Swedish University of Agricultural Sciences
Faculty of Natural Resources and Agricultural Sciences
Department of Urban and Rural Development
Unit for Environmental Communication

Rationality, Science and Moral Knowledge

– Opinion forming of the public citizen in the Modern and neo-Modern age

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Limitations of this Thesis

This paper has been written as part of a magister (Masters) course at the Swedish Lantbruksuniversitet, Uppsala, Sweden. The parameters were that the paper be written over an eight week period and be approximately twenty-five pages in length. Due to extenuating circumstances this thesis was written in two weeks meaning that the time for reflection and revision of the content has been reduced significantly.

This study is not able to make assertions any broader that this case but could be used by the reader as a paper amongst other materials to further the understanding of this particular situation and to act as 'food for thought' for further studies regarding the complexities of knowledge acquisition and decision-making for citizens in the internet age.

The writer is not an expert in bovine tuberculosis or a sociologist.

Introduction

In an age where science and technology is king, the face of knowledge acquisition for the private citizen is a very different and more complicated prospect than is has ever been. For those with a basic literacy and access to a computer, answers to questions now come instantaneously and are as simple to obtain as the click of a button.
As modern societies struggle to manage questions of environmental problems and natural resource management in the most scientifically and ethically sound ways:

What does this mean for private citizens and public decision making?

As European policy shifts (and legislates) towards an ideal of public participation, the question arises: how can individuals attempt to interpret informational sources available to make the best decisions? To refine this mammoth question further and frame the subject that will follow in this thesis: ***what is the impact of this question on the management of natural resources?***

Aim

This thesis seeks to be an exploration of the challenges and opportunities encountered by modern private citizens when attempting to develop an informed and ecologically sound opinion about issues of natural resource management. The paper seeks to discover through the case of the ongoing and embroiled bovine tuberculosis problem in the United Kingdom where a private citizen might encounter challenges forming a conclusive opinion that they could justify as rationally and ethically sound to themselves. The thesis also intends to explore the impact citizens who have come through this internet assisted information gathering process might have on the management of 'more complicated environmental problems and growing risks' Elling 2008: 6).

The analysis will explore the impact of conflicting scientific information on private citizens attempting to base their opinions on rational, evidence based assumptions. It will also explore how the private citizen might adjust their opinion formation criterion if attempting to gain Elling's 'moral knowledge' through accepting influence also from sources outside of institutions and science as neo-Modernism might suggest is the better model.

In this thesis, when the term 'Modern' is used in a context that indicates reference to a time period, I am speaking about Modern society since the internet began to gain prevalence in homes and publicly accessible points in the community (anytime in the 1990's might be correct here depending upon many variables) onwards to the present day.

Theoretical Framework – Modernity and neo-Modernity: What does this mean for the private citizen and decision making?

The theoretical basis of this thesis centres on the values, social structures and roles within modern society and what criteria people or institutions might use in an attempt to reflect these aspects when making decisions. When defining Modernity as a concept, Giddens describes a society which functions in a way that presumes it can control all aspects of social and natural life through the application of knowledge, technology and bureaucracy (Giddens 1997: 207). In contrast with traditional pre-modern societies, a modern society is characterized by being industrialized, mechanized and reliant on science for production and advancement (Giddens 1997: 55). Structurally, modern societies tend to be comprised of the State (government/legislative system/administration), the market (economic system) and private individuals, all of which influence the freedoms and regulations of one another to varying degrees depending upon the political system and cultural norms in place. The proportion of people employed in agricultural or other nature -based occupations is relatively small in comparison with those employed in administration, manufacturing and services. This employment shift has moved many modern citizens into cities as centres of work with more population distributed in urban areas than was ever practical or desirable before.

Giddens suggests through discussion of several theories of environmentalism and ecology that the shift away from traditional social arrangements where people worked as a part (and at the mercy) of nature, towards a centralised system able to control many of the uncertainties of life through large scale, rationally based institutions created an ***intellectual and physical disconnect with the natural world*** (Giddens 1997:207-208).

The concept of Modernity incorporates descriptions of all areas of the economic, social, structural and ecological sphere. The strand most relevant to this thesis is the impact that the social organisation most common in modern societies has on the individual and their establishment of identity. Giddens posits that under the industrialized, modern framework, individuals become less influenced by family groups and more influenced by large scale organizations, the government and mass media (Giddens 1997: 56).

'The self was once developed in local contexts of activity and in relation to relatively clear-cut criteria of group membership. To 'have a self' was to 'be' someone of a particular sort; now however, to 'have a self' is to 'discover who one is' through what one does.'
Giddens 1995: 224.

Giddens continues that identity forming by individuals in pre-Modern times was highly influenced by family and close social influences. Factors such as local traditions, religion, culture and other variables very close to the person making those decisions were key and as such 'socially constituted' decisions on self were largely a reflection of the values and beliefs of those in the individual's social network who had preceded them. He argues that in modern times, specifically in Western societies the influence of family and traditional cultural norms are diluted by the rational, institution-focused modern societal structure

and the values that underlie it (Giddens 1995: 224). Individuals are influenced by a greater number of variables in an impersonal way, thus making the modern citizen's self forming more of a 'personal realization' taking into account more numerous, contrasting and culturally foreign sources of influence. This increase in avenues of influence and the dilution of traditional sway leaves modern citizen with a void to fill in terms of where to acquire knowledge and how to make decisions about their opinions.

An underlying value of Modernity is the assumption that making decisions that reflect rational and functional concerns will be better than ones based upon the more subjective values. This general preference towards rationality has foregrounded science at the heart of knowledge as the processes adhered to in the production of scientific theory show more direct correlation with rational/ functional concerns than many other types of information production. Rather than looking to the past for a pattern from which to copy where institutional and personal decisions are concerned, rationality suggests a transformative way of thinking, considering the best possible functional, logical and scientifically based solution over traditional ways of doing things (Giddens 1997: 526). When translated again back to the modern citizen, this concept of science as an apex source of information some how above other sources, could lead the modern individual to attempt to apply similar rationale to their own decisions in the place where traditional values used to reign supreme. As access to information increases, specifically with the prevalence of internet usage rising, the questioning of accepted paradigms central to scientific work infiltrates social life and so increases the will of private citizens to look more broadly and deeply for information before taking a position on their opinions. Giddens suggests this is a process of 'self betterment' common in the modern age (Giddens 1997: 526).

