

Commons, super wicked problems, responsibility: is it possible to counteract climate change?

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Abstract

Anthropogenic climate change is dangerous and needs to be dealt with. This is the starting point of this thesis. From here two different debates are explored and it is assessed whether they are able to provide solutions. The first debate shows that climate change can be considered a “Tragedy of the Commons.” The key to overcoming the tragedy lies in cooperation. Therefore cosmopolitanism, Confucianism and republicanism are explored. However, empirical evidence shows it is difficult to establish cooperation in the case of a *global* commons. Furthermore, climate change can also be viewed as a “super wicked problem.” Literature on this concept claims a super wicked problem can be counteracted through neutralizing hyperbolic discounting, which all starts with a change of attitude. Therefore, this thesis analyses the concept of responsibility. Through this argument it will become clear that we can no longer exempt ourselves from responsibility in climate change. However, while super wicked problems literature offers a policy tool based on path dependency, it remains somewhat unclear how we can move from a change of attitude to a decrease in temperature.

Key words: commons, super wicked problems, responsibility

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1 – Introduction

Many natural scientists characterize the time we live in as the Anthropocene, an era in which humans dominate geology, and moreover, in which global climate may change significantly for the next thousands of years (Crutzen, 2002, p. 23). In other words, the global environment is no longer considered stable as it were during the era of the Holocene, which lasted ten thousand years (Dansgaard *et al.*, 1993; Petit *et al.*, 1999; Rioual *et al.*, 2001). Crutzen (2002, p. 23) provides several examples of the growing influence of humans on the planet: during the Holocene the human population has increased tenfold; it is estimated that humans exploit thirty to fifty per cent of the Earth's surface; fossil-fuel burning as well as agricultural exploitation of the Earth are responsible for a significant rise in the concentration of carbon dioxide (by thirty per cent) and methane (by more than a hundred per cent).

I will argue throughout this thesis that *anthropogenic* climate change (from here: climate change) is dangerous and needs to be dealt with. In order to come up with (a build-up towards) a potential solution I will explore several political theoretical debates. For now I will give a brief outline of the researched debates, which will be addressed in more detail later on in this introduction. First, I will argue that climate change can be considered a “Tragedy of the Commons.” I will argue that while the commons debate puts forward theoretical solutions, these are not likely to be (politically) feasible. Therefore I also explore the popular, but relatively untested concept of “(super) wicked problems.” Furthermore, I will build upon (super) wicked problems by analysing responsibility as a concept, and by arguing that we cannot exempt ourselves from responsibility.

The term “Anthropocene”, as it is employed by natural scientists, presupposes some sort of scientific objectivity. That is, it is through measurements that scientists are able to assess changes in the Earth's system. Furthermore, they are able to determine (to a certain degree) that these changes are human-induced. Hence, labelling a new era seems neutral; it is based on facts. Nonetheless, the term itself is value laden. Biermann (2014) recognizes that the term “Anthropocene” is inherently political and fundamentally changes the manner in which we understand our political systems. According to Biermann (2014, p. 57) the concept of humankind as a species remains underexplored and undefined, and hence it also remains underexplored that human agency (as a driving force) differs to a great extent. This view is supported by Cox, who argues that the presupposition of the Anthropocene (humankind became a great threat to the Earth with the beginning of the Industrial Revolution) is wrong in assuming that the whole of humankind is to blame. Instead, it should take the capitalist world-system into account (Cox, 2015, p. 60).

Lepori (2015, p. 104) also disagrees with the Anthropocene's presupposition of universality among humans. As a consequence of this presupposition, the concept as such does not acknowledge

that at its heart lie political-economic relations that are asymmetrical in power (Lepori, 2015, p. 124). Moreover, as a consequence the concept is unable to make clear how climate change has come about through political-economic drivers (Lepori, 2015, p. 124). Malm and Hornborg (2014, p. 64) add to this that the global distribution nowadays is still unfair, and this makes it difficult to view the whole of humankind as the new geological agent. For example, the developed nations together held 18.8 per cent of the world population, whereas they emitted 72.7 per cent of CO₂ since 1850 (Malm & Hornborg, 2014, p. 64).

Apart from the fact that these Anthropocene critics make clear that the term in itself is value laden, it also becomes apparent that people are confined to the system they find themselves in. That is, asymmetrical power relations exist. As such, states do not always have a choice with regard to their means of production, nor do individuals with regard to their consumption. For example, some developing states are heavy polluters. However, the goods they produce are not for their own citizens. Rather they are produced for citizens of highly developed states. On the other hand, many citizens of developed states who buy these products lack the means to buy more sustainable products. I am aware that people's actions are limited in this sense, nonetheless I argue that we are not merely puppets on a string. By arguing that people have agency this thesis focuses on what we can do, rather than what we cannot do. By putting my argument forward this way, I hope the Anthropocene is not merely interpreted as a worst case scenario, but rather as an opportunity to bring about change.

Despite the fact that the Anthropocene as such has received some well-deserved criticism, as outlined above, it does put forward the idea that mankind may leave too big of a stain on the Earth's system to erase. As Crutzen puts it:

A daunting task lies ahead for scientists and engineers to guide society towards environmentally sustainable management during the era of the Anthropocene. This will require appropriate human behaviour at all scales, and may well involve internationally accepted, large-scale geo-engineering projects, for instance to 'optimize' climate. At this stage, however, we are still largely treading on terra incognita. (Crutzen, 2002, p. 23)

Steffen (2012, p. 27) sums up the challenges that mitigating climate change faces: once in the air one cannot distinguish who is responsible for carbon dioxide getting there, and thus, the only solution is to be found internationally; emitters should be coordinated. However, the reduction of emissions needs to be dealt with on a local and regional level, while policy coordination needs to take place on the national level (Steffen, 2012, p. 27).

Implicit in both Steffen's and Crutzen's argument, and in much of the Anthropocene literature, is that climate change is a problem to be managed by technocrats. However, this approach does not take into account that it in fact matters how we shape potential solutions, as they will influence the way in which humans will live in relation to the Earth, nature, and each other. It is important to note

that while I argue that climate change is a problem in need of a solution, I do not propose a specific way forward – apart from the fact that I argue it cannot merely be a technocratic solution. According to Wissenburg (forthcoming), originally the Anthropocene discourse proposes two solutions: adaptation to or mitigation of climate change. The third option, geo-engineering, is often met with apprehension, since it is more radical than the former two, by changing climate in itself. Whether one option is preferable (or not) is important to discuss. However, it is beyond the scope of this thesis. Now that it is clear what this thesis focuses on it is time to present the theoretical debates which are the foundation of the argument presented in the end.

In the “Tragedy of the Commons” Hardin (1968, p. 1244) describes a pasture open to all, where each herdsman tries to keep as many cattle as possible. This scenario will function properly at times when numbers are low (for example because of war, or disease), and there is plenty of land. However, once social stability begins the logic of the commons evolves into a tragedy; each herdsman is rational, and therefore, he will try to maximize his gain. Adding cattle to his herd will increase its utility, but at the same time it will also put a burden on its utility, since the effects of overgrazing will be shared by all herdsmen. However, the negative impact is only a fraction compared to the positive impact, and therefore the herdsman will rationally conclude that he should add more cattle to his herd (Hardin, 1968, p. 1244). The tragedy, of course, is that every herdsman who makes use of the commons reaches the same conclusion, and furthermore, his world is limited (Hardin, 1968, p. 1244). According to Hardin (1968, p. 1244), the problem lies in the fact that the commons are free to all. Hardin (1968, p. 1245) proposes two options with regard to access to the commons. First, we could privatize them. Second, we could keep them public property, but limit access to them.

Hardin’s article was aimed at overpopulation as a tragedy, rather than climate change. Nonetheless, it is applicable to climate change as well. As will be further explained in chapter 2 climate change is a consequence of (mainly) too high a percentage of carbon dioxide in the atmosphere. This percentage is a consequence of actions performed by humans (whether it is individuals, states, or corporations). The tragedy lies in the fact that it is individually rational for people to perform actions that emit carbon dioxide. That is, an individual who needs to clean her laundry will make use of a washing machine. Or she needs to drive a car to get to her work. These are two examples of how individuals, by performing everyday actions, are increasing the burden on the Earth’s system.

According to Hardin’s (1968) logic people will not by themselves limit their carbon dioxide emitting actions, since they are after maximizing their own gain. However, Hardin (1968) argues, there are three ways of overcoming the tragedy of the commons: privatization, coercion, and mutual coercion mutually agreed upon. These will be discussed in more detail in chapter 3.

Hardin's most influential critics, Ostrom *et al.* (1999, p. 279) disagree with Hardin's view of humanity; humans are not necessarily self-interested and only after maximizing their own gain. They admit that humans can act in selfish ways, but on the other hand, are also capable of reciprocal behavior to overcome social dilemmas (Ostrom *et al.*, 1999, p. 279). Ostrom *et al.* (1999, p. 279) distinguish four types of users. First, the free-riders, who are unwilling to cooperate. Second, users who are willing to cooperate only if they are assured that no free-riders will exploit them. Third, users who are inclined to start cooperation in the hopes that their trust will be returned. And finally, users who have an altruistic mindset, in order to achieve higher returns for the group. Whether a common-pool resource problem can be overcome, Ostrom *et al.* (1999, p. 279) argue, depends on the types of users of the resource; reciprocity can be used to build a reputation of trustworthiness, and in turn, trustworthiness will lead to more cooperation.

Ostrom's argument that people are capable of reciprocal behaviour is indeed extensively supported by empirical evidence, not in the last place by her own case studies (Ostrom, 1990), but also by empirical research conducted by others; McKean (1982); Berkes (1992); Tang (1992); Schlager (1994); Lam (1998); Dayton-Johnson (2000); Varughese and Ostrom (2001); Agrawal (2002); Bardhan (2002); Araral (2009) and Cox *et al.* (2010). Therefore the third chapter of this thesis will assess to what extent the commons debate as well as several political theories are able to provide us with the possibility of establishing cooperation and reciprocity to deal with climate change.

However, the common denominator in the researches that support Ostrom's claim is that they all investigated small scale, locally governed commons, whereas the Earth's system (which is at stake in the case of climate change) is a global commons. Furthermore, chapter 3 will show that so far there is no empirical evidence that supports reciprocity and cooperation in global commons. To put it another way, while the commons debate provides for theoretical solutions (which are further explicated in chapter 3), it does not provide tools to make these solutions (politically) feasible.

Therefore another strand of literature is explored: "(super) wicked problems." This strand of literature argues that societal (or wicked) problems are ill-defined and are dependent on elusive political judgment (Rittel & Webber, 1973). Accordingly, scientific approaches – though often employed – are badly equipped to deal with this type of problem, since they are normally aimed at solving problems with findable solutions (Rittel & Webber, 1973, p. 160). Rittel and Webber (1973, p. 160) were the first to coin the term wicked problem and argued that nearly all public policy issues can be defined as wicked problems. As a consequence, they were unable to provide a solution for wicked problems.

This changed however, when Levin *et al.* (2010, p. 4) expanded the notion of wicked problems by introducing the term "super wicked." Levin *et al.* (2012) in fact provide social scientists with a practical approach to address climate change, by introducing "applied forward reasoning", which is a

policy tool based on path dependency. According to Levin *et al.* (2010, p. 4) super wicked problems are global environmental problems which are characterized by four additional features that are absent in wicked problems. First, there is a lack of time. Second, in order to address the problem a central authority is required. However, this authority is weak or non-existent. Third, the ones who try to solve the problem are also part of its cause. And fourth, as a consequence of hyperbolic discounting (humans have a preference for the reward that arrives sooner rather than later, *ceteris paribus*) addressing the problem is pushed into the future while quick actions need to be undertaken in order to come to long-term solutions.

Based on the fact that super wicked problems literature claims it can be of more use than traditional policy analysis (Levin *et al.*, 2010), it deserves to be tested. According to Levin *et al.* (2010, p. 8), solving a super wicked problem requires neutralizing its fourth key feature, hyperbolic discounting. That is, a super wicked problem requires immediate action, and hyperbolic discounting delays addressing the issue. People are able to overcome hyperbolic discounting, and hence choose the larger reward, by looking at the choices that they make as predictors of what kinds of choices they will make in the future. That is, when people think of their choices as future predictions, the logic by which they choose becomes much like a prisoner's dilemma, and this, consequently, stimulates choosing the larger, later reward (Ainslie, 2005, p. 650).

Levin *et al.* (2010, p. 7) draw the analogy with smokers. They too are aware of the potential bad outcomes of their habits; nonetheless they light up a cigarette for immediate gratification. However, smokers can also neutralize their hyperbolic discounting by for example paying someone to hide their cigarettes (Levin *et al.* (2010, p. 8).

