk perceptions in the past include smoking, radon gas or climate change. Social intensification of risk perceptions appears to have been a feature of a range of health and other risk crises over the past 20 years in many nations across the globe. For example the risks posed by: BSE; radiological and chemical contamination events; responses to the Y2K 'millennium bug'; child protection failures; and major transport and terrorist disasters[4].

The starting point of the social amplification framework is the assertion that risk events, which might include actual or hypothesised accidents and incidents, will be largely irrelevant or localised in their impact unless they are communicated to society more generally. As a key part of that communication process, risk events and their characteristics become portrayed through various risk signals (images, signs, and symbols) which in turn interact with a wide range of psychological, social, institutional or cultural processes in ways that intensify or attenuate perceptions of risk. Within such a framework, our experience of a risk can only be properly defined through the interaction between the potential harms attached to a risk event and the social and cultural processes which shape interpretations of that event. An advantage of SARF is that it is clear in foregrounding an essential tension, often implicit within many social sciences risk studies, that while many hazards are real enough our knowledge of them can only ever be constructed through social processes[5].

The metaphor of amplification is derived from classical communications theory, and is used to describe the way in which risk signals are received, interpreted and passed on by a variety of social agents. Kasperson and colleagues argue that such signals are subject

[3] Kasperson, R.E., Renn, O., Slovic, P., Brown, H.S., Emel, J., Goble, R., Kasperson, J.X. and Ratick, S. (1988) The social amplification of risk: a conceptual framework, *Risk Analysis*, **8**, 177-187.

[4] See examples in Pidgeon, N.F., Kasperson, R.K. and Slovic, P. (2003) *The Social Amplification of Risk*. Cambridge, Cambridge University Press.

[5] Rosa, E.A. (2003) The logical structure of the social amplification of risk framework: Meta-theoretical foundations and policy implications. In Pidgeon, N.F., Kasperson, R.K. and Slovic, P. (2003) *The Social Amplification of Risk*. Cambridge, Cambridge University Press.

to predictable transformations as they are filtered through various social and individual 'amplification stations'. Such transformations can involve increase or decrease in the volume of information about an event, selection to heighten the salience of certain aspects of a message, or reinterpretation and elaboration of the available symbols and images, leading to a particular interpretation and response by other recipients of these messages. Amplification stations can include both individuals and social units; for example, scientists or scientific institutions, reporters and the mass media, politicians and government agencies, or other stakeholder groups and their members.

If we think of the individual as the amplification station then we know that individual concerns about risks can be driven by a range of qualitative dimensions of a risk event (dubbed by Department of Health, in the context of human health risks, as 'Fright Factors') which are particularly sensitive for people, as shown in Box 1. Of course, we also know from longstanding work on risk perceptions that there is no single public, and that responses can vary greatly with respect to people's cultural or other associations[6]. For example, rural and urban dwellers are likely to see the landscape and the place of trees in it differently, as will people who do/do not place an intrinsic value on the existence of trees. That being said, a risk issue which has several of these attributes would be expected to generate higher public concerns, all other things being equal. Although the issues in Box 1 are framed primarily in relation to threats to human health, they describe generic factors, several of which are likely to apply to people's perceptions (rightly or wrongly) of the current Chalara outbreak: an apparently **novel** pathogen posing an **inevitability of disease spread** and **irreversibility** once a site has been infected, a threat to a **highly valued** part of the British landscape and symbol of identity, and **uncertainty** about the outbreak causes and underlying science. All of these factors would help to explain current public reactions.

As noted above, a key tenet of SARF is that reactions to risk are a function of the social processes through which risk is communicated and interpreted. Risk signals that are imbued with particular symbolic significance will trigger a range of connotations that may exert a strong positioning power on public attention. These symbols may take the form of visual images[7] or may be images that are called to mind in relation to particular hazards. Early work in this area clearly showed the strong negative images that were associated with particular technologies (eg nuclear power and radioactive waste[8]). Similarly metaphors that are used as part of risk communication strategies can obtain a significance that is both unwanted and extends far beyond the intentions of the communicator. This is well illustrated by work around foot and mouth disease where the metaphor of fighting a war was used as part of the call to action; action that later became associated with images

[6] Pidgeon, N.F., Hood, C., Jones, D., Turner, B. and Gibson, R. (1992). Risk perception. Ch 5 of *Risk - Analysis, Perception and Management: Report of a Royal Society Study Group*, London, The Royal Society, 89-134.

[7] Joffe, H. (2008) The power of visual material: persuasion, emotion and identification. *Diogenes*, 55(1), 84-93.