Inversely, Giddens criticizes this clinical format of decision making as being responsible for (or contributing to) the current crisis of ecological and natural resource management. Gidden's observes that for all the sway towards scientific and rational principles of societal and environmental management, modern society finds itself in dysfunction. The dysfunction arises from the fact that societal leaders, though trying to make rational decisions, taking advice from experts and acting with the sanction of voting citizens, make decisions that are not able to address ecological crises in a way that has long running, sustainable efficacy. This 'control orientation' inherent in Modernity and its reliance on science and technology has taken out some of the vital human ethical influences that prevent nature from being viewed and managed as a utility. He describes this dysfunction of control and rationality as it relates to environmental problems as bringing up 'basic moral questions and dilemmas of our existence' and he titles this the 'paradox of Enlightenment' (Giddens 1995: 207).

Another sociologist Bo Elling, addresses the topic of decision making in Modern times, suggesting that decisions attempting to base themselves on purely scientific and rational grounds (as has been suggested by Giddens as a problem with traditional or 'strong Modernity' theory) would lack 'moral truth' as the decision would not take into account intrinsic human social considerations such as traditions, values and cultural norms vital to ethical decision making (Elling 2008: 27).

This question of ethical or 'moral knowledge' (that is, knowledge that does include these subjective elements such as values, culture, norms and time frame) is Elling's equivalent to Giddens paradox of Modernity, though it grounds itself as something that strays far enough from the underlying assumptions of Modernity and its science and technological basis as to be distinct from it, referring to moral knowledge as being an ideal of the neo-Modern era (Elling 2008: 29). Yet the acquisition of moral knowledge presents it's own 'Modern Problematic' as Elling questions how a modern citizen offered so many avenues for collecting information, guidance and influence on their decision making process, can obtain this truly 'moral knowledge' that allows for both scientific/rational and spiritual/tradition elements to be included in their assessments of reality (Elling 2008: 29).

Elling looks to the influence of the language on the perception of individuals as to the validity or trustworthiness of information they receive (this element will be expanded upon in the Problem Formulation section).

Moral knowledge is a departure from strong Modernism into neo-Modernism. Elling suggests individuals need influences from within and outside the scientific and institutional systems to create an evolving truth that reflects the ethics of the particular historical context within which the individual exists (Elling 2008: 31-32). Elling further expands this neo-Modern concept into ecological thinking to ground the concept firmly within an environmental politics frame. He stipulates that this type of ecology is based upon the principles that science, rather than being objective, is a dynamic and evolving knowledge through out time (Elling 2008: 31). This 'shifting truth', if you will, and the recognition of values and ethics particular to that historical frame distinguish this neo-Modern ecology approach from both Modernist values and ecological values which place nature staying the same via protection as a priority above other considerations. In terms of acquiring moral knowledge within this neo-Modern framework, Elling suggests that the individual cannot rely on information that is 'centrally steered' (produced by the State for the State's purposes) but must gather information that supplements scientific and purely functionally rational foci with concerns from broader reaching individuals and groups, thus incorporating values, norms and ethics within a time-centred context (Elling 2008: 32).

Research Questions and Development of Reasoning

Four main questions will be explored with this case study and thesis.

The first pair will revolve around the analysis of three key scientific reports available on the bovine tuberculosis issue in the UK.

Another pair of questions will debate what this analysis of openly available written materials shows about the problematic acquisition of Elling's 'moral knowledge' in the age of the internet and what this could mean for natural resource management in the present and future.

The questions will be based upon three sources. Two scientific sources have been chosen for question 1: the first is a summary of a ten year study made by the Independent Scientific Group (known hereafter as ISG) on the efficacy of different types of badger culls in controlling bTB (Donelly 2007). The second is a report compile by Sir David King, Chief Scientific Adviser to the House of Commons regarding the science of the Independent Scientific Group and advising the Department of Environment, Food and Rural Affairs (DEFRA) how to act to control the disease going forward (King 2007).

Question 2, 3 and 4 will include analysis of the ISG and King reports, plus reference to a third report put together by the Environment, Food and Rural Affairs Committee (EFRAC 2008).

All three sources are described in detail in the Methods section.

1. How might a private citizen looking to form an opinion based on rational thinking and scientific evidence on the management of bTB in the United Kingdom respond when reading reports with conflicting advice? (Values linked with strong Modernism)

2. Based on the three reports analysed in this thesis, how might the citizen attempt to acquire 'moral knowledge' on bTB? How and where did the ethical and aesthetical considerations emerge? (Neo-Modernism)

The analysis of the materials viewed for the first two questions will come in the form of a discussion. Question number 1 will be looked at through the lens of rationality and scientific rigour. Western society has woven the importance and validity of scientific reports into the fabric of socialization. One needs only to look at advertising campaigns to understand the weight corporations and individuals give to information that pertains to be 'proven by experts', or 'scientifically tested'. It would stand to reason that a modern citizen might use these principles in an attempt to interpret information they hoped to use as a basis for their opinion on a topic.

I will arrange the analysis under four main headings: ***Rationality, Science, Language and Structure and Results***. I will explore the features of the two reports separately, discussing what the private citizen (hereafter referred to as 'the reader') might be led to feel from what they viewed and why they might move towards this assessment.

I will compare the two reports in a final section and highlight several key areas where I suggest the reader might have the most difficulty coming to their own decision based on rationality and science.

I will explore question 2 under a number of headings that seeks to identify strands of knowledge in the EFRAC report that are coming from outside or additional to the scientific ones found in the King and ISG report. The headings will address elements of ethical and value based significance that place the information within a historical and cultural context that would aid the reader in obtaining a more 'moral knowledge' on the

topic of bTB management. I will provide examples for each heading and explain where in the report each theme was raised and it what ways it might be significant in influencing the reader.

3. What could the discussion of questions 1and 2 indicate more broadly about how the private citizen acquires moral knowledge in the Modern/neo-Modern age?

Discussion: Given the more recent focus of Western governments on public participation, what impact might citizens that have come through a similar information gathering process have on the management of 'more complicated environmental problems and growing risks' (Elling 2008:6)?