As has been stated, Levin *et al.* (2012) develop a policy tool based on path dependency. In developing path dependent causal processes, three diagnostic questions are important:

Diagnostic Question 1: What can be done to create stickiness making reversibility immediately difficult?

Diagnostic Question 2: What can be done to entrench support over time?

Diagnostic Question 3: What can be done to expand the population that supports the policy? (Levin *et al.*, 2012, p. 129)

Levin *et al.* (2012) emphasize the importance of norms with regard to the third diagnostic question, either as an initial stimulation, or through the creation of positive feedback processes that “generate “logics of appropriateness” uniting and expanding a political community” (Levin *et al.*, 2012, p. 146). According to Levin *et al.* (2012, p. 146) there are two other main reasons, apart from the fact that norms can create positive self-reinforcing processes, to focus on norms. First, norms can respond to the feature of a lack of a central authority. Second and related, norms can respond to the feature that the ones who try to solve the super wicked problem are also the ones causing it,

since norms have a logic that is ever-developing. Levin *et al.* (2012, p. 146) give the example of colonialism; nowadays, (almost) no society views it acceptable, whereas a hundred years ago it was considered normal.

To put it another way, solving climate change according to the method Levin *et al.* put forward, requires changing people's attitude towards their own behaviour. That is, they must be made aware how their actions are potentially detrimental, in order for them to not push the problem-solving into the future. From a different attitude can arise a new set of norms. Whether this mechanism is feasible, is further discussed in chapter 4. For now it is important to note that this thesis builds upon the concept of super wicked problems, by putting forth an analysis of the concept of responsibility. Responsibility here being a potential starting point for a change in attitude. Hence, in chapter 5 several types of responsibility are addressed. I will argue, mainly based on Vallentyne's (2008) and Braham's and Van Hees's (2009) argumentations, that individuals can be held responsible for their actions. Furthermore, I will argue that states can be held remedially responsible, based on a revision of Miller's (2007) argument. The research problem is formulated as follows:

While climate change can be considered a tragedy of the commons, the solutions the commons debate puts forth are difficult to realize. Can we turn towards the theoretical perspective of "super wicked problems" as an alternative, and if so, how?

The research problem, as stated above, is considered an instrument in order to answer the research question, which is formulated as follows:

In what way can the concept "super wicked problem" contribute to establishing responsibility in climate change?

This thesis is structured as follows. The second chapter will explain what climate change is, what its potential consequences are and whether we can assess to what extent it is human-induced. The third chapter will map the debate of the commons, as well as explore several political theories which could lead to the solution put forth by the commons debate: reciprocity and cooperation. The fourth chapter will argue for super wicked problems as a potential alternative and provide us with the build-up towards the argument for responsibility, which will be addressed in chapter five. Finally, this thesis will end with a reflection on the research and several recommendations for future research.

Chapter 2 – What is climate change?

In this chapter the basic physics of the greenhouse effect are explained. This basic idea is undisputed. From thereon I will discuss in what ways climate change can be assessed. I will provide a basic explanation of how climate change research is conducted, and which pitfalls it faces. From there on I will discuss the arguments presented by climate change sceptics, which I will then argue are irrelevant when we consider the reasonable probability of climate change, and the danger that comes with it.

2.1 What is the greenhouse effect? A basic explanation of climate change

All matter with a temperature above zero degrees Celsius emits radiation (the hotter, the more radiation and the shorter the wavelength) (Emanuel, 2007, p. 3). Air allows solar radiation to go downwards towards the earth and infrared radiation upwards away from the earth, while solids and liquids absorb the bulk of the intercepted radiation, while at the same time emitting radiation (Emanuel, 2007, p. 3). Furthermore the atmosphere contains water (in its condensed phase as well as in its gas phase), which absorbs radiation more efficiently than nitrogen and oxygen, as well as other gases that strongly interact with radiation, such as carbon dioxide and methane (Emanuel, 2007, p. 4). Thus, greenhouse gases absorb much of the infrared radiation that passes through them, while at the same time emitting radiation (Emanuel, 2007, p. 4). According to Emanuel (2007, p. 4) the essence of the greenhouse effect, then, is the Earth's surface taking in more radiation from the atmosphere rather than the sun, and as a consequence, balancing this extra intake of radiation by warming up and so emitting more radiation itself.

As Dobson (2016, p. 91) explains, the greenhouse effect effectively makes life on this planet possible, but the increase of greenhouse gases in the atmosphere is what causes the Earth's temperature to rise, and furthermore, is very likely a consequence of human actions, and therefore, this type of *anthropogenic* climate change is different from the natural greenhouse effect.

According to Emanuel (2007, p. 4) this basic physics explanation of climate and the greenhouse effect is absolutely undisputed. Furthermore, there would be no further discussion in establishing to what extent humans influence climate change, if it were possible to hold all variables in the climate system fixed except for the concentration of a single greenhouse gas as well as the temperature (Emanuel, 2007, p. 4). The problem lies in the fact that altering a greenhouse gas will also influence other variables, and thus the system as a whole (Emanuel, 2007, p. 4).

2.2 How can we assess whether climate change is a consequence of human actions?

How are we to tell which climate change is the consequence of human action? There are two options. First, according to Emanuel (2007, p. 7), we can look at the difference in greenhouse gases and sulphate aerosols between now and the pre-Industrial era (since we can reasonably assume that prior to the Industrial Revolution human influence was small). The downside of this approach is that there are no climate measurements of the 19th century, only proxies (for example tree rings), which have a large margin of error (Emanuel, 2007, p. 7). However, plotting the global mean temperature derived from measurements as well as proxies show an unprecedented upturn in recent years (Emanuel, 2007, p. 7).

This claim is supported by Hegerl *et al.* (2011, p. 2-3), who argue that based on temporal and spatial patterns (so-called “fingerprints”), it is impossible that 20th century warming of the Earth could have happened without human factors. In fact, these fingerprints indicate that the increase of greenhouse gases has lowered the efficiency with which the Earth is able to radiate heat from its surface into space, and consequently, the surface temperature has increased (Harries *et al.*, 2001). According to Hegerl *et al.* (2011, p. 3), these types of fingerprints show the same results as do observed changes over the last hundred years. In fact, if only natural forcing was at play in the last century it is likely that the global climate would have cooled in the latter part of the twentieth century (Hegerl *et al.*, 2011, p. 3). In other words, leaving out human-induced changes creates a pattern that does not fit the data (Hegerl *et al.*, 2011, p. 3). According to Hegerl *et al.* (2011, p. 4) the most important argument in favour of fingerprinting studies is that their success is not based on whether climate models simulate the amplitude of fingerprints correctly; rather they assess the precise amplitude from observations.

Hegerl *et al.* (2011, p. 4) give two main arguments for their claim that it is impossible that the observed warming is a consequence solely of natural fluctuations. First, long-term warming on a global scale is in need of a net energy source. When such a source is absent, one would assume that local variations in temperature would average out on a global scale in the long term. Second, it is not possible that rising temperatures are a consequence of fluctuating ocean temperatures (one could try to argue for this statement since fluctuating ocean temperatures drive regional climate variations such as el Niño). However, ocean temperatures in the second half of the twentieth century have a pattern of warming that can be explained by warmth transferring from the oceans into the atmosphere, not the other way around (Barnett *et al.*, 2005; Levitus *et al.*, 2000). Hence, Hegerl *et al.* (2011, p. 4) conclude, the atmosphere and ocean temperature are rising, and one cannot explain this rise without an external source.

Besides comparing greenhouse gases, as well as spatial and temporal patterns between the 21st century and the pre-Industrial area, the second option for assessing whether climate change is human-induced, is using climate models to simulate the past 100 years of climate change (Emanuel, 2007, p.

7). A few problems arise when one chooses this method. First, it is difficult to perfectly mimic chemical and physical processes in the climate system, since they cannot exactly be worked out (Emanuel, 2007, p. 7). Second, the computer must make manageable chunks out of molecules to make the outcome of the model more accurate, but this remains difficult; the scales in the model are much larger than the processes in real life (Emanuel, 2007, p. 7). The processes are parameterized, and as a consequence, such models are always only an approximation of reality (Emanuel, 2007, p. 8).

According to Emanuel (2007, p. 8) we must have a certain degree of faith in these models; we cannot know for sure whether they are right or wrong. Rather, we should assume that the truth lies somewhere between the higher and lower estimates that the models make (Emanuel, 2007, p. 8). Now that it is clear how climate change is assessed, we can look at the most important outcomes of research on climate change.

2.3 What are the impacts of climate change?

The Intergovernmental Panel on Climate Change (IPCC) observes seven main changes in the climate system, its confidence in its findings differing from medium to high (IPCC, 2014, p. 2-4). First, the last three decades were likely the warmest in the last 1400 years, with the period of 1880 to 2012 seeing a rise of 0.85 degrees Celsius. Second, the accumulation of stored energy in the climate system can for more than ninety per cent be accounted to ocean warming. Apart from the ocean warming, it is also increasingly acidified as a consequences of absorbing CO₂. And furthermore, the global mean sea level has risen by 0.19 meters over the period 1901 to 2010. The fifth important change is the increase of precipitation in the Northern Hemisphere.

With regard to changes in land ice the IPCC has observed three changes. To start off, ice sheets both in Greenland and Antarctica have been losing mass over the period 1992 to 2011. Additionally, in many regions glaciers have continued to shrink. And finally, in most regions permafrost temperatures have risen as a consequence of an increased surface temperature. With regard to the last main change in the climate system, the decrease of annual mean sea-ice in the Arctic, it is noted that over the period from 1979 to 2012 it has decreased with 3.5 to 4.1 per cent each consecutive decade.

2.4 The irreversibility of climate change

Solomon *et al.* (2009, p. 1704) argue that the extent to which climate change is damaging not only relies on how great the change will be, as is often stated, but also on the probability that the change that is taking place is irreversible. Furthermore, they show that in fact the increases in carbon dioxide concentration are already for a large part irreversible for at least a thousand years after emissions have

ended (Solomon *et al.*, 2009, p. 1704). While it is the case that ending emissions establishes a reduction in radiative forcing, this effect is nullified by ocean heating taking place more slowly (Solomon *et al.*, 2009, p. 1704). Consequently, it will take a minimum of a thousand years for atmospheric temperatures to decline (Solomon *et al.*, 2009, p. 1704).

A further complicating factor, Steffen (2012, p. 27) argues, is that the climate system has certain tipping elements, which consequently entails that certain changes are irreversible in a human's lifetime. Besides the tipping elements, there can also be abrupt environmental changes, since many subsystems (such as a monsoon system) of our planet respond in a nonlinear fashion (Rockström *et al.*, 2009, p. 472). Additionally, these subsystems are subject to change around certain threshold levels (Rockström *et al.*, 2009, p. 472). These thresholds are not always well-defined and subsystems can influence one another. In other words, reaching the threshold in one subsystem may send another subsystem over the edge, even though there the critical value for key variables has not yet been reached (Rockström *et al.*, 2009, p. 472).

2.5 Climate change scepticism

As has been stated previously, scientific uncertainty still exists on important aspects of climate change. According to Dobson (2016, p. 92) sceptics have three critical remarks with regard to climate change. First of all, they find the evidence that the increase in temperature is caused particularly by the increase in greenhouse gas concentrations unconvincing. Second, they remain unconvinced whether the rise in temperature is unnatural; that is, whether it lies outside of the normal variation. And finally, sceptics express their doubts whether a rise in temperature is a consequence of human activity.

Doran and Zimmermann (2009, p. 22) held a survey amongst Earth scientists (mostly geochemists and geophysicists), and found that there is largely a scientific consensus with regard to a rise in the global mean temperature compared to the pre-Industrial level as well as humans having a significant impact in the change of global mean temperatures. In fact, ninety per cent of the respondents think temperatures have risen, whereas eighty-two per cent think this has been human-induced (Doran & Zimmermann, 2009, p. 23). Furthermore, Doran and Zimmermann (2009, p. 23) add, out of the specialized scientists with regard to climate change (that is, anyone who listed climate change as their expertise, combined with the fact fifty per cent of their papers have been peer-reviewed on the subject of climate change) a majority of 96.2 per cent thinks global mean temperatures have risen, and 97.4 per cent think this has been human-induced. Therefore, Doran and Zimmermann (2009, p. 23) conclude, there is in fact scientific consensus, and rather the debate among scientists seems to be misunderstood by policy makers and the public.

2.6 Why we should take climate change seriously – even if potentially scientists are wrong

Even though there is consensus amongst climate scientists, there is still a small chance that the majority is wrong. If this is the case, one of the most important and difficult policy issues of our time would be off the table. Furthermore, there would be no need to discuss this matter further in this thesis. This section will make clear why we ought to think about precautionary measures against climate, despite the small chance that it may not be necessary.