[8] Slovic, P., Layman, M., Kraus, N., Flynn, J., Chalmers, J. and Gesell, G. (1991) Perceived risk, stigma, and potential economic impacts of a high-level nuclear waste repository in Nevada. *Risk Analysis*, 11: 683-696.

resonant of a war zone[9]. Given the strong values associated with the countryside and rural spaces, and the cultural, affective[10] and symbolic meanings of woods and trees for many people in Britain[11], it would be advisable for Defra to attend to any defining images that emerge around Chalara or tree disease more generally, recognising that they are likely to be particularly powerful in representing and defining views of the risk and the way it is managed.

Box 1 – Fright Factors[12]

Risks are generally more worrying (and less acceptable) if perceived

- to be **involuntary** (eg exposure to pollution) rather than voluntary (eg dangerous sports or smoking)

- as **inequitably distributed** (some benefit while others suffer the consequences)

- as **inescapable** by taking precautions.

- to arise from an **unfamiliar or novel** source

- to result from **man-made, rather than natural** sources

- to cause **hidden and irreversible** damage, e.g. through onset years after exposure

- to pose some particular danger to **small children or pregnant women** or more generally to **future generations**

- to threaten a form of death (or illness/injury) arousing **particular dread** or threaten something **of particular social value**

- to damage **identifiable rather than anonymous victims**

- to be **poorly understood by science**

- as subject to **contradictory statements** from responsible sources (or, even worse, from the same source)

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[9] Nerlich, B. (2004) War on foot and mouth disease in the UK, 2001; towards a cultural understanding of agriculture. *Agriculture and Human Values*, 21(1), 15-25.

[10] Contemporary thinking and evidence in risk research has shown that affective responses are important drivers of both perceived risks and effective decision-making: see eg Slovic, P. (2010) *The Feeling of Risk*. London: Earthscan.

[11] Henwood, K.L. and Pidgeon, N.F. (2001) Talk about woods and trees: threat of urbanization, stability, and biodiversity. *Journal of Environmental Psychology*, 21, 125-147.

[12] Adapted from Department of Health (1998) *Communicating About Risks to Public Health: Pointers to Good Practice. Revised Edition.* London: The Stationery Office.

Social amplification researchers have also studied the operation of the media. Again the Department of Health distil a series of so-called 'Media Triggers' which help us to understand why an issue garners prominent levels of media reporting, at least in the short-term. These are shown in Box 2. If a risk issue is associated with several of these factors in combination it will attract attention from reporters and news editors. Again, with Chalara, we can see several of these factors at work: **widespread exposure** of the tree population, **visual impact** (images of both healthy and infected trees), the possibility of **blame** for allowing a known risk to enter the UK, potential **conflict** along ideologically significant lines (eg between the UK and other EU governments regarding risk control measures), and high **signal value** (what does this episode portend about other threats to tree health and plant biosecurity, or about the risks from the systems for managing the natural environment?).

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Box 2 – Media Triggers[13]