Elling presents several questions in the opening chapter of his book Rationality and the Environment. The one I am most interested in is,

'Can communication and information influence a situation with more complicated environmental problems and growing risks?' (Elling 2008: 6).

Understanding the challenges faced by public citizens trying to make an evidence based and moral decision on bTB gives some small insights as to how citizens are making similar decisions on different environmental topics in Britain and world wide. It is important more than ever to consider the many and varied lenses and bases of analysis the individual applies to information in an attempt to *interpret* what is presented and compile an opinion.

Question 3 and the discussion section are intended to refer more closely back to the theory presented by Giddens and Elling, drawing from the strands of analysis arising from questions 1 and 2. I hope to be able to introduce some concepts of my own into the discussion and make the beginning of some small suggestions about what all this means for the individual and decision making and the bigger challenge of sustainable environmental and natural resource management.

The Case: *Bovine Tuberculosis in the United Kingdom*

This case study was chosen because it is typical of ongoing and costly environmental problems associated with the clash of humans and nature. Regardless of extensive research and funding no clear solution has emerged for future management and no former solution has proved effective for more than short term containment. Due to the long term nature of this problem, it is a perfect example of a situation where a plethora of written materials exists around the topic and a good example of the problems faced by private citizens when making decisions about natural world issues.

A brief history…

Bovine Tuberculosis (*Mycobacterium bovis)* is a pathogen found broadly in the British Isles and around the world. It is a disease that can affect both animals and humans but is

most commonly maintained and transmitted within herds of cattle. The disease can be transmitted through the air (inhalation), through ingestion and via skin contact if the skin is broken (Iowa State University 2009).

Bovine tuberculosis (known henceforth as bTB) in the United Kingdom has been a major problem both politically and economically for more than 30 years with outbreaks of the disease occurring all over the country with some areas such as Wales and the West Country being more severely affected. When an outbreak is detected by Government inspectors, all movement of cattle is prohibited and no products from the cattle (milk or meat) can be sold to the market to prevent further contamination. If an outbreak is confirmed, then it is routine for the entire herd to be destroyed (DEFRA 2010a).

To give scale to the situation, bTB cost the British Government more than 63 million pounds in 2009/10, research and development excluded (DEFRA 2010a). This is largely due to a system of compensation paid to farmers to make up for loss of income directly linked to Government regulations on the sale and transport of infected animals. Outbreaks of bTB in England in 2009 lead to the destruction of 25557 head of cattle (DEFRA 2010b).

Past management strategies have failed to eradicate or lessen the impact of the disease. Animal, social and financial costs intensify whilst a solution continues to elude authorities. Cattle-based controls and wildlife reservoirs of the disease are routinely discussed. The wildlife reservoir of the disease (mainly the infection carried in wild badgers) is the most contentious as broadly farmers and farmers' unions consider the badger to be the major trigger of outbreaks. Those who view the badger as the major trigger of infections tend to support a cull of the wild badger population to curb the spread of disease. Scientific evidence on this point is contradictory with many studies citing that cattle based controls would be more effective in managing the disease. The Department for Environment, Food and Rural Affairs (DEFRA) has frequently expressed support for the addressing of this issue through a system of long-term badger culls. Wildlife groups are opposed to this management strategy whilst scientific evidence is not conclusive on whether this will decrease, increase or not affect the instances of bTB in cattle.

Method: With numerous sources of information available, where will the focus be and why was this focus chosen?

The central question of this thesis relates to the individual and their process of decision making in Modern times. In order to approach this question, I began by considering what a 'typical' person might do when looking into an environmental question or issue of natural resource management. This position would beg me to answer the question 'what is a 'typical' person like?'. It became clear to me very early that any answer I could imagine here would be a speculation excluding and ignoring the variety inherent in individuals in all areas of life. I decided that to make assumptions based upon my own observation of people also limited my study as my lens for viewing other people is coloured with my own attitudes and experience. In order to circumvent this problem I

made the decision that I would consider the individual in terms of the broader theory of Modernism/neo-Modernism and its key principles.

As the basis for Modernity and its structures assumes that rational and scientific (evidence based) models of decision making are more valid than other decision making rationales, I have applied this to my case by reviewing and comparing two scientific reports. As Modernity assumes a focus upon the influence of institutions I have taken a third report devised by a committee commissioned to review the Government department that requested and funded the two scientific reports originally identified. My research questions allow me to explore the challenges of conflicting scientific conclusions and also where guidance towards Elling's 'moral knowledge' might be found by the reader of these sources.

How were the sources found?

As the thesis asks a question specific to Modern individuals in the age of the internet, all materials analyzed are resources available on the World Wide Web. The initial search was deliberately as basic as possible to mirror the search an individual with limited knowledge of the bovine tuberculosis issue might make using key words they could have found from a main stream newspaper article, a conversation with friends or any other brief contact with the issue.

To bring up a variety of sources, I used the search engine Google, with the search field filled with the words 'Bovine tuberculosis in the UK scientific reports'. With very minor filtering (I excluded reports that originated from the search but were actually about TB outbreaks outside of the United Kingdom) I found the three sources I chose to use for my analysis.

The first report regards a study funded by the United Kingdom House of Commons Department of Environment, Food and Rural Affairs (furthermore known as DEFRA). The study was commissioned to be completed by a group of scientists and experts in the field of bTB. The collection of scientists and experts were officially titled the Independent Scientific Group and will be referenced in the paper as ISG. The study was conducted over a ten year period and intended to provide data collected over a longer period to DEFRA on management of bovine tuberculosis in the UK through trials carried out in some of the worst affects areas of farmland. It was also stated that conclusions from this study would form the basis for management strategies of bTB in the UK in the long term.

Interestingly, the second scientific report is compiled by the Chief Scientific Adviser to the House of Commons also at the request of DEFRA. This report was requested immediately after the final results and conclusions from the ISG's ten year study were published and submitted to DEFRA. This report was put together over a one month period. The Chief Scientific Adviser did not make contact with the ISG during the compilation process and was criticized for this by the writers of the third source, the Environment, Food and Rural Affairs Committee (EFRAC 2007: 55).