According to Malnes (2008, p. 661), climate change can be viewed as a type of danger, danger here being a combination of high stakes and unfavourable odds. One can speak of danger when it is reasonably possible that a chain of events can lead to an adverse outcome (Malnes, 2008, p. 661). Another way of looking at danger is considering the worst possible outcome times the chance of the worst possible outcome happening. In the latter case, even when the odds are favourable danger will prevail if the stakes are high enough (Malnes, 2008, p. 662). Based on the stakes, this latter form of danger provides the possibility of making the distinction between pseudo-danger and actual danger, based on the odds (Malnes, 2008, p. 662). Furthermore, whether the danger should be averted depends on the price of precaution.

Before explaining Malnes's argument further, let me first make clear in what manner his argument differs from conventions in the precautionary principles literature, even though he essentially means the same. Usually literature on precautionary principles is set in terms of risk, precaution, and uncertainty. "At the core of the precautionary principle is the intuitively simple idea that decision makers should act in advance of scientific certainty to protect the environment (and with it the well-being interests of future generations) from incurring harm" (O'Riordan & Jordan, 1995, p. 194). Here, risk avoidance is applied when "... there is reasonable uncertainty regarding possible environmental damage or social deprivation arising out of a proposed course of action" (O'Riordan & Jordan, 1995, p. 194). If we draw the analogy with Malnes it becomes clear that both risk and danger are to be avoided.

Malnes's argument does differ slightly from precautionary principles literature when we look at uncertainty, even though he acknowledges there is disagreement amongst scientists with regard to climate change (this will be explained in the following paragraphs). However, this is different from precautionary principles literature, since here uncertainty problematizes precaution in three ways (O'Riordan & Jordan, 1995, p. 199). First, there may be uncertainty through a lack of data. Second, uncertainty may be a consequence of ignorance. That is, often scientific hypotheses are based on evidence that should not be generalized. And third, uncertainty may be a consequence of indeterminacy. That is, a system is so complex that its parameters as well as their interrelationships are unknown.

Malnes's account of the danger of anthropogenic greenhouse gas emissions is based on two components (Malnes, 2008, p. 662). First, the stakes are high; large parts of land may become inhabitable as a consequence of rising sea levels. The second component, the odds, is more difficult to assess, since there remains disagreement with regard to how the increase of temperature in the past century has come about. However, despite the fact that every model that simulates the evolution of climate has shortcomings, they all share the common denominator that mankind has, over the past thirty years, influenced the evolution of climate (Malnes, 2008, p. 662). Thus, the odds with regard to climate change are unfavourable; it is likely that, when left unaltered, anthropogenic emissions cause changes to the climate system (Malnes, 2008, p. 662). It is this prospect that makes anthropogenic climate change a real danger rather than a pseudo-danger.

The question remains whether the greenhouse theory is credible. Malnes (2008, p. 666) applies the Condorcet theorem, since all models agree that human influences must be taken into account to assess climate change. According to this theorem, if each member of a jury is more likely to be right than wrong, the consequence is that it is more likely that the majority of the jury is right rather than wrong (List & Goodin, 2001, p. 283). The larger the jury is, the higher the probability that the right outcome is supported by a majority of the jury.

However, Malnes (2008, p. 667-668) also objects to the use of the Condorcet theorem in the case of climate change, since it is not sure whether each climate scientist is more likely to be right than wrong. First of all, model-based simulations of the atmosphere are not independent of one another, many share computer code or are based on one another (Emanuel, 2007, p. 8). And second, several atmospheric processes do not lend themselves for modelling, and thus parameters have to be used, which, consequently, "... can change not only the climate simulated by the model, but the sensitivity of the model's climate to, say, greenhouse gas increases" (Emanuel, 2007, p. 8).

Malnes's objections to the use of the Condorcet theorem seem well grounded to the extent that climate scientists make use of models that are not independent of one another. However, as has also been explained in section 2.2, climate scientists can also make use of fingerprinting studies, which conclude that climate change is human-induced as well. This weakens the argument against the use of the Condorcet theorem in the case of climate change. However, we can continue to take Malnes's argument seriously, since the crucial remains whether we should take climate change studies in general seriously, even if they potentially are wrong. Or as Malnes says himself, leaving out other types of studies, the crucial issue remains "...whether model-based simulations of the climate give enough reason to reckon with a real danger that ought to be averted. So they do, although they may well be wrong" (Malnes, 2008, p. 669). To put it another way; yes, climate change may not be as bad as scientific consensus currently holds it to be. However, the stakes are so high, that we ought to take this danger seriously, and thus, take (precautionary) measures.

In this chapter I have explained the basic physics of climate change. Furthermore, I have explained in what ways we can assess whether climate change is a consequence of human actions. Also, I have briefly outlined the impacts of climate change. The changes in the climate are not only a matter of degree, but also of irreversibility. Additionally, I have presented the arguments made by climate change sceptics. In the last section, I have made clear why these arguments are irrelevant, since it is the combination of high stakes and odds which should form the basis of our precautionary measures against climate change. From here on the next two chapters will explore different strands of literature, and assess whether they provide us with possible solutions to climate change.

Chapter 3 – A tragedy of the commons

Although the first chapter briefly introduced the commons debate, this chapter will explain it in more detail. The focus in this chapter is partly theoretical, and partly empirical. I will argue that, contrary to what many of Hardin's critics contend, empirical studies have not yet refuted his thesis with regard to *global* commons. Thus, the first section of this chapter will explicate Hardin's argumentation, as well as Ostrom's argumentation, Hardin's most influential critic. After this section it should be clear that Hardin's concept of the commons still stands today. From there on I will argue that climate change can be considered as a tragedy of the commons, which then gives us the possibility to delve into the several philosophical debates. The main argument is that the key to solving a tragedy of the commons lies in cooperation. Furthermore, this chapter will argue that the Hardin versus Ostrom debate does not provide a sufficient answer as to how we should bring cooperation about. That is, the commons debate does provide options with regard to theoretical solutions. However, tools to bring these into practice are lacking.

3.1 A rational herdsman increases his herd of cattle

In the "Tragedy of the Commons" Hardin (1968, p. 1244) describes a pasture open to all, where each herdsman tries to keep as many cattle as possible. This scenario will function properly at times when numbers are low (for example because of war, or disease), and there is plenty of land. However, once social stability begins, the logic of the commons evolves into a tragedy; each herdsman is rational, and therefore, he will try to maximize his gain. Adding cattle to his herd will increase its utility, but at the same time it will also put a burden on its utility, since the effects of overgrazing will be shared by all herdsmen. However, the negative impact is only a fraction compared to the positive impact, and therefore the herdsman will rationally conclude that he should add more cattle to his herd (Hardin, 1968, p. 1244). The tragedy, of course, is that every herdsman who makes use of the commons reaches the same conclusion, and furthermore, his world is limited (Hardin, 1968, p. 1244). According to Hardin (1968, p. 1244), the problem lies in the fact that the commons are free to all. Hardin (1968, p. 1245) proposes two options with regard to access to the commons. First, we could privatize them. Second, we could keep them public property, but limit access to them.

Hardin's analogy with the pasture "open to all" refers to the population problem (a finite world can support only a finite population) (Hardin, 1968, p. 1243). He argues, contrary to most scientists who propose technical solutions, for a change in human values and an extension of morality (Hardin, 1968, p. 1243). Hardin (1968, p. 1244) argues that it is difficult to define an optimum population (and thereby the maximum good per person). Goods are incommensurable, but since Hardin is talking about nature here, he argues that the proper criterion is survival (Hardin, 1968, p. 1244).

According to Hardin (1968, p. 1244), the proper population size can only be determined if we abandon the idea of “the invisible hand”, popularized by Adam Smith. This idea promotes the assumption that decisions by individuals are the best decisions for society as a whole (Hardin, 1968, p. 1244). Hardin (1968, p. 1245) argues that we can judge acts morally in different ways, depending on the system in which they were performed. He gives the example of killing a bison; this would not have been considered wrong 150 years ago if a plainsman was in need of food, yet today, we would consider it wrong for anyone to do since bison are close to extinct (Hardin, 1968, p. 1245).

Hardin (1968) presents three possible solutions for the commons: privatization, coercion, and mutual coercion mutually agreed upon. Privatization however, will not work in the case of pollution, which Hardin considers a reverse tragedy of the commons. As Hardin puts it:

... the air and waters surrounding us cannot readily be fenced, and so the tragedy of the commons as a cesspool must be prevented by different means, by coercive laws or taxing devices that make it cheaper for the polluter to treat his pollutants than to discharge them untreated. (Hardin, 1968, p. 1245)

Hardin (1968, p. 1247) favours overcoming a tragedy of the commons through mutual coercion that is mutually agreed upon. According to Hardin coercion does not have to be perfectly just, as long as it is better than a situation that favours the conscienceless (Hardin, 1968, p. 1247). Here he gives the example of taxes; we accept them as a coercive device because we are aware that “... voluntary taxes would favour the conscienceless” (Hardin, 1968, p. 1247). While it is certainly up for debate whether mutual coercion should be just, the focus in this chapter lies not on the question how we ought to live. Instead, it tries to answer the question if, and if so, how, it is possible to come to mutual coercion. This question will be addressed later on in this chapter.

3.2 Reciprocity is key

In their influential article “Revisiting the commons: local lessons, global challenges” Ostrom *et al.* (1999) contend that Hardin’s view that commons will inevitably be destructed by their users is not necessarily the case; there are circumstances under which sustainable use of the commons can be established. This article is a follow-up on Ostrom’s (1990) research on different strategies of governing the commons. To start off, there are more solutions than the ones presented by Hardin – privatization and socialism (Ostrom *et al.*, 1999, p. 278). Before further explaining Ostrom’s argument let me first say that this is a very narrow interpretation of Hardin’s work. As Bish (1977) contends, Hardin is often misunderstood by other theorists, who argue he only presents these two solutions. According to Bryan (2004, p. 884), Hardin argues for the establishment of mutual coercion through a process of deliberation. Bryan’s argument is flawed in the sense that Hardin does not exclude (authoritarian) coercion as a possible solution. However, indeed as long as coercion is mutual, there is

no reason to assume it is not established through a process of deliberation, since it would seem that all affected parties would have to agree with a solution.

Despite the narrow interpretation of Hardin's work, we can continue exploring Ostrom's argument, since the relevance of her argument here is that she gives explanations on establishing cooperation, rather than the way in which she criticizes Hardin. According to Ostrom *et al.* (1999, p. 278) there are successful instances of commons management, mostly on a local or regional scale. They concede that it will be difficult to translate these small scale instances onto a larger scale, whereas this is exactly what is necessary, since the need for management for global commons problems will increase (Ostrom *et al.*, 1999, p. 278). According to Ostrom *et al.* (1999, p. 278-279) common-pool resources, as they call it, are characterized by two components that potentially trigger users pursuing their self-interest. First, there is the difficulty of exclusion (which can be costly). And second, subtraction by a user lessens the availability for other users.

However, according to Ostrom *et al.* (1999, p. 279) it is possible to solve common-pool resource problems through dealing with two components of the problem. First, access should be restricted, and second, users should be triggered to invest in the resource rather than overexploiting it.

Ostrom *et al.* (1999, p. 279) disagree with Hardin's view of humanity; humans are not necessarily self-interested and only after maximizing their own gain. They admit that humans can act in selfish ways, but on the other hand, are also capable of reciprocal behaviour to overcome social dilemmas (Ostrom *et al.*, 1999, p. 279). Ostrom *et al.* (1999, p. 279) distinguish four types of users. First, the free-riders, who are unwilling to cooperate. Second, users who are willing to cooperate only if they are assured that no free-riders will exploit them. Third, users who are inclined to start cooperation in the hopes that their trust will be returned. And finally, users who have an altruistic mindset, in order to achieve higher returns for the group.

Whether a common-pool resource problem can be overcome, Ostrom *et al.* (1999, p. 279) argue, depends on the types of users of the resource; reciprocity can be used to build a reputation of trustworthiness, and in turn, trustworthiness will lead to more cooperation. But, sometimes evolved norms do not suffice in preventing overexploitation of a common-pool resource. In such cases, Ostrom *et al.* (1999, p. 279) argue, users (either users themselves or with the help of external authorities) must come up with rules that specify who can use the resource, how much of it, and when.