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A possible risk issue is more likely to become a major story if the following are prominent or can readily be made to become so:
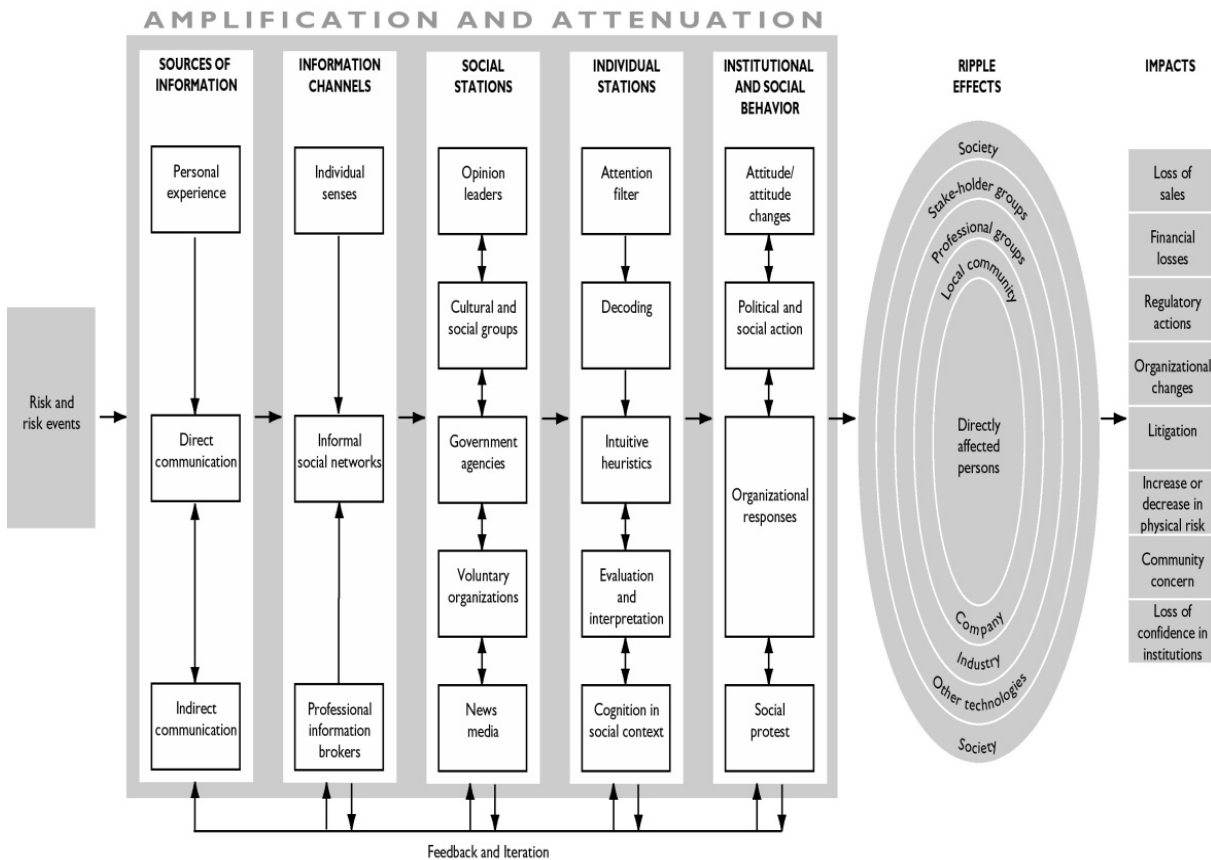
- Questions of blame
- Alleged secrets and attempted "cover-ups"
- "Human interest" through identifiable heroes, villains, dupes, etc. (as well as victims)
- Links with existing high-profile issues or personalities
- Conflict – between politicians, institutions or nations
- Signal value: the story as a portent of further ills ("What next?")
- Widespread exposure to the risk, even if at low levels.
- Strong visual impact (eg pictures)
- Links to sex and/or crime

We know, from research on a range of case studies, that significant amplification events (raised concerns or media attention) are invariably triggered when several of these factors shown in Boxes 1 and 2 work in synergy, but that the precise combination will differ from case to case. Amplification events also involve a range of actors. Figure 1 represents a schematic representation of the processes underlying social amplification of risk. It shows many of the actors and institutions through which information about risks becomes translated. Also, importantly, in a second stage of the framework, directed primarily at risk intensification processes, the authors argue that social amplification can account for the observation that some events lead to spreading 'ripples' of secondary consequences. The

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[13] Adapted from Department of Health (1998) *Communicating About Risks to Public Health: Pointers to Good Practice. Revised Edition.* London: The Stationery Office.

'ripple effects' go far beyond the initial impact of the event, and may even impinge upon initially unrelated issues.

Figure 1 – Amplification and Attenuation: Sources, Communications and Secondary Ripple Effects [14]

The secondary impacts shown in Figure 1 (often referred to as Stage 2 amplification) include such things as market impacts (perhaps through consumer avoidance of a product, country or area), calls for regulatory constraints, litigation, community opposition, loss of credibility and trust, stigmatisation of a facility or community, and investor flight. In this respect, it is important to understand that while risk perceptions themselves are subjective phenomena, they can also be very real in their consequences. For example, when parents became concerned about MMR vaccination and the hypothesised (but unsubstantiated) link with autism, this led to a percentage of children missing out on vaccination and declining population immunity. Also, secondary consequences may be only tangentially related to the risk issue itself: in the UK's 2001 foot and mouth outbreak, one unintended consequence of government advice to avoid visiting affected areas was a significant reduction in tourism and economic impacts in the affected rural economies. In this way messages from key institutional stations of amplification (in this case MAFF and the office

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[14] Source: Kasperson, J.X., Kasperson, R., Pidgeon, N.F. and Slovic, P. (2003) The social amplification of risk: assessing fifteen years of research and theory. In N.F. Pidgeon, R.K. Kasperson and P. Slovic (eds.) *The Social Amplification of Risk*. Cambridge, CUP.

of the Government Chief Scientist) interacted with rising public concerns. The lesson for policy is to always scan for such unintended consequences (of both the issue or of policy responses) during any such crisis. In relation to Chalara it will be important for Defra to ask itself not only what factors drove the events in the first place, but what secondary behavioural and economic consequences might also occur as a result of any new control measures or advice to the public.