The third source is written by the Environment, Food and Rural Affairs Committee. The group is a type of select committee comprised of seventeen members of parliament from different parties and seven committee staff (EFRAC 2008: Foreword). This committee and its broad function as soft auditors of DEFRA's activities and expenditure is working specifically in this document to assess the ten year study by the ISG and also the handling of the bTB management as a whole. In assessing this process, the paper references both the nature, reason for and professional conduct associated with the King report. It is a longer piece of work than the King and ISG reports (sixty-seven pages) and brings in statements and requested comments from special interest groups, other relevant scientific studies and asks scientists already involved in the DEFRA process for their opinions on the handling of the science. Due to the auditing nature of this document, recommendations are made and interestingly, value judgments and comments on proper etiquette. This source makes a good compliment to the other King and ISG reports as it engages closely with their subject matter in a critical way whilst bringing in more subjective, culturally based concerns and limitations.

The three reports were among the top five links suggested from my original Google search. I believe this is worth mentioning as they are realistically among the very first materials a private citizen would view when looking into this topic via a Google search. It is poignant to the questions of this thesis that even if the private citizen were to read just these three, most easily accessible publications, they would come across seriously conflicting scientific advice and heavy critique of the government department that commissioned them.

Analysis

Question 1

How might a private citizen looking to form an opinion based on rational thinking and scientific evidence on the management of bTB in the United Kingdom respond when reading multiple reports with conflicting advice?

Report: Independent Scientific Group

Rationality

As described in the problem formulation/method section, the first report reflects the results of the ISG and their findings from 10 years of study on bTB. An individual reading this source would immediately notice two things: the duration of the study and the number or experts involved in the compilation.

Rationally, a study over a longer term should be able to show more solid results than one completed over a shorter one as patterns and repetition would be able to be observed.

The reader would also notice that the ISG have compared their data with similar, smaller previous studies that had taken place in the UK and Ireland. Where tests were measuring the same thing in the same way (herd infection incidence following 'proactive' and 'reactive' badger culling, these terms explained below), the results of the data showed the same trend (Donelly 2007: 3). Rationally, a pattern forming in numerous independent studies might lead the reader to have more confidence in the results of the study because of the validation from other studies.

The summary begins with an acknowledgement of existing science and openly states the contradictory nature of reports that precede the ISG study. This grounds the trial within a continuum of study and suggests that their work is part of a number of contributing papers on the same topic. This more humble position could lead the reader to respond to the results in one of two ways: by becoming more confident with the conclusions due the writers' acknowledgement of context or less confident due to the less forward stance.

Science

Their findings were based primarily on a series of data collected from activities referred to as the Random Badger Cull Trial (Donelly 2007:1). The Random Badger Cull Trial (RBCT) involved thirty sites around the UK each 100km square. Each site was paired with two others forming what the scientists named a 'triplet'. Each triplet contained one site that was designated for proactive culling (a reduction of badger population to 30% of previous numbers at regulated intervals), reactive culling (culling only when outbreaks were confirmed) or 'survey only' (no culling). In total ten triplets existed in the thirty total sites and data was cross referenced between the triplets and over the duration of the studies (Donelly 2007: 2). The numbers of bTB herd infections were recorded in each area to produce data on the various culling focused management techniques. The reader would notice a rational arrangement of activities including multiple options repeated numerous times in order to produce data that could indicate (or not) a trend. This could cause the reader to assess the trial as seeming to be rationally based and in this way, a good choice for their chosen method of decision making.

The report showed the ISG's results and concepts using a variety of visual tools including simple diagrams and technical graphs (the graphs being beyond the immediate understanding of most laymen). Depending upon the readers' reliance on visual representation for comprehension, these cues could increase the readers' ability to understand and engage with the topic.

Language and Structure

The language of the summary of findings was plain English rather than technical. The intention of this language use could have been to make the information and findings as accessible and comprehensible to as many readers as possible. It could also be argued that the intention was to remove any ambiguity regarding the results and conclusions. The reader could quickly grasp from this short summary the intention of the study, who was

carrying out the study and their roles, the gist of the experiments and the findings in a very simple delivery.

The Results

The results of this study concluded the following about the efficacy of badger culling in controlling the number of bTB outbreaks in the UK (Donelly 2007: 3):

'…widespread badger culling has simultaneous positive and negative effects on the incidence of TB in cattle'

'Detailed consideration is needed to determine whether culling on any particular scale would be economically and environmentally sustainable.'

Report: King (Chief Scientific Adviser)

Rationality

King is the Chief Scientific Adviser to the British House of Commons. If the reader were to trust in the power bestowed by their institutions as strong Modernity might suggest a citizen could, then the official role that King has in the Government administration may lead the reader to feel instantly that the findings will be of good quality and rational basis.

The King report is significantly longer (twenty-five pages in comparison to four) than the ISG summary, meaning there is more opportunity for the reader to be convinced and find fault with the publication. Several examples exist where rationality (as reliant on causality and factual evidence rather than speculation) could be questioned by the reader. The first instance where a rational basis could be questioned is at Point 4 of the introduction where, similar to the ISG's statements, King acknowledges that previous scientific studies have been inconclusive in their results. In contrast to the ISG, King then follows up the comment with a judgment which he does not reason, ''while that evidence might not be as conclusive as one might like, further trials are unlikely to significantly improve the certainty in the evidence base' (King 2007: Introduction Point 4). If the reader was familiar with the basis of science then the reader may question the rationality behind a scientist stating that further study or experiments applied to an as yet inconclusive topic would not increase certainty. Later in the same paragraph, King speaks of the necessity for decisions and action based on 'the scientific evidence we have…in spite of its uncertainties' to take place urgently (King 2007: Introduction Point 4). By saying that actions should be based on science the reader might imagine that King desired the action to be rational and as a result of evidence. His addition of the words, 'in spite of its uncertainties' could confuse the reader as it is a contradiction to suggest that evidence, which is in its essence objective, could be uncertain.

King casts aspersions on the findings of the ISG that the incidence of infections increased in the pastures bordering the proactively culled areas by saying the recorded increase 'may or may not be totally related to the removal programme...' (King 2007: 5). However

at Point 27 King acknowledges that the findings related to increased infections in the same bordering areas may in fact be the case, then at Point 35 brings into the report badger behaviour, suggesting that due to biological factors it is likely that badgers in setts (social groups) that have been disturbed would range more widely and, if infected, spread bTB to adjoining areas when attempting to rejoin a social group (King 2007: 5, 12, 14). The reader is presented with King's opinion and the reason for his stance in sections of the report far removed from one another in argument and proximity. This could potentially cause the reader to miss some of King's references to this particular aspect of the ISG's findings and thus cause challenges for the reader to identify his rationale in stating his opposition to them. I will discuss this point further in the final part of this section.