Ostrom *et al.* (1999, p. 281-282) concede that the lessons from local and regional common-resource problems will be difficult to translate to global common-resource problems because of several reasons. First, there is the scaling-up problem; a large scale means more participants, which means it will become more difficult to organize and agree on rules. Second, there is the challenge of cultural diversity; different cultures make it difficult to find a shared understanding. Third, common-

pool resources are interlinked, even more so on a global level. Fourth, the rates of change are accelerating. Fifth, global resources are usually managed through treaties, which are signed on a voluntary basis. The consequence here is that nations can hold out for privileges before they decide to join. And finally, we have only one globe that we can use to experiment. Despite the long list of (potential) difficulties Ostrom *et al.* (1999, p. 282) contend that no matter how difficult, it is not impossible to come to terms with each other on common-pool resources.

3.3 Empirical evidence does not support Ostrom's claim in the case of global commons

According to Araral (2014, p. 12) there is a consensus amongst academia that Ostrom is right in her critique of Hardin: the tragedy of the commons is not in fact a tragedy, but rather a drama, than can be overcome. The solution to collective action problems in the commons lies, according to Ostrom, in self-governance and mutual trust (Araral, 2014, p. 14). Ostrom's criticism of Hardin is indeed extensively supported, not in the last place by her own case studies (Ostrom, 1990), but also by empirical research conducted by others; McKean (1982); Berkes (1992); Tang (1992); Schlager (1994); Lam (1998); Dayton-Johnson (2000); Varughese and Ostrom (2001); Agrawal (2002); Bardhan (2002); Araral (2009) and Cox *et al.* (2010). However, the common denominator in all these researches is that they investigated small scale, locally governed commons.

Contrary to local and regional commons, there has not been much research on global commons. Research on the possibility of extending Ostrom's framework onto global commons is out there. Stern (2011) argues that strategies for small scale commons do not necessarily transfer directly to global commons. For example, strategies such as defining boundaries for resources as well as who can make use of it under what conditions will be impossible to establish in a global commons. Therefore, empirical evidence that supports Ostrom's claim that it is possible to achieve a successful commons on a global scale is still lacking.

Araral (2014, p. 17) contends that, while Ostrom has significantly contributed to the research field on the commons, actually her criticism on Hardin is in need of some revision; if we look at some of the large scale commons and their deterioration, and at the fact that competing actors with different interests are unable to come to terms with each other and come up with effective measures to deal with the problems, the only conclusion can be that Hardin's pessimism is spot on in the case of large scale, national, and global commons. That is, users are unable to overcome their self-interest. This observation gives us the opportunity to delve into several philosophical strands, to see whether they can provide us with the key to solve global commons problems, such as climate change.

3.4 The tragedy of the commons from a game theoretic perspective

Several game theorists have argued that the situation of the commons can be characterized as a game. According to game theorists cooperation is necessary for reaching a point of sustainable use of the environment (Dodds, 2005, p. 415). And, since game theory depicts situations in which players come to cooperation it is supposed to be well suited for this type of problem. Dodds (2005, p. 412-414), for example, gives two reasons why game theory is the right fit for dealing with a tragedy of the commons. First, it is able to elucidate (aggregate) human behaviour. Second, game theory assumes that users will strive for the best solution for themselves. Game theory thus makes use of the same line of argumentation as Hardin does. That is, in game theory there are outcomes, and each player has a rational ordering in preference over the outcomes (De Bruin, 2005).

However, as De Bruin (2005, p. 201) argues, rationality is linked with self-interest, whereas morality is linked with justice and fairness. As a consequence, what is rational and what is moral are two different things. Or to put it another way: “Where rationality may be equivalent to the satisfaction of individual desires, morality takes care of the desires and well-being of all” (De Bruin, 2005, p. 201). In the next paragraphs I will argue that that, indeed, we are in need of an extension of morality (as originally proposed by Hardin), rather than a framework that will create a rational outcome.

3.5 A different direction for the debate

So far it has been argued that even though Hardin’s thesis has received valid criticism, it still holds in the case of global climate change. That is, it is yet to be refuted. That is not to say that in the case of climate change it is impossible to establish mutual coercion. However, so far no adequate form of cooperation has been established (Araral, 2014). Both Ostrom’s and Hardin’s work run into the problem of establishing cooperation. Hardin argues that people are self-interested, and that they will only stop their gain-maximizing if they are assured that other people will also agree to stop their gain-maximizing. This assurance can be based on (mutual) coercion, or privatization. The latter solution, we already know, will not work in the case of climate change, if we think of it as a form of pollution. Ostrom’s argument entails that people can behave reciprocally, and not necessarily out of self-interest. However, here the problem with cooperation in global commons is that there are many participants, which makes it difficult to agree on rules, as well as many different cultures, which make it difficult to find a shared understanding.

Whether one calls it mutual coercion or cooperation seems rather irrelevant. Both strands in the debate of the commons should be able to facilitate an environment in which trust can be established. Therefore, the next sections will explore several philosophical strands to see whether

they are able to provide us with the key to solve global commons problems, such as climate change. In these sections commons users are distinguished as individual citizens, as well as states. Corporations are not taken into account in this framework; it is assumed they fall under the jurisdiction of states. Therefore, states have the possibility to lay down conditions in order to regulate corporations' behaviour that affects the climate.

3.6 Realism versus cosmopolitanism

Nordgren (2016, p. 1044) criticizes the idea that states are unwilling to mitigate climate change, since it is not in their self-interest. Instead, he explores the possibilities that it is individually rational for states to mitigate. He basis his thesis, amongst others, on Green (2015, p. 2), who argues that mitigation is in the self-interest of states in terms of economic efficiency. Other than economic efficiency, Nordgren (2016, p. 1049) bases his argument on national security, by arguing that mitigating climate change is a matter of self-defense. According to Nordgren (2016, p. 1053) stressing the self-interest of nation states gives a different perspective than the normal view of the commons, as "burden-sharing", since the latter emphasizes a collective obligation. Nordgren (2016, p. 1053) opposes his view of national interest (which should be categorized in the realms of political philosophy as either realism or communitarianism, since his view supports that national obligations should be based on national self-interest), as opposed to cosmopolitanism (burden-sharing).

If it is individually rational for states to mitigate climate change, why do they not act upon it? It seems that the framework of the tragedy of the commons still holds in this case, *contra* what Nordgren (2016) is arguing. Users (states) of the commons know it is in their interest to mitigate climate change, but are unable to come to cooperation.

Apart from the flaw in argumentation, there is another problem with Nordgren's analysis. Arguing from a national interest perspective, instead of a collective obligation perspective, narrows the possibilities in our thinking about solutions. We already know the problem, or tragedy, of the commons is a problem of cooperation and trust. Debating the commons problem from a cosmopolitan point of view enables us to think of each and every user as equals and members of the same community. While, if we argue from a national interest standpoint, we pit users against one another. If we wield this kind of framework, it will make users want to defect more so than if we wield a communitarian framework. It is easier to cooperate with users that one (potentially) trusts, users that belong to the same community. As has been stated previously, user can refer to a state as well as a citizen. Nordgren addressed states. However in the next sections we will only refer to users as citizens, since we are talking about a community, and about autonomous people that are able to form structures.

3.7 Is it possible to establish a sense of community among global commons users?

So far this thesis has argued against a realist perspective. Furthermore, a cosmopolitan perspective would suit cooperation amongst commons users (citizens) better. But can we expect these users to reduce their use of the commons?

According to Johnson (2003, p. 272), the common view with regard to individual ethical obligations in use of the commons has a Kantian aspect to it (every user should restrict his access to the commons to a level that is considered sustainable as long as other users reduce their use in a similar way, irrespective of how other users act), and consequently deduces individual actors to one of many, whilst they can act for and by themselves.

Instead of focusing on individuals, Johnson (2003, p. 286) argues for a focus on structural changes on a socio-economic level that will change aggregate behaviour, since its significance is greater. Of course, this would also help. However, this does not mean we can exonerate all individuals. Johnson disagrees by arguing that there is no point in unilaterally restricting one's use of the commons, since there is no reasonable expectation that this action has any significance (Johnson, 2003, p. 275). One can see where Johnson is coming from. It is rational for an individual user to keep making use of the commons, especially since he has no guarantee that other users will refrain from making use of the commons. However, Johnson's argument is based on a false premise. According to Johnson (2003, p. 275), users of the commons can only communicate with each other by either increasing or reducing use of the commons. This seems rather silly. Why would it not be possible for users to communicate to each other that they, for example, consider switching to green energy to mitigate climate change? Hourdequin (2010) offers the same point of criticism. Before exploring her critique further, I will first give an outline of her argument.

3.8 The link between individuals and their community

Hourdequin (2010, p. 444) argues that it is through moral integrity that we can establish whether it is right or wrong for an individual to exploit the commons. However, moral integrity does not necessarily challenge the presuppositions of collective action problems, since these distinguish between one the hand what is rational for an individual, and on the other hand what is rational for society as a whole. According to Hourdequin (2010, p. 444) the gap between individual and collective action can be bridged through the relational perspective, which is based on Confucian philosophy.

According to Hourdequin (2010, p. 452) commons problems presuppose that individual actors act from a rational economic perspective, and therefore, they will not influence the way they think about each other (in terms of morality). This goes right against Confucian morality, which thinks of an

actor not as a rational individual, but rather as a self in relation to others (Hourdequin, 2010, p. 452). Furthermore, according to Confucian philosophy, individuals learn from one another, by looking at what constitutes moral behaviour (Hourdequin, 2010, p. 453).

Rather than the mutual coercion that Hardin proposes, the Confucian model argues for a moral change in individuals; collective action problems are unsolvable via only incentives aimed at rational individuals (Hourdequin, 2010, p. 454). According to Hourdequin (2010, p. 454) many people view and act not only as a rational economic actor. People in also base their decisions on social consequences, or how they will be perceived by other people. A choice to overexploit the commons, for example by driving an SUV, sends a message to other people. When a moral community has been established, with members who feel a connection to that community, those members will react morally to these types of messages (Hourdequin, 2010, p. 454).

Hourdequin (2010, p. 455) argues that conceptual models such as the commons, in which people are individual economic actors, driven only by economic incentives, will not nurture an environment in which people will act in a moral way. From this standpoint it is possible for people to encourage each other to not overexploit the commons, and continuing this line of argument, a critical mass can be established, which can persuade hard core exploiters to act otherwise (Hourdequin, 2010, p. 456). Or, to put it differently: “Since philosophical and economic characterizations may produce the very kinds of persons they describe, we should consider carefully the heuristic value of thinking about our climate change obligations in a traditional collective action context” (Hourdequin, 2010, p. 456).

3.9 Individual reductions and communication

In his response to Hourdequin’s criticism Johnson (2011, p. 148) concedes that he mistakenly wrote that the only incentive that users of the commons have is to maximize their benefits from its use. Instead he now argues that the analysis shows that users will behave in a gain-maximizing way, when the rules of the commons apply. The rule that is important in this argument is that the only form of communication that users have is either through reducing or increasing their use of the commons (Johnson, 2011, p. 156). The difference with his previous article, Johnson (2011, p. 149) argues, is that in his previous formulation, it would not have been possible to deduce lessons from the tragedy of the commons, since his previous formulation presupposes that users are completely self-interested, no matter what the conditions are. In the new formulation a collective action analysis shows that:

... given the two assumptions about the way players interact, one should expect a Tragedy of the Commons unless one makes an unrealistically optimistic assumption about human motivation. The tragedy is to be expected when normal people are confined by a structure that prevents them from acting successfully to secure the common good. (Johnson, 2011, p. 149)

However, in his new formulation Johnson still does not take into account that it is possible for users to communicate in other ways than by reducing or increasing their use of the commons. Also, Johnson does not refute Hourdequin's argument that users can view themselves as members of a community, and therefore are able to judge each other morally. Johnson (2011, p. 149) still adheres to his view of humanity, by arguing that no, people are not intrinsically selfish, but yes, they are only willing to cooperate if they are assured that others will not defect. And furthermore, the unilateral reductions that Hourdequin proposes will not ensure that others will not defect (Johnson, 2011, p. 149).

Johnson (2011, p. 150) argues that his ideas are supported by Ostrom's work, since in her case studies there were no instances where a tragedy (or rather, drama) was averted through unilateral reductions. This seems to be besides the point. A very important line of argumentation for Ostrom is that cooperation and mutual trust are important. Hourdequin advocates for a Confucian way of thinking, in which users consider themselves members of a community, and therefore feel not only a collective responsibility, but an individual as well (since these individuals together constitute a community). This seems perfectly in line with what Ostrom considers mutual trust. What Johnson here argues, is a very narrow interpretation of Ostrom's work.