SARF also stresses a need to understand the historical and cultural context within which any hazard arises. For example, public concerns in Europe about genetically modified organisms (GM) in the late 1990s arose in the wake of the publicity surrounding the institutional failures of BSE. Public participants in focus groups were quick to use the BSE affair (almost as a cautionary tale) to illustrate why they had concerns about the potential for future failures and unanticipated consequences with GM – people drew from this experience of BSE the rather subtle conclusion that government and industry could not be fully trusted to manage the new technology without at least some risk of unintended consequences[15]. So understanding the immediate history of a risk and associated issues, alongside the relevant regulatory and institutional issues, are all important. A second case, that of chronic wasting disease which was discovered in Wisconsin deer in 2002[16], illustrates the multi-causal nature of social amplification. Few people had attitudes about the disease in advance, although they had strong attitudes toward deer and deer hunting. Because deer and hunting are important in Wisconsin, major newspapers published stories at a rate of more than one a day for most of 2002, and new attitudes were created along with behavioural intentions and documented changes in behaviour. Using SARF the authors of this study show how characteristics of the disease, scientific uncertainty, and management actions which raised fear amplified the risk. In addition the media reporting re-interpreted 'normal' scientific and managerial uncertainty as problematic.

Through the Stage 1 and Stage 2 impacts, the possibility also arises that hazard notifications may modify the way the hazard - and indeed other hazards - are subsequently represented. Applying this notion more specifically to the question of risk communication:

> *"the design of any risk communication needs to take as much account of what came before it, as it does of the message, content or objectives to be achieved in the present" (p.76).*[17]

These ideas were developed more specifically in a health context by Breakwell and Barnett's work on the contraceptive pill scare as they developed the concept of the hazard

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[15] Marris, C. (2001) Public views on GMOs: deconstructing the myths. *EMBO reports*, 21(7), 545-548.

[16] Heberlein, T.A. and Stedman, R.C. (2009) Socially amplified risk: attitude and behaviour change in response to CWD in Wisconsin deer. *Human Dimensions of Wildlife: An International Journal, 14:5, 326-340.*

[17] Pidgeon, N.F., Henwood, K.L. and Maguire, B.T. (1999). Public health communication and the social amplification of risks: present knowledge and future prospects. In P. Bennett and K. Calman (eds) *Risk Communication and Public Health*, Oxford, OUP, 65-80.

sequence[18]. They suggested that the frameworks that people use to make sense of risk information (which they termed the hazard template) are in part a function of the hazard sequence. This is constituted by previous notifications about the hazard itself or about other hazards which have a similar 'axis of exposure.'[19] However, social axes of exposure are also important. For example, it may be that where one agency is managing several hazards (as was the case with MAFF regarding BSE and GMOs), it is the characteristics and fluctuating stock of trust in the agency over time[20] rather than the risk issue per se that become all important. This is an important point, to which the discussion returns in the implications section.

Breakwell and Barnett suggest the implications of this for risk communication:

> *"….to predict the likely impact of a hazard notification we would argue that it is necessary to understand the content of the hazard template, to know how the template has developed over the hazard sequence, how it is constituted and thus where new notifications are likely to be anchored. Knowing the content and the structure of the hazard template will heighten anticipation of reactions to a hazard notification and will be indicative of the potential for risk amplification".*

In terms of Chalara, the key lesson here for Defra and the plant biosecurity community more generally would be that public understandings of Chalara risks will not be developed in isolation, and that it will as a consequence be helpful to understand what other phenomena these are being linked to and drawn upon in people's representations. It is this key observation from SARF (risk perception is constructed from a range of factors) that also helps to explain why some scientists and plant managers have been taken unawares by rising public and media concerns.

In the context of tree diseases, recent policy research at Imperial College has focused on the lessons to be learned from the institutional handling of Dutch Elm Disease for the current management of Sudden Oak Dieback[21], and we would add to this the need to investigate whether public views are also being shaped by pre-existing beliefs about the Dutch Elm events. Speculating somewhat, public concern about Chalara may be linked not only to memories of Dutch Elm, but also a growing awareness of other tree diseases (eg acute oak decline, *dothistroma* needle blight, horse chestnut bleeding canker, several variants of *phytophthora* as well as outbreaks of Asian longhorn beetle and oak processionary moth). The general message arising from these cases of pests and

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[18] Breakwell, G. and Barnett, J. (2003) Social amplification of risk and the layering method. In Pidgeon, N.F., Kasperson, R.K. and Slovic, P. (2003) *The Social Amplification of Risk*. Cambridge, Cambridge University Press.

[19] Biological in the case of Chalara

[20] Research has shown clearly how distrust in risk managers is closely related to heightened risk perceptions. Dimensions of institutional trust include whether an agency is perceived to be competent (has expertise), acts in our interests and in an even-handed way (demonstrates care), and shares out values: see eg M. Siegrist, T.C. Earle and H. Gutscher (eds.) *Trust in Cooperative Risk Management: Uncertainty and Scepticism in the Public Mind.* London, Earthscan, pp117-142.