The King report states in its introduction that the report was commissioned by DEFRA in order to 'help DEFRA in reaching policy decisions' (King 2007: 2). If the reader were to consider the utility presented here, then they may question whether it is rational for a Government department to commission a scientist not specialized in the field to comment and advise them on the results of a team of scientists selected by the same department ten years earlier as experts in the field to provide the data on which DEFRA could base its future management decisions. The reader could conclude that DEFRA sought to gain a further opinion and find this acceptable to their logic, or the reader could decide that this action acted against what they as an individual would consider rational.

Science

King criticizes the ISG on several points of its data collection and chosen representation. King maintains throughout the report that he agrees with the ISG findings that proactive culling decreases the instances of herd infection in its test area (King 2007:4). At Point 24 he states that the same results are 'on the borderline of statistical significance', stating a letter and number equation, p=0.064, in brackets to justify this statement (King 2007: 10). If the reader was without a scientific background, they could gather from the context that this equation and the term 'statistical significance' had a specific and universally understood meaning within the science community. In point 29 King re-states that he does not agree with the finding of the ISG that the borderlands to proactive areas show consistently higher levels of infection after culling, stating his reason that the date is 'statistically insignificant' (King 2007: 12). In this instance, King does not quote an equation. In Point 24, 'borderline statistical significance' could be considered a general positive position as it was backed up by the equation (a symbol that a layman would presume had significance to other scientists or statisticians) and the positive opinion of King. This absence of equation and the negative position of King leads the reader to view Point 29 with a greater extent of negativity as the words 'insignificant' would most likely be viewed with a more colloquial understanding. The reader could consider this a reasonable discrepancy in reporting or it could cause them to feel suspicious of the skew or intention of the writers' persuasion.

Language and Structure

The King report is written in short sentences and peppered with more emotive language signalling urgency. Woolgar would suggest that this straying of the writer from 'neutral', 'objective' language could cause the reader to view the report as less scientific because of the expectation that scientific discourse would contain language fitting this format and used in this way (Woolgar 1988 in Elling 2008: 28).

The tone of the report could be described as authoritative as the document is written as a critique or judgment on the work produce by the ISG. The writer shifts to using the collective pronoun 'we' in the conclusions section, which although it was stated at the beginning of the document that the Chief Scientific Adviser was assisted by several others in compiling the report, deviates from the general tone of the rest of the report which one could argue has leveraged off Kings position as the Chief Scientific Adviser.

The results

King presents a summary of his position and recommendations for action in Point 41. He rejects the ISG's conclusions that the badger cull has not been proven to decrease instances of bTB outbreaks and that outbreaks increased in areas adjacent to proactively culled zones (King 2007: 16).

In Point 47 King advises that data from the reactive trial areas be thrown out altogether due to a disturbance in the run on the trial by an outbreak of Foot and Mouth disease and also rejects all data collected in the first year of the trial due to his opinion that not enough time has elapsed between the cull and the data collection to prove any conclusive connection (King 2007: 17).

His final recommendation states (King 2007: 18):

' Our view is that a programme for the removal of badgers could make a significant contribution to the control of cattle TB…provided removal takes place along side an effective programme of cattle controls'

<u>How might the citizen weigh up a decision between the legitimacy of the two reports?</u>

In comparing the two reports, I will use the same headings as above.

Rationality

When comparing the contrasting views of the ISG and King reports, the reader is presented with several personal judgments to make. The first could concern the authors. There are two aspects to this: the writer's **prestige** and the **relevance of the experts** involved in both works. On the one hand, a reader without knowledge of this issue or any of the scientists involved in either report could be impressed with King's title, Chief Scientific Adviser to the House of Commons. This judgment could be based on Modern individual's recognition of the structure and supremacy of the state and respect for individuals officially handed the mandate to speak by that institution. If the reader instead

were to value the functional rather than prestige aspects of the authors, they may assess that the scientists involved in the ISG project were more specialized experts in the area than the Chief Scientific Adviser whose field of expertise was chemistry.

The **duration of data collection** may also be a factor in the reader trying to make a rational decision on the validity of the works. The ISG project took place over ten years with time for comparisons and repetition to occur and decrease the level of uncertainty. It is difficult for the reader to compare this type of study with the King report as the King report was specifically requested as an assessment/advice to DEFRA rather than a primary data gathering activity and compiled in one month. In making a decision about the two reports, the reader might question the **intention of the reports**, both requested by the same Government body, DEFRA. The intention of the ISG report makes simpler rational sense than that of the King report. A reader assessing the stated and actual intention of the ISG report could conclude that with the instances and costs of bTB increasing, a long term study would be beneficial to the current knowledge base. Coming to a decision about the intention of the King report is more difficult as the reader might question why DEFRA wanted a second opinion from a Government employed scientist on work deliberately set up to be independent (hence the group's name) from the department in question. The reader could conclude that commissioning the King report was a good way for DEFRA to seek advice from another highly respected scientist. Alternatively they could wonder if DEFRA suspected that there was something illegitimate about the results of the ISG report, or they could speculate that DEFRA had a political reason to disagree with the ISG findings and hoped to delegitimize the findings in favour of a previously decided bTB management plan. All conclusions would make rational sense, the direction of the individual's assessment shaped by their personal values, past experiences and bias towards or against government agencies.

Science

If the reader was placing scientific evidence above all other values, then the ISG would be the only legitimate report as the King report relied upon critique and speculation rather than data and tested hypothesis.

Language and Structure

The **length of the two sources** could impact upon the reader's decision on the legitimacy of results. The ISG source is a very limited summary of complex and long-term study. It is simplified and written in a basic, colloquial language style. It is easy to absorb the essence of the study, but also presents only the very 'tip of the iceberg' of findings, which some readers might find caused them to question the methods and what information they were missing. Importantly, in the Modern age of the internet, many readers choose to reader materials adapted for a fast pace of living. They prefer a summarized document to one that goes into depth as this issue is one of many that potentially interests them of has an impact on their life. The King report showed more specifically its criticisms and was able to return to them over the course of the twenty five page paper. The length of the King report could also have been detrimental in some respects, considering the

sometimes disjointed discussion of points with relevance to one another. A reader skimming only sections of the report (for instance conclusions) would miss the rationale that King used to form his opinion.