According to Johnson (2011, p. 150), instead of unilateral reductions we need unilateral reductions combined with a richer form of communication. Johnson gives the example of someone riding a bike. It is not clear by riding a bike that someone is doing it in order to reduce climate change; this also needs to be communicated. It is too demanding to expect a unilateral action to communicate this by itself (Johnson, 2011, p. 151). This seems more like a semantic argument, more than anything else. First, it seems odd that if people ride bikes for environmental reasons, they would not talk about it. Sure they would tell at least someone what the reason behind it is. They may not tell it to passing people on the street, but word will get out and it will spread. Of course, the message will not reach everyone in the world, but that is not to say no one will know about it. Second, this is more or less the same as what Hourdequin is arguing. She argues for a sense of community, in which it is possible to morally judge each other. And it is this possibility of judgment which can create an environment in which ecological conscience is nurtured. There is no reason to presuppose that Hourdequin's argument leaves out "richer forms of communication."

The real problem lies in the fact that indeed, as Johnson (2011, p. 151) suggests, there are seven billion people in the world, and it will be difficult to establish a sense of community in them. This relates to Ostrom's findings of the commons; yes, local commons tragedies can be overcome, but this is different for global commons. This relates to cooperation and mutual trust. Mutual trust can be established through a sense of community. It is clear Johnson's argument will not help the debate any further. He does propose richer forms of communication, but on the other hand argues users are unable

to communicate in any other way than via reducing or increasing their use of the commons. So, while Johnson criticizes Hourdequin's argument on some levels, her argument in fact gives more possibilities of exploring other ways to establish other forms of communication, or a community.

Hourdequin disagrees with Johnson's response. First of all, in her framework there is no such thing as a unilateral action that exists in isolation. Her framework instead presupposes that people in fact relate to each other, an opposite view than that of the commons (Hourdequin, 2011, p. 158). Furthermore, Hourdequin (2011, p. 159) argues, Johnson presents a very bleak version of communication; not only will acts seldom be as private as Johnson suggests, even if acts are unaccompanied by any communication the acts by themselves can be communicative.

Moreover, individuals' behaviour can be an important step towards the emergence of norms as well as sanctions, which according to Hourdequin (2011, p. 161) are important factors in a stable situation of the commons that Ostrom describes. Additionally, commons problems happen in situations where there already are norms and morality, and people draw from them in order to deal with a problem (Hourdequin, 2011, p. 162).

So far the Confucian-based argument for a self in relation to others is the best addition to the debate. If we want to establish a framework through which users can find possibilities to communicate (in order to overcome trust issues and start cooperation), founding a sense of community seems a good way to start. There is, however, one criticism by Johnson on Hourdequin's argumentation that is valid.

My goal is not to argue against unilateral reductions, but to make clear that climate change is a moral problem of an unusual and unfamiliar kind. Responding in the usual way – with emphasis on reducing one's individual contributions to the problem – is not morally appropriate. Far from providing a convenient excuse to inaction, my goal is to show readers that they must make greater, and perhaps more difficult, efforts. (Johnson, 2011, p. 155)

3.10 Moving beyond individuals

Indeed, as I have said, a sense of community is a good start. So far however, the focus with respect to community has mainly been individual. According to Treanor (2010) the main focus of environmental virtue literature is personal virtue, which is inadequate for bringing about social change and stopping environmental crises. Instead, Treanor (2010) proposes to focus on public virtues, since these enable individuals to flourish, as well as that they are complementary to more traditional environmental virtues.

Treanor (2010, p. 13) argues that there is no sharp distinction between public and personal virtues since individuals are social beings, and thus part of a community. However, both types of

virtues contain a different emphasis. Public virtues primarily focus on the well-being of a community, whilst personal virtues are mainly applicable to personal well-being (Treanor, 2010, p. 13).

Environmental problems are often the result of an agglomeration of individually insignificant actions and, as such, they usually require solutions that address collective action. Collective action, in turn, requires political leverage. Thus, community relationships, institutional structures, and political will all have an important role to play in responding to environmental crises. (Treanor, 2010, p. 14)

According to Treanor (2010, p. 16) it is in this community where people can set (virtuous) examples for one another, as well as where people can argue and confront each other about the choices they make. As Treanor (2010, p. 17) puts it, the mutual coercion that Hardin proposes will not enforce itself. The same goes for Ostrom's cooperation.

The advantage of this republican point of view is that, apart from being a response to climate change, it argues for the need for humans to be politically and socially active (Treanor, 2010, p. 22). Or, in other words, a human being needs to flourish as a member of a community (Treanor, 2010, p. 22). This differs from ecological citizenship, where citizens have political obligations to one another as a consequence of ecological space scarcity (Dobson, 2006, p. 448). Ecological citizenship presupposes a different view of citizenship and political obligation than does traditional republicanism. As Dobson states: "Political obligation between citizens is generated, in my conception, by the requirements of justice under conditions of ecological space scarcity" (Dobson, 2006, p. 448). However, as Dobson (2006, p. 448). argues, ecological citizenship does not exclude traditional political obligations (such as obligations of the ruled towards the ruler), but rather is something different that exists alongside of it.

Barry and Smith (2008, p. 1) also argue for the compatibility of republican ideas with several principles of green politics: active citizenship as a form of stewardship, a democratized and decentralized state that promotes sustainability as a common good, and a connection between future and present generations. As they state:

We believe that emphasising the republican strains native to the political cultures of western liberal democracies could help to create a political environment more conducive to green politics and policy, and allows greens to offer an 'immanent critique' of the current unsustainable development paths being followed by western societies in a language comprehensible to the majority of its citizens. (Barry and Smith, 2008, p. 1-2)

The republican point of view is in fact not much different than the Confucian-inspired way of thinking that Hourdequin proposes, where individuals learn from one another what constitutes moral behaviour. That is to say, both strands of thinking argue the individual only exists in relation to a community. Of course, the upside of republicanism with regard to Confucianism is that it does not need to account for a hierarchy in relations.

3.11 Experimental research suggests that a sense of community just might do the trick

Hardin (1968, p. 1246) argues that we cannot control mankind's conscience with regard to using (or limiting the use of) the commons; thus an appeal to conscience will not work. Hardin is against an appeal to responsibility; on the one hand, this kind of appeal implies condemnation if one does not act accordingly to what is expected, but on the other hand, if one does behave accordingly, it implies that others can willingly continue to exploit the commons, whilst the responsible ones stand aside as "simpletons" (Hardin, 1968, p. 1246). Or in other words: "It [responsibility] is an attempt to get something for nothing" (Hardin, 1968, p. 1247).

This is a rather pessimistic view of the human race and goes against the case I have made for philosophical strands that argue for a sense of community. However, it is not surprising. Previously in this chapter I have argued that Hardin has a view of people as rational players, who think only in terms of preferences. However, experimental studies suggest that the theoretical argument for a sense of identity provides for a potential solution.

When users (in an experimental set-up) have the possibility to anonymously make use of a commons they will take as much as they need, as long as the commons are replenished (Kramer & Brewer, 1984; 1986). Kramer and Brewer (1984) show that if the common resource is depleted a common identity can help users overcome their incentive to hoard the resource for their own use in favour of collective welfare. They arrive at this conclusion through an experiment with two different groups. In the first group members received a group identity, whereas in the second group members received a differentiating group identity. The mean intake of the second group was higher than the first group's (Kramer & Brewer, 1984). Or, to put it another way: "In general, individuals in heterogeneous groups were found to be more likely to exercise personal restraint in their use of an endangered common resource when a superordinate group identity, corresponding to access to the resource, was made salient" (Kramer & Brewer, 1984, p. 1055). In their later research Kramer and Brewer (1986) exposed different groups to either a commons dilemma (where a user takes from a resource) or a public goods dilemma (where a user contributes to a resource). As far as the groups were small and the dilemma was framed as a commons dilemma (or both) their findings were consistent with their previous research (Kramer & Brewer, 1986, p. 548). What is interesting is that Kramer and Brewer (1986, p. 549) found that in large groups there was a difference between a commons and a public goods dilemma. In the former the effect of a common group identity was much stronger than in the latter. To be more precise:

For subjects in the commons dilemma structure, self-restraint increased under collective identity conditions, in comparison with individual identity conditions, and this effect was strongest when group size was large. This held true even though expectations of reciprocity and overall confidence in one's own ability to influence outcomes were low in the large-group-collective condition. Thus, in the commons dilemma setting, subjects were apparently responding more to

the salience of collective loss than to the diffusion of risk in the large-group situation. (Kramer & Brewer, 1986, p. 549).

3.12 Reductionist theories versus rights-based theories

Even though so far this chapter has argued for the need of the establishment of a sense of community in order to overcome the tragedy of the commons with regard to global warming, actions by individuals or users (of the commons) have been emphasized. Scavenius (2016, p. 54) distinguishes two strands of theories in climate politics. First, there are reductionist theories. Amongst others, Hardin's tragedy of the commons falls into this category. Reductionist here means "... that the account of agency and rationality does not appreciate social, institutional and political explanatory factors: everything can be explained by individual rational agency" (Scavenius, 2016, p. 54). Second, there are rights based theories, whose task it is "...to apply the explicit moral principles that ought to guide climate politics" (Scavenius, 2016, p. 54).

My revision of the tragedy of the commons shows that it is in fact possible to argue from a commons perspective and take factors other than rationality into account. Nonetheless, let us review the case that Scavenius makes for rights based theories. According to Scavenius (2016, p. 55), her revision of the problem of the commons, by viewing it from a rights-based perspective, is able to view a commons problem as a question of who has a right to access to the commons, rather than the traditional, reductionist, view, which views it as a question of economic incentives.

Scavenius (2016, p. 57) contends that the perception of climate change as a wicked problem can be turned inside out; viewing it as a resource problem, to which access can be limited, makes it manageable. From there on, Scavenius (2016, p. 58) continues, can we come to policies that protect commons and distribute access to them in a fair way.

First of all, one of the problems with climate change, or pollution for that matter, was already formulated by Hardin. Air cannot be fenced off. This seems like a simplification. Yes, restricting access would make it manageable. However, from the moment you start to restrict access you will run into the same problems as you would with any type of commons. What kind of restrictions will users agree to? Will they abide by these rules? How are we able to punish users who cheat? Can we even properly check who cheats? So, in this sense, the idea that air cannot be fenced off is not so much a simplification.

What is interesting about Scavenius's argument, is that she is the first author in the field of commons literature who calls climate change a wicked problem. As has been explained shortly in the introduction, and will be explained in more detail in the next chapter super wicked problems share four characteristics that make them different from other kinds of problems. For now it is important to

remember that the key to solve a super wicked problem lies within the fourth characteristic, hyperbolic discounting (humans prefer the quicker, less paying reward over the richer but slower-paying reward (Ainslie, 2005)). Scholarship on hyperbolic discounting has remarked that individuals as well as firms who are aware of hyperbolic discounting are also able to neutralize it. Levin *et al.* (2010, p. 8) propose a strategic policy instrument, focused on path dependency scholarship, in order to intervene in such a way that path dependent processes can be triggered and nurtured.

One can easily draw the analogy between hyperbolic discounting and commons users who keep “adding cattle to their herd.” On a short time horizon, this is the smart thing to do. However, in the long term it will lead to overuse of the commons. This chapter has argued for the establishment of a sense of community amongst commons users. Despite the fact that the commons debate does provide us with a potential solution, there is one important theoretical setback. In the case of a global commons, empirical research has shown that it is difficult for users to come to reciprocal behaviour and overcome their short-term self-interest. It remains to be seen whether a sense of community would facilitate reciprocal behaviour worldwide. That is, the commons debate provides a theoretical way out, but the question remains whether it is (politically) feasible in real life. It is with super wicked problems and its use of a strategic policy instrument that we have the possibility to look for viable political alternatives. What is especially interesting, and will be further explained in the next chapter, is that the concept of a super wicked problem provides the option of building a larger population who adheres to certain principles. This makes it more robust than the appeal to a community that has so far been made.

Chapter 4 – super wicked problems

As has been shown in chapter two, there are many scientific grounds to argue that climate change poses a serious threat to the future of our way of life. In this chapter I will explore to what extent we could benefit from the use of the literature on (super) wicked problems, and to what extent it provides fruitful solutions.

First, I will explain where the concept of super wicked problems comes from. I will explain in detail what the concept entails and in which academic fields with regard to climate change it has been used. I will argue that it is a downside that the creators of the concept did not propose a strategy to deal with wicked problems. From there, I will argue that the development of the concept into super wicked problems has filled this gap through the seminal article written by Levin *et al.* I will explain in detail how they propose to tackle super wicked problems, by explaining first the scenario based approach and second applied forward reasoning. Then I will criticize some aspects of applied forward reasoning, as well as some general aspects of the use of path dependency. I will argue that even though path dependency has brought the academic field of (super) wicked problems further with regard to potential solutions, in the end its logic can lead to potentially detrimental consequences.