[21] Potter, C., T. Harwood, et al. (2011) Learning from history, predicting the future: the UK Dutch elm disease outbreak in relation to contemporary tree disease threats. Philosophical Transactions of the Royal Society B: Biological Sciences 366(1573):1966-1974.

pathogens might be that they cannot be eliminated but rather should be contained. Picking up on the anchor for beliefs being the organisations responsible for managing the risks, it is also possible that public concern may become linked back to the previously perceived threat of sale of the public forest estate[22]. Another possibility is that the spread of the disease is primarily seen in terms of preventable breaches of biosecurity - as a 'man-made' product of lax import or export controls in the context of Europe or of failings in Defra's own procedures, rather than being naturally spread by the wind. We would argue that, in this event, there would be a significant reputation risk (in effect a Stage 2 impact involving loss of trust in Defra amongst stakeholders and public), particularly if more than one contemporary failure in tree biosecurity were subsequently to be closely linked together in the public mind[23]. It is not our intention here to suggest that public concerns about Chalara will be definitively a product of these issues, but to point out aspects of the broader historical and cultural context to which public understandings of Chalara and its risks might plausibly be anchored. Only properly designed empirical research will be able to demonstrate this, and we provide suggestions later for how these issues might be investigated further.

Critiques and Extensions

It is important for Defra to recognise, before utilising the framework as a way of thinking about the issues that it faces, several contested points about the original social amplification idea. These have been raised over the years by various academic critics, and in several respects help us to extend the scope and implications of the framework. We discuss these under four headings: its oversimplification of the social communication process; a need to understand actors' perspectives; the difficulty of separating 'real' from 'perceived' risk; and the positive impacts of risk amplification. Hence:

- <u>Figure 1 presents a very much simplified characterisation of what is always, in reality, an exceedingly complex set of relationships.</u> Research in media and communications studies has highlighted the limitations of the simple sender-message-receiver model as used in SARF. Feedback can and does occur between the various groupings, as is shown in Figure 1, reflecting the fact that communication is almost always a process of two-way exchange or discursive dialogue between parties. More fundamentally, however, risk crises are marked by hard fought battles between competing political interests (government, opposition parties, campaign groups, corporations, scientific experts, and the media), all of whom seek to frame the agenda in ways which fuel the communication dynamics of stories[24]. This is a process that is difficult if well nigh on impossible to manage

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[22] www.parliament.uk/briefing-papers/sn05734.pdf

[23] See Freudenburg, W. (2003) Institutional failure and the organisational amplification of risks: the need for a closer look. In Pidgeon, N.F., Kasperson, R.K. and Slovic, P. (2003) *The Social Amplification of Risk*. Cambridge, Cambridge University Press.

[24] Murdock, G., Petts, J. and Horlick-Jones, T. (2003) After amplification: rethinking the role of the media in risk communication. In Pidgeon, N.F., Kasperson, R.K. and Slovic, P. (2003) *The Social Amplification of Risk*. Cambridge, Cambridge University Press.

directly in a top-down manner, but in a crisis it is good practice to at least seek to understand fully the existing communication channels and ongoing dynamics. This will obviously differ on a case-by-case basis.

- <u>It is often as important to understand how the actors involved themselves interpret the information that they receive as it is the routes by which information about risks is transmitted.</u> Indeed, citizens should be thought of as active participants in a risk drama. This task calls for rather subtle qualitative research on the discourses, mental models, values and frameworks that people use to translate a particular risk issue into the language of everyday life. This may seem a difficult thing to achieve in a crisis – but, good practice in risk communication is to always seek some understanding of the audience first, what their needs are, and what it is most helpful to communicate to prompt significant behaviour change or decisions[25]. If this is not done, communications are at significant risk of failure.

- <u>It is a first order mistake to assume that as a result of social amplification processes the 'true' risk is inevitably low while the public and media in some sense is always misinformed, exaggerates, or lacks key scientific knowledge (to be corrected by suitably designed risk communications).</u> What seems far more important about the framework is to appreciate the dynamic nature of both public and expert representations during a risk crisis. The original social amplification authors were clear to point out that the framework was not intended to imply that such a simple 'real' versus 'perceived' risk distinction could be drawn[26]. Risk descriptions are always socially constructed – whether expert measures or lay perceptions[27]. However, the amplification metaphor, if used unreflexively, does seem to imply this, and the instant appeal of this line of argument for policy is not difficult to see, and is one of the reasons why the framework has endured. <u>Such reasoning should be avoided at all costs.</u> There are several reasons for this caution, but chief amongst them are, first, the fact that public and media concerns often reflect legitimate factors that go beyond the simple scientific risk measures of probability and damage. The public will care more about things such as intrinsic values, local identity and knowledges, and their judgements about institutional competence. Hence, simply communicating about the science of risk will fail to address these more deep-seated concerns, and may even exacerbate matters (eg lead to a loss of trust). A second reason for being wary of any simplistic use of the amplification idea is that an unambiguous expert description of 'risk' and its acceptability may be very difficult to specify anyway – in most crises the science will involve gaps in