In terms of the **words and style** used, what a reader trusts and judges as a more valid way of saying something is highly subjective and dependent on the reader's norms, bias, and experience reading scientific materials.

Results

If you take the matter out of the conclusions you are left with two very different advices. The ISG report conclusion is 'we do not have the answers. More research is needed to find the answers we need'. The King report says 'I have some of the answers. This is my plan'. The King report conclusions give a firmer, stronger advice than the ISG conclusions, even though they are based on the same data set. If the reader was looking for an item that could tell them what should be done they may feel more comfortable with the King report. If the reader was looking for an objective conclusion and felt comfortable that there was not strong leadership towards an action plan, then they may feel that the ISG report reflects the more closely the reality of the unfortunately situation.

This analysis of the King and ISG reports shows the vast number of challenges faced by Modern individuals hoping to make a decision based upon rationality and scientific evidence. Multiple factors contribute to the end decision the individual will come to, many based on the individual's personal view of priorities, their values and their assessment of the validity and trustworthiness of the writer.

Question 2

Based on the three reports analysed in this thesis, how might the citizen attempt to acquire moral knowledge on bTB? How and where did the ethical and aesthetical considerations emerge?

In an attempt to acquire moral knowledge, the reader would need to bear in mind what they had learned from scientific sources whilst simultaneously looking to other actors outside of the system for guidance on ethical factors. If this can be achieved, then the knowledge gained is a truer reflection of moral knowledge as it takes into account human aspects particular to time and culture whilst recognizing the contribution of science to solving the problem of bTB in cattle and what this means for the animals who are its reservoir in wild nature.

The third report, put together by EFRAC is an interesting document for this particular question. It is stated in the foreword of the paper that the committee was formed 'by the House of Commons to examine the expenditure, administration, and policy of the Department for Environment, Food and Rural Affairs and its associated bodies' (EFRAC 2007: Foreword).

Values and Expectations

The reader would notice on reviewing this document that not only does the document question choices of spending, administration and policy but it also makes reasoned comments on actions taken by the department and its ministers in a way that **incorporates the values and expectations** of this particular time and culture, unexpectedly in line with neo-Modern ecological thinking theory (Elling 2008: 31-32).

One such example is its open criticism of the Chief Scientific Adviser's (and DEFRA by proxy) way of putting together his report without consultation with the ISG, 'We consider it unfortunate and unsatisfactory that Sir David King and his group of experts did not meet the ISG to discuss their work as we believe that if they had done so, a more constructive dialogue between the two groups of experts might have been established.' (EFRAC 2008: 55). The reader is introduced to a different dimension of the conflict they have seen between the opinions in the two reports as this critique reminds the reader that the scientists are expected to behave within specific professional conduct parameters for their work to attain the highest value it can within this cultural context.

Another similar critique includes etiquette. 'Defra ministers' apparent reluctance to meet Professor Bourne to discuss the final results of the work he and the ISG have been doing for Defra and its predecessor for 10 years is both very disappointing and discourteous' (EFRAC 2008: 55). The language use, I would argue, is specific to a British context and linked to values. The statement would have stood independently without the word 'discourteous'. The use of this word brings in reference to etiquette which is a set of rules very much dependent upon specific time frames and the cultural values of reciprocal obligation. Depending upon how the reader prioritises etiquette in their own lives, this word (and the subject matter behind the criticism) could impact upon their view of the science they had read in the King report or contribute to their total understanding of the issue.

Special Interest Groups Contributions

Another way that the reader gains an understanding of ethical elements outside of the science or institutional channels is through the incorporation of **special interest group comments**. Examples from four special interest groups come through in the EFRAC report that may inform the reader of other concerns in this management process that were not presented in the King and ISG reports.

The Badger Trust is a wildlife trust that seeks to educate people about badgers and lobby for their protection. The EFRAC report includes a statement from them regarding their opinion on cattle based controls being the most important, 'killing badgers is not yet known to be of any value whereas the vastly greater problem of infected cattle travelling throughout the country is well recognised' (EFRAC 2008: 37). The quote included shows the reader the Trusts' opinion is against the badger cull and also, through use of language reminds the reader that cull or 'badger based controls' equates to killing badgers. The use of the word 'killing' is significant as it is one of the only instances in all three reports

where that word has been used. Some readers might find this particular opinion offering with its more emotionally weighted language brings them to think about what the cull means for wildlife, bringing in the ethics of killing wild fauna as a means to protect commercially produced livestock.

The Badger Trust is also quoted in the report to feel that decisions taking place at DEFRA after the disbanding of the ISG as happening 'within a science vacuum', which they say was a problem in 2005 when some initial decision were made, they solidify this position by warning, 'We (The Badger Trust) are extremely concerned that he (the minister) is about to make the same, critical mistake again' (EFRAC 2008: 35). This could lead the reader to consider whether DEFRA was conducting themselves with the level of respect for science they would expect from the government department thus bringing expectations norms into the picture. Alternately, the reader could view this comment as signifying the bad relationship between the ISG scientists and DEFRA, and impact their response to one or either group, reflecting the reader's own past experiences in similar situations where their work had been devalued by a colleague, or another stored memory with emotions attached. The criticism forces the reader to take sides, this activating something outside of the rational and scientific decision making rationale.

The National Farmers' Union (NFU) is a members association that acts as a collective source for information and a force to lobby government on behalf of farmers. The comments included in the EFRAC report from the NFU lead the reader to understand what is arguable the central conundrum of the bTB management problem in the UK. The NFU states that "the big worry is that it may destroy the industry before it destroys the disease." (EFRAC 2008: 39). This quote is in response to the recommendations that more sensitive tests need to be developed for detecting bTB in cattle as a measure to control the spread of the disease. The NFU voices the farmers' worry that the more sensitive testing will in reality mean more herds testing positive and in turn more animal destructions and loss of revenue (EFRAC 2008: Point 142 and 144: 39). This stance does not gel with rationality or scientific principals as the view is detrimental to the disease control but yet is a genuine and widespread concern that has vastly affected the entire management of bTB since its inception. The comment forces the reader to think about the consequences to the farming industry, the livelihoods of farmers and their families and the lobbying power of the NFU as a political force. All these factors are essential in the reader truly understanding the issues at the heart of bTB management and may bring the reader closer to a moral knowledge by forming the supplementary sources outside of science needed in a more neo-Modernist approach.