4.1 How can we define a wicked problem?

Rittel and Webber (1973, p. 155) signal increasing protests by the publics against designed governmental programs. Previously professionals were able to do a good job of solving problems such as city planning and construction, problems that are “definable, understandable and consensual” (Rittel & Webber, 1973, p. 156). Now however, these problems have been fixed, which leaves us with more difficult problems, that are not to be measured through efficiency. Rather, the publics are interested in what way solutions influence equity (Rittel & Webber, 1973, p. 156). According to Rittel and Webber (1973, p. 160) an important reason why the publics are protesting against professionals is that the latter built their programs based on the paradigm of science and engineering. That is, professionals assumed they would be able to solve societal problems with applied science, based on the idea of efficiency. However, societal problems are in need of a different kind of solution, since they are “... inherently different from the problems that scientists and perhaps some classes of engineers deal with. Planning problems are inherently wicked” (Rittel & Webber, 1973, p. 160).

Rittel and Webber (1973, p. 160) were the first to coin the term “wicked problem”. They claim that societal problems are by nature distinct from, for example, problems in natural science, since the latter may have findable solutions. Thus, societal problems, or wicked problems, are ill-defined and are dependent on elusive political judgment. Wicked problems share at least ten characteristics (Rittel & Webber, 1973, p. 160-167).

The first characteristic is that there is no definitive formulation of a wicked problem. That is, for someone who is trying to solve the problem it is impossible to have complete information on it. In fact, the solution depends on how one understands the problem. In other words, it is impossible to definitively formulate a wicked problem, since each specification of the problem is also a specification of the direction for a treatment.

Relatedly, wicked problems have no stopping rule. Similar to the absence of criteria for sufficient understanding of a wicked problem, there are also no criteria as to whether the problem is solved, or treated. Furthermore, in trying to resolve a wicked problem, one can decide to stop when one considers the resolution sufficient, or sufficient enough considering certain limitations.

Furthermore, whether a resolution is sufficient is judged normatively. That is, it is not decided whether a resolution is correct, but rather whether it is a satisfying or good solution.

Fourth, a solution for a wicked problem cannot be tested beforehand; an implementation of a solution always has consequences over a protracted amount of time. Furthermore, these consequences may be different from what was originally intended.

Once a solution has been implemented it leaves a considerable mark that cannot be undone. In other words, there is no possibility to learn by trial-and-error. Consequently, if one tries to reverse a decision that has had a negative impact, one will create with that decision other irreversible effects that may pose another set of wicked problems.

The sixth characteristic of a wicked problem is that there is an infinite amount of potential solutions, as well as permissible executions of these solutions, to handle a wicked problem. There are no rules that account for every situation possible in social policy.

Even though there is an array of potential solutions, every wicked problem is unique by nature. A current problem may share many characteristics with a previous problem. However, it is always possible the current problem has a characteristic which distinguishes it from the previous problem that is of great importance.

Apart from the fact that a wicked problem is unique in its nature, it can also be viewed as part of another problem. A problem here is the difference between the current state of affairs and the state of affairs as we think it ought to be. For example, suppose we want to reduce child obesity. We may think that if we provide children with healthy food we take away the cause of obesity. However, we can also consider child obesity as a symptom of a higher level problem, such as poverty. The higher the level of the problem, the more difficult it becomes to solve, since it becomes more general. However, curing the symptom is not the same as curing the real problem, and therefore one should try to solve the problem at the highest level possible.

Additionally, what the wicked problem exactly is, is up for debate. An explanation has to be chosen, and this in turn shapes the nature of the resolution of the problem. If we think again of the problem of child obesity it becomes clear that there are different ways in which to view, and consequently resolve the problem. We could think of child obesity as a lack of money for healthy food, easy access to junk food, a lack of exercise, etcetera.

The final characteristic of a wicked problem relates to the people who are responsible for its resolution. Different from science, where scientists are not blamed for a refuted hypothesis, this type of immunity does not exist for planners in social policy. They can be held accountable for the consequences that stem from their solutions.

To sum it up, a wicked problem is defined by unidentifiable causes and a lack of outlines, which make its nature problematic. In trying to resolve a wicked problem one gets stuck in the ambiguity of its causal webs. Furthermore, Rittel and Webber (1973, p. 167) add that potential solutions face another obstacle, namely the increasing pluralism of the publics, whose valuations differ and contradict each other.

4.2 How has the concept of wicked problems been used with regard to climate change so far?

Now that it is clear what constitutes a wicked problem we can look at its usage with regard to climate change. Many authors have argued for viewing climate change as a wicked problem. Pollit (2015, p. 181) for example, gives four reasons. First, it has an effect on a variety of policy sectors. Second, climate change consists of several sub-problems, which can be framed in several ways. Third, the consequences of climate change will be felt primarily in the future, which makes it hard for politicians to address. And finally, climate change will have a different impact on different regions in the world.

Pollit (2015, p. 184) argues that academic public management could make useful contributions in four areas of the climate change debate. First, it could contribute to the multidisciplinary debate of policy implementation. The second area of debate it could be of use is multi-level and horizontal government. The third option is network management and partnership. The fourth potential area of research is citizen attitudes and beliefs, and the involvement of citizens in public services.

Other scholars have also proposed the use of the concept of wicked problems in tackling climate change. Thompson and Whyte (2012) explore the possibilities that the wicked problems framework offers environmental philosophers, based on the idea that solutions to wicked problems can only be found through an interdisciplinary approach. Palmer (2012) uses wicked problems as a concept to assess environmental risk governance in the European Union. Furthermore wicked problems have been used to assess to what extent international boundary organizations in climate

change face difficulties when the demarcation between science and politics becomes blurred (Hoppe *et al.*, 2013).

From these examples we can conclude that the concept of wicked problems is used by several academic fields. This is partly a consequence of the fact that Rittel and Webber do not provide us with a tactic to tackle wicked problems, they merely signal that they exist and that they are difficult to solve. Another seminal article in the field of wicked problems was written by Levin *et al.* (2010), who do provide us with a solution, based on path dependency.

I will explain the argument by Levin *et al.* (2010) in the next section. For now it is important to note that their use of path dependency in tackling climate change has had a follow-up by other authors. Dewulf and Termeer (2015) use the concept of a wicked problem in association with the consequences climate change has on densely populated delta areas. They make use of adaptation tipping points and pathways. Varone *et al.* (2013) also make use of path dependent processes in order to analyze state action based on the concept of functional regulatory space. And finally, Lazarus (2009) proposes climate change legislation that is able to circumvent the four additional features that make a wicked problem super wicked, as described by Levin *et al.* (2010), by including institutional design features that shield its implementation from powerful political and economic interests.

4.3 From a wicked problem to a super wicked problem

According to Rittel and Webber (1973, p. 160) nearly all public policy issues can be defined as wicked problems. This is also acknowledged by Levin *et al.* (2010, p. 4), who expand the notion of wicked problems by introducing the term “super wicked.” They argue that a new class of global environmental problems can be considered super wicked problems, and these super wicked problems have four additional key features that are not present in wicked problems (Levin *et al.*, 2010, p. 4). First, there is a lack of time. Second, in order to address the problem a central authority is required. However, this authority is weak or non-existent. Third, the ones who try to solve the problem are also part of its cause. And fourth, as a consequence of hyperbolic discounting (humans have a preference for the reward that arrives sooner rather than later, *ceteris paribus*) addressing the problem is pushed into the future while quick actions need to be undertaken in order to come to long-term solutions.

These key features challenge traditional policy analysis techniques, since these techniques usually assume that preferences are fixed and thus concentrate on short-term self-interest (Levin *et al.*, 2012, p. 139). The problem with these techniques lies in the fact that they think of human behaviour in a very limited way, and as a consequence, are unable to not only explain the tragedy of super wicked problems, but are also inadequate in formulating an effective policy response (Levin *et al.*, 2012, p. 139).

The first key feature, a lack of time, entails that the problem at a certain point will either be too critical or irreversible, whilst many public policy processes are fashioned into a way of achieving compromise, which does not fit into the time running out frame (Levin *et al.*, 2010, p. 6). In no other case than climate change is the idea of time running out more present according to Levin *et al.* (2010, p. 6), who claim that significant impacts will happen and the problem will become more pressing; each year as we stand by the chances of non-reparable harm increase, as well as dangers to communities and ecosystems.

Furthermore, a super wicked problem is characterized by the lack of central authority, which comes down not only to the general problem of lack of cooperation in an anarchical, global system, but also to the fact that other factors than policy choices influence the impact on climate change (Levin *et al.*, 2010, p. 6-7). There are multiple actors as well as (policy) levels that in some way contribute to the problem of climate change. For example, states have a certain amount of influence, but so do different economic sectors (Levin *et al.*, 2010, p. 7).

Additionally, super wicked problems are different from other policy problems, in the sense that the ones who try to solve it are also causing it. In the case of climate change, it is impossible to escape making a contribution to it (Levin *et al.*, 2010, p. 7). For example, even if one would switch from a car run on fossil-fuels to a car run on electricity one would still emit greenhouse gases in daily activities.

The final feature that challenges traditional policy techniques is hyperbolic discounting, which reflects a situation in which decision makers (as well as the general public), are likely to base their decisions on very short time horizons, thereby neglecting important evidence (Levin *et al.*, 2010, p. 7). Hyperbolic discounting can be viewed as a human characteristic where people prefer the quicker, less paying reward over the richer but slower-paying reward (Ainslie, 2005). Therefore, as Levin *et al.* (2010, p. 8) explain, hyperbolic discounting is irrational and should be prevented.

The solution for dealing with super wicked problems presented by Levin *et al.* (2010, p. 8) is focused on the fourth key feature, hyperbolic discounting. That is, a super wicked problem requires immediate action, and hyperbolic discounting delays addressing the issue. Scholarship on hyperbolic discounting has remarked that individuals as well as firms who are aware of hyperbolic discounting are also able to neutralize it (Ainslie, 2005). People are able to overcome hyperbolic discounting, and hence choose the larger reward, by looking at the choices that they make as predictors of what kinds of choices they will make in the future. That is, when people think of their choices as future predictions, the logic by which they choose becomes much like a prisoner's dilemma, and this, consequently, stimulates choosing the larger, later reward (Ainslie, 2005, p. 650).

By this logic, Levin *et al.* (2010, p. 8) propose the use of path dependency to neutralize hyperbolic discounting, through developing a strategic policy instrument which makes it possible to intervene in such a way that path dependent processes can be triggered and nurtured. That is, we should deal with super wicked problems in such a way, as they call it, to bind “our future selves” (Levin *et al.*, 2010, p. 8). They base their thesis on Bernstein *et al.* (2000), whose basic argument is that applying the logic of social science probabilistic prediction is difficult. That is, usually the theoretical toolkit for fields as political science or international relations is based on research on “single-issue regimes with clear goals (e.g. liberalize trade, protect endangered species, limit known ozone depleting chemical with known effects) and analyses have been designed to uncover generalizable explanations for regime creation, change or effectiveness” (Levin *et al.*, 2010, p. 8). Before further delving into Levin *et al.*’s argument, I will first explain Bernstein *et al.*’s (2000) argument in more detail.

4.4 The analogy between physical and natural phenomena in social science is false

Bernstein *et al.* (2000, p. 44) contend that social science theory is unable to come up with a framework which can be used to develop an understanding of the world. Even more so, social science theory is often unable to make accurate predictions. Therefore, they maintain that the usual analogy in social science between physical and social phenomena is incorrect and, in fact, evolutionary biology provides for a more useful analogy (Bernstein *et al.*, 2000, p. 44).

Bernstein *et al.* (2000, p. 45) argue that applying the logic of physical science to social science does not go well, since most predictions are probabilistic. In international relations it is often too demanding to make predictions, since there is a lack of consensus on definition and measurement of the concepts, which is not in the last place a consequence of the arbitrary nature of concepts. Furthermore, even if problems of definition and measurement could be overcome, international relations would still have difficulties with statistical analysis, since it is nearly impossible to organize samples of comparable cases (Bernstein *et al.*, 2000, p. 46).

Regularly, in international relations the strategy for theory building is backward looking, in an attempt to build deductive, nomothetic theory. The standard form of a deductive-nomological model is as follows: given A, B and C, if X then (not) Y. Here the conception of causality requires empirical invariance under specified boundary conditions (Bernstein *et al.*, 2000, p. 48). Bernstein *et al.* (2000, p. 47) argue against this type of theory building, since they believe that one is unable to analyze the most interesting social outcomes through the lens of law-like relationships, since social relations are not clock-like, because actors’ behaviour is not fixed. All social systems are open systems; they can be influenced by external stimuli, and hence their structure and causal mechanisms evolve (Bernstein *et al.*, 2000, p. 48). To put it another way, social science in its current deductive, nomothetic form not

only generates a false certainty, but also generates big generalizations that have a low level of policy relevance (Bernstein *et al.*, 2000, p. 71).