[25] Pidgeon, N.F and Fischhoff, B. (2011) The role of social and decision sciences in communicating uncertain climate risks. *Nature Climate Change*, 1, 35-41.

[26] Kasperson, R.E., Renn, O., Slovic, P., Brown, H.S., Emel, J., Goble, R., Kasperson, J.X. and Ratick, S. (1988) The social amplification of risk: a conceptual framework, *Risk Analysis*, **8**, 177-187.

[27] See Pidgeon, N.F., Hood, C., Jones, D., Turner, B. and Gibson, R. (1992). Risk perception. Ch 5 of *Risk - Analysis, Perception and Management: Report of a Royal Society Study Group*, London, The Royal Society, 89-134.

knowledge, uncertainty and contested claims about the nature and quality of evidence (see the point about politics and risk framing, above). Under such circumstances it is impossible to say that a risk was unambiguously low or high (the baseline for gauging a particular concern as 'amplified' or 'attenuated')[28]. Regarding risk acceptability, consider the BSE affair, where reducing beef consumption was an easy precaution for most of the population to take. But this marginal response of boycotting beef may be disastrous for the beef industry, and accordingly seem highly disproportionate in the industry's eyes. Thus 'disproportion' can be relative to viewpoint, and it becomes important to understand this viewpoint and how it makes other viewpoints seem amplified. Very recent research, some focusing upon zoonoses cases, has once more highlighted the difficulties in establishing an unambiguous or one-dimensional benchmark against which 'distortion' can be measured[29] [30] [31] [32]. As noted above, the original version of SARF was careful not to imply that this was possible. In a subtle variation of these arguments regarding 'real' and 'perceived risk', Busby and Duckett argue that social amplification is most typically used (and retains its appeal for policy-makers) as an attribution about other parties – ie as a way of labelling one's own view about the risk as correct, and those of opponents as ill-informed. But this also creates an opportunity to study the way in which social actors behave when they are faced with have the problem of regularly having to deal other actors with responses that are not commensurate with their own views of a risk.

- Finally, <u>not all amplification effects, particularly those at Stage 2, might be undesired, as when sufficient political pressure for regulation of a previously neglected (attenuated) but very serious hazard is finally generated.</u> For example, significant legislative changes followed the fire which began in the 8th floor workrooms of one of New York's 'loft' clothing factories at the Triangle Shirtwaist Company in 1911, leading to the deaths of 146 clothing workers. By the year of the disaster, over half of the city's 500,000 workers worked above the seventh floor - many in poorly maintained and equipped buildings, and all beyond the reach of effective fire department rescue. Although, the initial public outrage at the factory management's disregard for safety eventually subsided, in the short term it was the stimulus for much needed reform of fire and workplace safety regulations in the city: as Behrens comments *"in the immediate aftermath of major disasters, groups and*

[28] Rayner, S. (1988) 'Muddling through metaphors to maturity: a commentary on Kasperson *et al.*, the Social Amplification of Risk'. *Risk Analysis,* 8(2): 201-204.

[29] Eldridge, J., and Reilley, J. (2003) Risk and relativity: BSE and the British media. In Pidgeon, N.F., Kasperson, R.K. and Slovic, P. (2003) *The Social Amplification of Risk*. Cambridge, Cambridge University Press.

[30] Raude, J.C., Fischler, et al (2004) GPs and the social amplification of BSE-related risk: an empirical study. Health Risk and Society, 6, 173-185.

[31] Busby, J. S., Alcock, R. E., & MacGillivray, B. H. (2009). Interrupting the social amplification of risk process: a case study in collective emissions reduction. *Environmental Science & Policy, 12*(3), 297-308.