The National Trust express still another element of the argument by bringing in the concept of budgets and public acceptability in their comment agreeing with the findings of the ISG: "We firmly believe that any significant decrease in BtB in cattle could only be achieved through such large scale and draconian measures to reduce badger numbers as to make the option impractical, unaffordable and publicly unacceptable.' (EFRAC 2008: 47). The destroying of the wild badger population to protect the commercially reared cattle is raised again as an ethical question, but backed up with issues of lack of feasibility and the assertion that public opinion would not agree with such extreme

measures. Mentioning the public in this way (when paired with a question of planning and budgets) leads the reader to consider aspects such as strategy, spending and the influence of public opinion in the context of such an embittered and growing problem. The reader is forced to dilate their lens on this problem a little further to incorporate yet more strands of social and political relevance.

Scientists as commentators on the process

As well as recognizing the scientists from the ISG and other studies as scientists, the EFRAC report asked the scientists for their opinions on how their work had been received and used by DEFRA in policy making. This is an interesting feature of the report as this brings the scientists into the conversation in a different role. Professor Bourne, the former Chairman of the ISG was quoted as saying, 'I don't think they [Defra] have done a very good job of it (interpreting ISG reports) and one of our comments in the final report is that Defra do seem to be unable to handle scientific data and translate that in to policy and that, that's something that we've recommended that Defra attend to.' This leads the reader to question why DEFRA did not (in the opinion of Bourne), use the science of the ISG for policy making and what that says about the broader external pushes and pulls being applied to the issue from outside the scientific field. In Modern society where science is intended as a basis for good decisions, the individual is shown a clear indication from Bourne (whether his opinion is accurate or not) that DEFRA are criticized for making decisions that deviate from evidence based policy.

Complimentary Science

Two additional scientific studies are brought into this report by EFRAC, that or Dr Cheeseman and Dr Enticott (EFRAC 2008:40-44). Both studies focus on the specifics of cattle based controls rather than debating the efficacy of badger based solutions as the King and ISG reports do. The studies and their focus on badger behaviour (how the badgers get in contact with the cattle) and biosecurity (how to prevent this contact) bring a new dimension of management to the reader. They are now presented (albeit forty pages into the third report) with a scientific, evidence based alternative to badger culls rather than just an argument between two schools of though on the same subject. Cheeseman brings up the reason this subject has not been explored as deeply as other control methods by referring to cultural aspects of farming, 'culturally, there hasn't been a need to pay strict attention to biosecurity in the cattle and sheep sectors—strict measures interfere with, and add cost to, the business.' (EFRAC 2008: 40). EFRAC then supports this cultural observation about lack of biosecurity on farms and applies a value judgment that they construct into a recommendation for the future suggesting that ' a more pro-active approach using vets based in the local communities, creating biosecurity "partnerships" between farmers and vets, may be more effective.' (EFRAC 2008:46).

<u>Summary of question 2</u>

When the reader incorporates the knowledge they find in the EFRAC report, they may begin to feel differently about the ISG and King report because their quest to form an

opinion on the bTB issue in UK now takes on additional elements beyond scientific evidence and rationality.

The individual hoping to gain an informed opinion about bTB from the three chosen reports could attempt to achieve a more moral knowledge by combining guidance gained from the EFRAC report and its inclusion of opinions from outside the commissioned scientific world and making a choice based on their own rationality on which science and action presented in the King, ISG and EFRAC reports fits best with their own values and perception of truth.

Question 3

What could the discussion of questions 1and 2 indicate more broadly about how the private citizen acquires moral knowledge in the Modern/neo-Modern age?

Foremost I will acknowledge that the individual, whether they choose to make decisions based upon the rational/scientific principle of strong Modernity, or the broader, ethics-inclusive, contextually specific principles of neo-Modernism, is confronted with a very complex and difficult task in making decisions relevant to environmental.

Conflicting Science

The analysis and comparison of the King and ISG reports in question 1 explored the different types of criteria a citizen would need to apply to scientific articles where the results do not agree. This begs the question: if science is relied upon in strong Modernity to lead society towards objective facts, what happens when science leads towards two sets of fact which are conflicting and how can people make decisions? The two reports aptly illustrate Gidden's paradox of Enlightenment as science in this case brings the reader further away from obtaining an objective opinion, yet simultaneous reconfirms its adherence to the system of Modern values of technical, rational and evidence based decision making. At this point Elling would suggest bringing the ethical, value driven and cultural aspects back into the process in order to act as moral compass and adjudicator between conflicting advices.

With the two scientific reports being nearly devoid of influence outside the original data collection of the ISG, I suggest that the reader would have been forced to make value judgments between the reports based on other factors: those of **rationality, language and personal values**.

To summarise what these three aspects meant for the case study and might mean more broadly, I will rehash some of the criterion for decision making I suggested in the analysis of question 1 and 2 in the form of questions citizens might ask themselves to make these value judgments.

Rationality

Did the author contradict themselves within their report?
Was the author basing their conclusions on scientific (proved through experiments and repeated results) evidence?
Is there a strong enough connection between the science, the logic and practical concerns of implementing the results as a plan of action to make the solution feasible?

Language

Why is the document written in the style that it is?
What was the intention of the author when using specific words or pronouns?
Is there any apparent agenda that can be identified?
Is the language being used to confuse/excite/bamboozle/intimidate me?

Personal Values

Does the data, recommendations or results pose ethical concerns for my values?
Have I seen similar documents from this source or author before and what did I think about them?
Do I trust the author/the purpose behind the report?

These are just a few of the many and varied questions a private individual might ask when attempting to draw moral knowledge from a document written with the intention of being objective. These applications of the human subjective nature to the reports which pertain to be objective moves in the direction of moral knowledge, certainly more closely than a purely rational, evidence based decision would.