Instead, Bernstein *et al.* (2000, p. 50) view the study of international relations as more akin to evolutionary biology; both are unable to predict phenomena, tendencies, or system transformations. The upside is that both "...can attempt to develop theories of process to organize our thinking about the past" (Bernstein *et al.*, 2000, p. 50).

Since evolutionary biology is constructed by a myriad of forces and more or less random events whose interaction cannot be modelled, scientists that study it do not strive for prediction, but instead focus on advancing theories that disclose the process and past of evolution (Bernstein *et al.*, 2000, p. 70). Theories of structure and process would be unable to appropriate some of the most important elements of influence for political outcomes because, as in evolution, they would have been incapsulated in any of the theories (Bernstein *et al.*, 2000, p. 70).

4.4.1 What is a scenario based approach and what does it look like?

Instead of physics, biology provides for a more alike analogy for international relations if we want to identify chains of contingencies that possibly shape the future (Bernstein *et al.*, 2000, p. 53). Therefore Bernstein *et al.* propose a scenario based approach, in which scenarios are "...narratives with plot lines that map a set of causes and trends in future time" (Bernstein *et al.*, 2000, p. 53). Rather than predictions, scenarios are based on a distinction between what we believe is relatively certain and what we think is uncertain, and consequently, they give us different narratives in which way the future may unfold (Bernstein *et al.*, 2000, p. 54). This is different from usual international relations theory development; there one already knows a certain single outcome, and then all one has to do is determine which of several theoretical perspectives "fits" best. Rather, the development of different scenarios enables us to identify driving forces and from thereon to see where these forces fit in the picture of a logical chain, which in turn spawns a range of outcomes, instead of a single future (Bernstein *et al.*, 2000, p. 54). According to Rosell (1999, p. 126), a good scenario is a logical chain that relates "drivers" to outcomes, as well as an hypothesis as to how the future may turn out.

Scenario based forward thinking exists of seven steps, those being determining driving forces, establishing predetermined factors, determining crucial uncertainties, advancing scenarios with clear "plot lines", excerpt early indicators for every scenario, take into consideration the ramifications of each scenario, and finally, develop "wild cards" that are not a component of any of the scenarios, but could potentially change the situation greatly (Bernstein *et al.*, 2000, p. 55).

As has been stated, in the first step we determine driving forces, which are "... the causal elements that surround a problem, event or decision" (Bernstein *et al.*, 2000, p. 55). They are the basis of several connections and outcomes, which can exist in different combinations.

The next two steps are closely linked, since they entail establishing first what seems certain, and second what seems uncertain (Bernstein *et al.*, 2000, p. 56). The fourth step brings these predetermined factors and crucial uncertainties together, by describing their possible interactions with driving forces, thus generating different story lines (Bernstein *et al.*, 2000, p. 56).

After that it becomes clear what the early indicators, or in other words, the observable and measurable attributes, of the political situation are. Consequently here we can start to see which scenario will unfold (Bernstein *et al.*, 2000, p. 57). Here we can ask ourselves the following question: "If a particular set of driving forces were to become most important and lead to a given scenario, what would be some of the early indications that events were indeed unfolding along that particular path and not along another?" (Bernstein *et al.*, 2000, p. 57).

Subsequently, looking at the ramifications of each scenario helps decision-makers to think about different unintended consequences of their decisions. Here decision-makers should ask themselves what they would do in a world different from the one they envisaged with their plans, and consequently, they have to let go of the single point forecast, which theory-based prediction usually compels them to (Bernstein *et al.*, 2000, p. 57).

Lastly, we look for wild cards. These are either events or actions which can drastically change the narrative plot lines, and exist out of an array of possible options (Bernstein *et al.*, 2000, p. 58). A wild card might hold an extreme value on an already known independent variable. Or it can be a whole new event that one would not expect based on standard social science arguments

To sum the scenario based approach up, we begin with identifying several factors of which we think they are most crucial to the future of a political relationship (Bernstein *et al.*, 2000, p. 58). From there on, we distinguish between most certain and most uncertain factors. Factors are weighed by the properties of value or causal impact, or both. Once the most important crucial causes are established, as well as their possible interactions, these become the basis of various plot lines. One can then establish several possible end-states, on the basis of assigning different values to these factors, or variables (Bernstein *et al.*, 2000, p. 59). These end-states are compatible with existing conceptual frameworks but are at the same time challenging "official futures" (Bernstein *et al.*, 2000, p. 59). This abstract framework can be transformed into causal stories, that entail narrative pathways (Bernstein *et al.*, 2000, p. 59).

4.5 Applied forward reasoning and why it is different from a scenario based approach

Levin *et al.* (2010, p. 9) take the argument for a scenario based approach by Bernstein *et al.* (2000) a step further by arguing that super wicked problems occur in open, non-linear systems. These are systems in which human beings do not only (inter)act in unpredictable ways, but thus also act unpredictably and reflectively to change their environment. Levin *et al.* (2010, p. 9) agree with Bernstein *et al.* (2000), who argue that the nature of super wicked problems makes them unsuitable for applying the backward looking method of prediction, also known as deductive nomothetic theory. Levin *et al.* (2010) apply the notions of Bernstein *et al.* (2000) to wicked problems, and take their argument one step further by not proposing a scenario based approach, but instead focus on “applied forward reasoning.” They base this on Patomäki’s argument;

Forward looking policy analysis ought to be interested in other possible and likely futures, and in determining the ways in which our actions and the actions of others contribute – sometimes via unintended effects and consequences – to making some of them real. (Patomäki, 2006, p. 12)

Levin *et al.* (2010, p. 10) argue that Bernstein *et al.*’s purpose was explanation, not intervention, and therefore they suggest to move beyond Bernstein *et al.* To achieve this, they argue they must use “an applied approach that explicitly links causal analysis to prescriptive solutions” (Levin *et al.*, 2010, p. 10). Or, to put it another way: ‘The purpose of an applied forward reasoning approach is to identify ways in which interventions might lock in particular pathways’ (Levin *et al.*, 2010, p. 10).

As has been explained in section 4.3, Levin *et al.* (2010, p. 8) make use of path dependency in order to neutralize hyperbolic discounting, or in their words to bind “our future selves”. They concede that this can be a tricky operation, since such a policy may require significant interventions with upfront costs when there remain high levels of uncertainty and most severe consequences of inaction are in the far future (Levin *et al.*, 2010, p. 8).

While Levin *et al.* (2010, p. 10) acknowledge that interventions run the risk of leading to unforeseen consequences, they nevertheless suggest an “applied forward reasoning” approach, since it can recognize manners in which interventions might encompass in specific policy pathways. There are many different definitions of path dependence, but there is a shared understanding among path dependence scientists that there are key doings at any given moment that set a system on a specific path (Levin *et al.*, 2010, p. 11).

4.5.1. What applied forward reasoning looks like

Levin *et al.* (2012, p. 129) formulate three diagnostic questions that, when answered in the right manner, will help to overcome the tragedy of super wicked problems. The questions are as follows:

Diagnostic Question 1: What can be done to create stickiness making reversibility immediately difficult?

Diagnostic Question 2: What can be done to entrench support over time?

Diagnostic Question 3: What can be done to expand the population that supports the policy?

(Levin *et al.*, 2012, p. 129)

The first and second question are meant to guide policy makers to create processes that benefit groups who are willing to change their behaviour as a consequence of the policy, thus changing the status quo bias (Levin *et al.*, 2012, p. 130). The third question is aimed at expanding these groups, bearing in mind the need to overcome the lack of authority (Levin *et al.*, 2012, p. 130). The framework of applied forward reasoning is meant to put forward four path dependent causal processes that respond to the questions posed above (Levin *et al.*, 2012, p. 131).

The first causal process is a lock-in, which follows when a policy intervention is implemented in such a way that it is instantly long-lasting, and hence, directly applicable to the first question (Levin *et al.*, 2012, p. 134). In a political system, institutional rules can stand in the way of change, thereby resulting in a lock-in (Pierson, 2004).

The second causal process is called self-reinforcing. This type of causal process is applicable to policy interferences where the costs of reversing the process accrue as time progresses (Levin *et al.*, 2012, p. 135).

The third causal process is closely linked to the second one; here the advantages for an interference, once it has been introduced, also accrue as time progresses (Levin *et al.*, 2012, p. 136). Both the second and third process are relevant for the second question.

The fourth causal process that is described by Levin *et al.* (2012, p. 136) is positive feedback; this process is necessary if one wants to tackle super wicked problems, since it enables one to focus exclusively on the processes that broaden support, and thereby, it is related to the third question.

According to Levin *et al.* (2012, p. 136) answering these questions results in three implications that policy makers should bear in mind. First, they should abstain from triggering policies in which direct interests are involved, which in turn will try to stop enlargement to other populations. Second, policy makers should prevent processes that only benefit the original population, and as a consequence, disable others from joining or benefiting. Third, policy makers

should aim for gaining the support of new populations as long as they do not lose the support of the original population.

Furthermore Levin *et al.* (2012, p. 139-140) distinguish several possible points of guidance based on the diagnostic questions, with the first question generating three points. First, one should profit from what is already, more or less, immediately irreversible. That is, it is important to know in what way durable constitutions and institutions provide possibilities for change and how they affect policy dynamics, as well as how possible windows of opportunity arise from these constitutions and institutions. Second, windows of opportunity sometimes provide us the possibility of obscuring the costs, and hence lock in participation. And third, analysts should focus on several points that could possibly enable a lock-in, rather than focus on the whole legislation in itself.

Levin *et al.* (2012, p. 140) lump the second and third question together, by arguing that analysts should not intervene if it is likely that an intervention will make expansion difficult. Rather, analysts should make clear what kinds of coalitions, with different values, play a role in society, as well as what kind of policy norms exist that regulate behaviour.

4.5.2 The role that norms play in applied forward reasoning

Apart from coalitions on a policy level and creating new interests in line with a super wicked problem, Levin *et al.* place an emphasis on the importance of norms as an answer to questions two and three, either as an initial stimulation, or through the creation positive feedback processes that “generate “logics of appropriateness” uniting and expanding a political community” (Levin *et al.*, 2012, p. 146).

According to Levin *et al.* (2012, p. 146) there are two other main reasons, apart from the fact that norms can create positive self-reinforcing processes, to focus on norms. First, norms can respond to the feature of a lack of a central authority. Second and related, norms can respond to the feature that the ones who try to solve the super wicked problem are also the ones causing it, since norms have a logic that is ever-developing. Levin *et al.* (2012, p. 146) give the example of colonialism; nowadays, almost no society views it acceptable, whereas a hundred years ago it was considered normal.

According to Levin *et al.* (2012, p. 147) it can take years, or even centuries, for norms to change through incremental changes. Therefore, they argue, there should be a momentum. If this momentum is absent, it will be difficult to establish path dependent processes through norms in an effective way, considering the time is running out feature of super wicked problems (Levin *et al.*, 2012, p. 147). From there on Levin *et al.* suggest three types of literature that “... offer guidance on how to unleash values and norms that can trigger swift progressive incremental trajectories” (Levin

et al., 2012, p. 147). These types being organizational strategy literature, research on advocacy coalitions and learning, and research on change and stability of policy subsystems.

Levin *et al.* in fact do not make clear how we move from *inter alia*, a change in norms towards a decrease in temperature. That is, the causal mechanism remains unclear. This is partly because they argue for expanding beyond mainstream policy analysis, and instead focus on "... non-linear and unfolding causal, yet, unpredictable, policy trajectories" (Levin *et al.*, 2012, p. 138). In other words, since they apply the logic of path dependency, or scenario based forward thinking, each situation is completely different for policy makers, and therefore there is no general causal mechanism. Furthermore, they argue it is beyond the scope of their article: "Our point here was not to provide definitive conclusions and policy recommendations, but to call for greater attention on the part of policy scientists and traditional policy analysts to these questions" (Levin *et al.*, 2012, p. 147). Hence, the question remains how we should bring about this change in norms. However, we do know what lies at the heart of a change in norms, and that is neutralizing hyperbolic discounting. That is, people must become aware of the consequences of their actions, in order for them to stop pushing problem-solving into the future. Therefore, in chapter 5 I will make an appeal for responsibility, which can become the foundation of new norms. But before we go to chapter 5 it is important to address another flaw in the super wicked problems argument.

4.6 Path dependency's flaws

Levin *et al.* (2012, p. 146) interchangeably use norms, as well as routines and expectations, and therefore it remains unclear what norms are. Furthermore, the fact that the use of norms is combined with the idea of a momentum is an important flaw in the argument presented by Levin *et al.* First of all, how are we to know whether it takes years or centuries for norms to develop, if we do not know what they are? As long as this remains unclear, it is difficult to go along with the argument that we need path dependency in order for the appropriate norms to develop.