[32] Busby, J. and Duckett, D. (2012) Social risk amplification as an attribution: the case of zoonotic disease outbreaks. *Journal of Risk Research*, 15(9), 1047-74.

individuals interested in reform are given unexpected opportunities to effect reforms that normally would take years to effect" (p. 372). [33] Likewise, SARF has been used to explain the proliferation in the USA of community 'right-to-know' legislation in relation to the release of former sex-offenders (so-called 'Megan's Law). Gowda's analysis of this case[34] draws upon Kingdon's well-known agenda-setting model[35], which argues that while crises do bring unprecedented (although often short-lived) windows of opportunity for legislative reform, effective change often also requires the availability of viable policy solutions circulating in the political stream in advance of the crisis. This example points to the constructive role that prospective policy analysis and horizon scanning can play in preparation for future amplification events. And although hasty legislative changes after a crisis can bring unintended consequences, it is rare for such legislation to be entirely ill thought out.[36]

Implications

From the analysis so far, the implications for Defra are as follows.

Public understandings of Chalara risks are unlikely to have developed in isolation, but will be based upon people's associations with related phenomena, interpretation of historical events, and judgements about institutional competence. The single most important practical implication of adopting a social amplification perspective is that we are prompted to reflect, when signs of amplified risk perceptions and concerns arise, on the possibility that there are underlying issues (over and above the strict technical or biological characterisation of the risk) which might be driving those concerns. This also helps to explain why some scientists and plant managers have been taken unawares about public concerns and media attention over Chalara. Recognising this should also guard against adopting a simple technical framing of the risk issue as the sole basis for communication (merely about 'risk') when it may be other more fundamental things (values, distrust etc.) that also require attention.

The Chalara outbreak does appear to have a range of characteristics, well-documented in other cases, that help to explain why some people are concerned about it: an apparently novel pathogen posing an inevitability of disease spread and irreversibility once a site has been infected, a threat to a highly valued part of the British landscape and symbol of identity, and uncertainty about the outbreak causes and underlying science.

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[33] Behrens, E. G. (1983) The Triangle Shirtwaist Company fire of 1911: a lesson in legislative manipulation, *Texas Law Review*, 62, 361-387.

[34] Gowda, M.V.R. (2003) Integrating politics with the social amplification of risk framework: insights from an exploration in the criminal justice system. In Pidgeon, N.F., Kasperson, R.K. and Slovic, P. (2003) *The Social Amplification of Risk.* Cambridge, Cambridge University Press.

[35] Kingdon, J. W. (1984) *Agendas, Alternatives, and Public Policies.* Boston: Little, Brown.

[36] See eg the considered analysis of the often maligned 'Dangerous Dogs Act' in Baldwin, R., Hood, C. and Rothstein, H. (2000) Assessing the Dangerous Dogs Act: when does a regulatory law fail? *Public Law* (Summer). pp. 282-305.

That all being said, there is a need to take an evidence-based approach to understanding public perceptions of Chalara and plant biosecurity. It is easy to speculate about what the public thinks and believes, or to make the mistake that media reporting can be used as a simple proxy for wider public beliefs. Both constitute weak evidence. A properly designed risk communication strategy should seek to empirically understand existing public perceptions, and then engage with those concerns wherever possible. Our suggestions in the concluding section of this report are designed to meet this end.

Given the strong values and symbols associated with the countryside, trees, and rural spaces it would also be advisable for Defra to attend to any defining images that emerge around Chalara or tree disease more generally. Prominent images are likely to be particularly powerful ways by which interest groups and others can represent and define risk and the way that it is being managed.

SARF helps to highlight the fact that in a risk crisis communication is a dynamic process, involves multiple parties (many with a vested interest in the issue), and cannot always be managed directly. Developing an understanding of this wider social context will help to: (a) diagnose why events have unfolded as they have; and (b) take forward future management efforts. We recommend strongly that Defra makes at least some effort to reflect upon the history and wider social context of this event.

Stage 2 of the framework (and many past case-studies) cautions that unanticipated secondary consequences of risk amplification may yet emerge. Although risk perceptions and concerns are themselves subjective, the secondary impacts of those perceptions often have significant material effects. As a result both need to be taken seriously. In relation to Chalara it will be important for Defra to ask itself not only whether unanticipated impacts might flow from the events in the first place, but what secondary behavioural and economic consequences might also occur as a result of any new control measures or its advice to the public.

A social amplification approach highlights a significant reputation risk for Defra in the current crisis (involving potential loss of public and stakeholder trust). This would be particularly likely if more than one tree / biosecurity issue became closely linked together in the public mind, as symbolic of perceived failings in the handling of plant biosecurity. Of course, there is no substitute for ensuring that risks and any associated uncertainties are managed as effectively as is possible. But maintaining trust also requires, following the recommendations of the House of Lords inquiry into BSE and related matters[37], a long-term commitment to genuine openness and transparency (especially regarding uncertainties) in communicating about risks.