Where to find information that can inform 'moral knowledge'

In the case, oddly, the moral knowledge came most directly from the EFRAC produced report. At first I thought this was a strange place to find the majority of ethical influence and consideration as EFRAC is essentially an auditing committee. When I compared the intention of EFRAC and all regulatory/auditing bodies, the connection became clearer. In the case of the bTB management conversation between the ISG, King and DEFRA, EFRAC was behaving in the role I was suggesting the reader take when making assessments about the scientific reports. In their official role, EFRAC were asking many of the same questions as posited above and attempting to justify to themselves, the governments and public citizens at large about the functional actions of DEFRA though value judgments based on both scientific/rational and ethical/cultural concerns.

If the main criteria for an institution, special interest group or individual to contribute to another person's moral knowledge could be said to be based upon their ability to stimulate thought in the reader that challenges them to make their own internal decision based on rationality, language analysis and personal values, then a number of other parties might be able to act in this role and enrich the public citizen's experience and progression towards moral knowledge.

To name a few such sources:

Scholarly Journal Articles
Specialised Magazine/Website Materials
Special Interest Websites
Opinion Internet Blogs

All may not be 'equal' in the quality and the depth with which they approach and understand the issue, but the onus then remains upon the reader to make the assessment for themselves based on their own internal values and considerations, which is an essential aspect in the process of acquiring moral knowledge.

Discussion

Given the more recent focus of Western government on public participation, what impact might citizens that have come through a similar information gathering process have on the management of 'more complicated environmental problems and growing risks' (Elling 2008:6)?

Given the shift towards public participation in all fields of public management, the State must aim to have an acute understanding about how private citizens use information available to them to form opinions. One might argue that Governments in the age of the internet are dealing with a flow of influence from public back to decision makers closer to a true participative democracy than in any time in history. The more traditional role of the state as a manager with paternalist tendencies, supported by highly specialized experts has been turned on its head as the state is now confronted with a populace that I will call 'semi-informed generalists' which must be included in the decision making process of the administration.

The Semi-Informed Generalist

I was searching for a term that would describe the Modern or neo-Modern citizen who had challenged themselves to make the best evidence based and ethical decision possible by reviewing a wide range of data before making their decision. In the case I chose to explore, I limited the sources examined to three reports in order to show a snapshot of the challenges faced by private citizens hoping to become informed and indicate some general themes that might apply more broadly. But the Modern/neo-Modern citizen with access to the internet need not limit themselves to a specific number or type of reports. In fact, the technology and evolving structures of the internet encourage and make simple the process of gathering information. A couple of key words typed nonchalantly into a search engine such as Google and the individual is inundated with links directly to information of all views and types, all that information ready to be absorbed and processed by a willing human mind. Returning to my problem of titling the citizens with access to such a broad scope of information I decided that the title would need to reflect the evolving role of that citizen in government decision making through their involvement in public participation. I have settled on 'semi-informed generalist' as it is

distinct from scientists who I would consider to be highly informed and specifically expert in a fine focus topic area. It also acknowledges that (if they so wish and by all means not all do) citizens living in the age of the internet, without any particular training or educational background can become highly educated on a topic causing them to be not only a private individual with their own utilitarian needs at heart, but also one that can identify and understand the bigger picture. When people fill this type of role in a business environment, they are referred to as generalists. At no other time in history has it been possible for citizens in the privacy of their homes to access the very same materials (classified materials excepted) that the experts viewed when they made their decisions and recommendations to government. Lack of formal knowledge on how to interpret the sources they read could have both negative and positive impacts for this neo-Modern type of citizen: they may not have the skills of a trained scientist necessary to assess the rigour of some technical documents but they may be at an advantage in gaining moral knowledge as they do not have the same ideological constraints, thus allowing them to incorporate more strands of contrast, value based and cultural aspects than the experts who inform their governments.

I would argue that this rise of the semi-informed generalist is a major point distinguishing the pre-internet and internet assisted periods of the recent Modern age and has a deep and far ranging impact on the management of more ‘complicated environmental problems and growing risks’ (Elling 2008: 6).

Conclusions

The Modern/neo-Modern citizen with access to both general and specialized information via the internet has every opportunity to become a semi-informed generalist on environmental problems of their choosing.

As semi-informed generalists given the opportunity to participate in decision and policy making of institutions and governments through public participation, the role of the citizen in influencing the management of ’environmental problems with growing risks’ is expanding and changing (Elling 2008:6).

With this increase of influence over government and institutional environmental strategy comes responsibility. Modern/neo-Modern citizens are confronted with many obstacles and advantages when attempting to make informed and ecologically sound opinions. On the one hand they have more opportunity than any generation preceding to self educate on issues of environment. They are in a position to make up their owns minds through the assessment of information available to them rather than accepting the solution proclaimed most loudly by institutions and governments that formerly had a monopoly on access to technical and intellectual expertise.

The very difference that sets Modern/neo-Modern citizens at this advantage is also the point that causes the most challenges. Forming an opinion given more than one viable option is not a new concept, but the sheer quantity of these options increased exponentially with the addition of the internet into the information gathering equation.

Citizens wanting to acknowledge their emerging role in society as co-decision makers with government find themselves needing to assess information they receive with a critical eye; weighing rational, technical, ethical and cultural aspects against one another in search for the balance that comes closest to Elling's moral knowledge.

As a greater proportion of citizens become aware of their new place in environmental stewardship, one can only hope that managing these 'complicated environmental problems with growing risks' becomes a task we as citizens are better equipped to tackle than previous generations. With access to a greater number of sources of information comes increased choices to make rationally and ethically sounds decisions, each assessment presenting an opportunity for the citizen to acquire moral knowledge.

With increased opportunity to acquire moral knowledge being presented to growing numbers of people via the internet as a tool for sourcing information, coupled with public participation rising as an avenue for this more morally informed knowledge to be applied in the public sphere, the chances of managing environmental problems in a sustainable and ecologically sound way seems much more likely.

As the popular saying goes, 'two heads are better than one'. With citizens as semi-informed generalists, scientific and technological experts discovering more intricate details about the natural world and how it works, and the inclusion of citizens in the government and institutional decisions that effect the environment, that, one might say, is a lot of heads.

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