Chalara also provides an opportunity for Defra, and the other UK agencies involved, to reflect upon their own roles as social stations of risk amplification and attenuation. All organisations have shared systems of meaning that frame the way in which they present

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[37] House of Lords Select Committee on Science and Technology (2000) *Science and Society, 3rd Report (Session 1999-2000).* London: The Stationery Office.

and deal with risk issues. These can become taken for granted and thus are difficult to identify and examine. Using the framework of SARF it has been noted that networks of knowledge, responsibility, loyalty, and trust within organisations may themselves serve as risk-attenuating factors[38]. Stakeholder engagement could be one vehicle through which Defra might stimulate constructive reflection on the institutional context of the Chalara events.

Finally, amplification events can bring unprecedented (although sometimes short-lived) windows of opportunity for much needed legislative and procedural reform. Although reform in times of crisis can bring unintended consequences, it is rare for such responses to be entirely ill-thought out. Over the longer-term, prospective policy analysis and horizon scanning can play important roles in the preparation for future amplification events involving biosecurity.

Future Research on Public Understandings of Chalara

Although Defra is aware of increased public concern about Chalara, at present there is scant evidence as to the exact nature of this concern, the reasons for it, how this concern is differentiated across groups with different values and interests, or how it varies across different parts of the country. As noted above it is important not to consider media coverage as a proxy for public concern or understanding and therefore a short in-depth programme of primary research is needed to provide evidence about this.

We suggest that any research specification here should ask tenders to propose a programme of research to identify and characterise public understandings of, and concerns about, Chalara. It is likely that this will have a significant qualitative component though it may be that tenderers will legitimately propose additional quantitative elements. Defra may wish to give particular consideration to proposals that enable analysis of how the current situation has developed over time (ie the research should not simply or entirely consist of a snapshot taken at the point at which the work is conducted.)

We believe that the following components of work would be valuable:

> 1. <u>Primary Research into Citizen Attitudes</u>: Here we would recommend a series of focus groups to explore how citizens make sense of the risk of Chalara and what signals for concern, if any, have been perceived. These groups may use stimulus materials and might usefully explore any behavioural dimensions of public response, the responses that are considered to be the responsibility of others, as well as trust in the institutions involved.

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[38] Merkelsen, H. (2011) Institutionalized ignorance as a precondition for rational risk management. *Risk Analysis*, 31, 1083-1094.

Consideration should be given to focus group composition – our own approach would be to recruit at least some citizens that a priori can be considered to have different interests in Chalara, such as gardeners, landowners, countryside visitors and users of green spaces in cities as well as those living in 'rural' and 'urban' communities. Consideration should also be given to selecting locations within currently affected and unaffected counties.

Sufficient time and resources should be committed to the project to allow for properly conducted qualitative data analysis – suggesting a University rather than Consultancy led project.

2. <u>Analysis of Social Media</u>: We propose that a social media analysis is conducted (alongside the conventional media analysis already proposed by Defra) in order to identify the patterns of on-line reporting and discussion. This might usefully include an analysis of its relationship with traditional media coverage. Additionally, this work might identify and analyse the information sources that circulated and any comments that accompanied this. Ideally such an analysis should explicitly consider both change over time, and the ways in which social media coverage might be layered with other relevant metrics for/proxies of risk perception[39].

3. <u>Calls to Helplines</u>: We believe it would be very valuable to identify any organisations such as Defra or Forestry Commission that have kept a record of calls received to their helplines about Chalara over the last few months. Such data would provide an excellent opportunity to identify the exact nature of the queries that are being raised about Chalara and how these have changed over time. Such an analysis may offer the opportunity to understand what (if any) questions are being asked by the public, what information is being requested, and what (if any) actions are being proposed and for whom.

4. <u>Case-study Work and Gauging Stakeholder Perspectives</u>: Each of the 3 lines of evidence above regarding the way in which citizens are making sense of Chalara can be set within the context of a broader case-study which documents the course of Chalara events over 2012. Investigation of the key communications, and their impacts, could be supplemented with interviews with key informants to explore their perspectives on changing patterns of public and stakeholder appreciation of the Chalara risk and the way in which these might relate to patterns of social amplification. This case-study work should form part of a thorough reflection by Defra and respective agencies (Forestry Commission, FERA etc.) on the wider social and institutional lessons (rather than the strictly scientific / technical issues) to be learned from the Chalara affair.

5. <u>The Role of Community Surveillance and Engagement</u>: Organisations such as the Woodland Trust, RSPB and the National Trust have a key role, not only in terms

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[39] What we propose here does not overlap with Defra's mention of social network analysis and we assume that this would be something separate although, if required, this could easily be integrated with the above suggestions.

of monitoring disease spread but also in informing individuals and communities about risks and appropriate biosecurity precautions in woodland and forest areas. Consideration should be given to how these communities might best be engaged in the research agenda suggested above.

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