Furthermore, the idea of a momentum suggests that all is lost when the momentum is absent. This is a problem common in path dependency. According to Gáspár (2011, p. 93) path dependency comes in two flavours. First, there is the soft version, which argues that events that occur earlier in time will have an effect on events later in time. Second, there is the strict version, which argues that "... there are contingent events in history that create institutional patterns with deterministic properties" (Gáspár, 2011, p. 93). Jordan and Matt (2014, p. 232) argue that positive feedbacks are self-sustaining, since they arise "... when a change in one direction sets in motion reinforcing pressures that produce further change in the same direction" (Jervis, 1997, p. 125). Furthermore, the accumulation of these effects can ultimately lead to the activity becoming path-dependent (Pierson,

2004, p. 18). That is, it can be very difficult for actors to change their ways once they have chosen certain actions, making past viable political alternatives impossible now (Pierson, 2004, p. 10-11).

If we would go along with the idea that it might take years for norms to develop, we can see how missing a momentum would be detrimental. The ideas and approaches that Levin *et al.* (2010) develop to tackle super wicked problems are extremely useful and different from traditional policy approaches. Knowledge of causal processes is important in bringing about change. However, the idea that everything hinges on a momentum limits our possibilities severely. First, it goes against one of the characteristics of super wicked problems, that time is running out. If we would somehow miss the lock-in of effective climate policy, we would be left with another policy, while time is ticking away. If we follow the argument of Levin *et al.* or path dependency in general, it would take quite some time, if it is even possible, to create a new momentum. Second, a momentum, or path dependency in general, suggests that if we find ourselves on a trajectory that is unable to effectively tackle climate change, there is not much that we can do about it.

So, even though the development of the concept of super wicked problems as well as the approaches that come with it have made an impact on the theoretical development of tackling climate change, so far no adequate answer has been formulated to the theoretical setback of a momentum. I propose, without letting go of the use of causal processes in practice (since they are useful), that we cannot afford to focus only on the creation of a momentum. Apart from the fact that chapter 5 appeals to responsibility in order to overcome hyperbolic discounting, it is also intended as an argument in favour of responsibility, no matter what path we are on.

Chapter 5 – Responsibility

So far I have argued that climate change is dangerous and needs to be dealt with. It can be framed not only as a problem of the commons, but also as a super wicked problem. Through the employment of super wicked problems literature I have explored more practical solutions than those put forward by the commons debate. As the previous chapter has made clear, super wicked problems literature has two major setbacks. First, it can take a long time, perhaps too long, for a momentum for path dependency to be created. Second, the concept of a momentum suggests that when we are not on the right path of dealing with an issue such as climate change, we are void of responsibility. In this chapter I will theoretically explicate that this is not the case, and furthermore I will show under what circumstances we can be held responsible for our actions. Furthermore, the development of the concept of responsibility can form the basis of a change in attitude, the potential solution super wicked problems literature proposes.

In this chapter I will first address brute luck, and its relation to individual responsibility. After I have explicated Vallentyne's argument with regard to individual responsibility, section 5.4 will assess what his framework means for mitigating climate change. From there, Miller's argument is explored, with an emphasis on remedial responsibility and national responsibility. In section 5.10 I will argue for a revision of his argument. Consequently, section 5.11 shows the consequences of Miller's (adapted) framework for mitigating climate change. After that, the argument by Braham and Van Hees is presented, who criticize Vallentyne and Miller by arguing that it is possible to assign value to actions compared to other actions. Then in section 5.13 the implications of the argument that has been made throughout this chapter are assessed. In the final section I suggest, based on the idea that this chapter convincingly argues that individuals are not exempt of responsibility, some ways of moving forward from here.

5.1 Brute luck and compensation

Dworkin (2002) argues for the compensation of brute luck, in order to come up with a situation where there is an equality of resources. He thereby distinguishes two types of luck (Dworkin, 2002, p. 73). The first is option luck, and is a matter of how intentional and calculated gambles turn out. That is, someone who gambles accepts the possibility of losing and the consequences that go with it. Second, there is brute luck, which can be considered a situation where no intentional gamble was made, but still risks turn out a certain way. Insurance links the two types of luck, since deciding on buying insurance can be considered as a calculated gamble in order to reject catastrophe (Dworkin, 2002, p. 74).

Someone who is born with a serious handicap faces his life with what we concede to be fewer resources, just on that account, than others do. This circumstance justifies compensation, under a scheme devoted to equality of resources, and though the hypothetical insurance market does not right the balance – nothing can – it seeks to remedy one aspect of the resulting unfairness. (Dworkin, 2002, p. 81)

From this perspective, it is possible to draw the analogy (and consequently argue for a solution) between the compensation of people with handicaps and people whose livelihoods are threatened by climate change. However, Dworkin's focus on compensating people is based on fairness. That is, they must be compensated, since the situation they are in is bad. This deontologist view may possibly stand in the way of fruitful solutions. Instead, Vallentyne argues for the compensation of brute luck under certain conditions:

To the extent that administrative costs are low, incentive effects are nonnegative, and the value of opportunity sets reflects some risk aversion, equality of initial opportunity for advantage will tend to favour compensating for bad brute outcome luck. The exact level of compensation provided for various kinds of brute luck, however, will vary depending on the costs and benefits of doing so. It deems it unjust, however, to provide compensation for brute luck where, for example, everyone would have equal and better life prospects without such compensation. (Vallentyne, 2002, p. 544).

Indeed, in the case of climate change, an issue that needs to be dealt with on a short term, it is preferable to choose the option that is most effective rather than the option that is most fair from a deontologist point of view. That is why the next section will explore whether it is possible to hold individuals responsible for their actions that cause climate change, based on Vallentyne's argumentation.

5.2 Brute luck and responsibility

According to Vallentyne (2008, p. 57) at first sight it seems plausible that someone should be held accountable for an outcome if she was responsible for that outcome. Nonetheless, this concept of responsibility for outcomes, while relevant for not only ethics but political philosophy as well, is still lacking investigation. Especially *partial responsibility* is yet to be systematically addressed (Vallentyne, 2008, p. 57). Mainly the latter form of responsibility is relevant for this thesis, since climate change is the consequence of many actions by many people. Before demonstrating Vallentyne's argument of individual responsibility, I will first explain his conceptions of brute luck and responsibility.

Vallentyne (2008, p. 58) agrees with Hurley's (2003) thin conception of brute luck, since he considers brute luck as the absence of responsibility. To put it another way, brute luck can be viewed as "... that for which the individual is not responsible while leaving open what the correct conception of responsibility is" (Vallentyne, 2008, p. 58).

Responsibility then is agent-responsibility, or attributive responsibility. This type of responsibility reflects a situation in which an agent is responsible "... to the extent that it suitably reflects the exercise of her agency" (Vallentyne, 2008, p. 58). This differs from causal responsibility, since here an agent can be unaware that certain actions would have the effect that they ended up having (Vallentyne, 2008, p. 58). Furthermore, agent-responsibility does not automatically lead to moral accountability. Rather, it depends on the moral theory whether we consider agents morally accountable when they are agent-responsible (Vallentyne, 2008, p. 58).

There are three different conceptions of agent-responsibility (Vallentyne, 2008, p. 59). First, there is the social practice conception. According to this conception someone is only agent-responsible for an outcome when the reactive attitude (for example blame or praise) towards her corresponds to the norms of social practice. Vallentyne disagrees with this conception, since social practices may be flawed. Second, Vallentyne distinguishes the normative conception, which holds someone agent-responsible for an outcome when the reactive attitude (again, for example blame or praise) towards her corresponds to a correct normative perspective (for example morality or prudence). Third, there is the metaphysical (or ledger) conception, which holds someone agent-responsible for an outcome if the outcome is a consequence of the exercise of her agency. It is possible to consider the second and third conception equivalent, given the following substantive assumption: a reactive attitude towards someone is appropriate from a correct normative perspective only when the happening of the outcome is accordingly reflective of someone's agency (Vallentyne, 2008, p. 59-60). Different from agent-responsibility, moral responsibility holds only to the extent that an agent is aware of moral considerations (Vallentyne, 2008, p. 60).

Furthermore, Vallentyne (2008, p. 61) distinguishes narrow responsibility (dependent on an agent's mental state) from causal responsibility (dependent on the outcome of choices) and broad responsibility (dependent on whether an agent is causally responsible for an outcome, based on an autonomous choice, and furthermore, on whether the agent anticipated or should reasonably have been able to anticipate that her choice would have the causal impact). Vallentyne, together with brute luck egalitarians, focuses on the latter.

According to Vallentyne (2008, p. 62), there are three conditions to be satisfied in order for an individual to be (broadly) responsible for an outcome. First, the individual must make an autonomous choice. Second, the outcome should be a consequence of the choice. Third, the individual should believe (or it is reasonably expected of her to believe) that the outcome is related to the choice. With regard to the second condition, it is important to note that it is not only about the outcome being a consequence of the choice. A connection between choice and outcome has to be sensitive to "...the difference that a choice makes to chances and not be based merely on what those chances are given the

choice” (Vallentyne, 2008, p. 63). Thus, the choice should increase the objective chance of the outcome.

5.3 Outcomes: choice versus brute luck

Thus far, the basic idea is that “... an agent is (broadly) responsible for an outcome to the extent that her choice increased the chance of the outcome and she believed this to be so” (Vallentyne, 2008, p. 64). This framework is compatible with determinism, since in any situation where a choice has to be made there are objective probabilities (between zero and one) (Vallentyne, 2008, p. 64). Furthermore, these probabilities do not have to be set in stone. That is, it is possible to make a probability of only the possibility of the event occurring (the value one is that, yes it does occur, while the value zero is that the event does not occur) (Vallentyne, 2008, p. 64). Vallentyne (2008, p. 63-64) concedes that the claim that choices are governed by probabilities is contentious. However this is a necessary presupposition for his framework.

From this presupposition it is possible to “... determine which outcomes (events and states of the world) are attributable to the agent’s choice and which are a matter of brute luck” (Vallentyne, 2008, p. 65). Furthermore, Vallentyne’s (2008, p. 67) aim is determining to what extent someone is responsible in two cases. First, the case where a choice to the full extent determines the outcome. And second, where the choice does not to the full extent determines the outcome.

In the first case, there is an agent who has to choose whether she lends someone money (she ends up with two dollars the next day if she chooses to lend the money (probability of 0.9), and one dollar if she does not (probability of 0.1)) (Vallentyne, 2008, p. 67). The agent chooses to lend the money and ends up with two dollars. The question is then whether this outcome can be assigned to her choice or whether it can be assigned to her brute luck. In the initial situation, since the agent has complete as well as true convictions, the outcome is clearly a consequence of choice (Vallentyne, 2008, p. 67-68). To say it with Vallentyne’s words: “The basic idea is that the agent’s initial situation (including her initial choice disposition) is a matter of brute luck. The difference that her choice makes to the situation (and only that difference) is attributable to her choice” (Vallentyne, 2008, p. 68).

Vallentyne (2008, p. 70) acknowledges this framework makes it seem that individuals who are highly disposed to a certain choice bear little responsibility. However, he argues this is not the case for three reasons (Vallentyne, 2008, p. 70). First, an agent is highly responsible if she makes a different choice than the one she was highly disposed to. Second, in the real world individuals usually have more than two options, thus decreasing the probabilities. Thirdly, and most importantly, an individual may be responsible to a high degree since responsibility for outcomes is based on an individual’s past choices. The latter is true not only because an individual’s earlier decisions can influence her later

dispositions, but also because, even though the agent is only slightly responsible for an outcome if only the *current* outcome mattered, there “... may be sufficiently many such choices so that the agent bears significant responsibility for the outcome (in virtue of all her choices)” (Vallentyne, 2008, p. 71).

In the second case an agent also has complete and true beliefs, but her choice is determined only by the probabilities of outcomes. That is, her choices do not to the full extent decide the outcomes (Vallentyne, 2008, p. 73). In this case the agent has the opportunity to either buy a one dollar lottery ticket, which gives her a one per cent chance of winning 200 dollars (and a 99 per cent chance of ending with nothing) or to not buy the ticket (and thus keeping her one dollar) (Vallentyne, 2008, p. 73). The agent is ninety per cent disposed to buy the ticket, and hence, ten per cent not to (Vallentyne, 2008, p. 73). She buys the ticket and wins 200 dollars. According to Vallentyne (2008, p. 74) here too the outcome luck is ten per cent attributable to choice and ninety per cent to brute luck.

According to Vallentyne (2008, p. 74), this view has over the generally accepted view that in this second the outcome can only partly be attributed to choice. In the general view of luck egalitarianism, where two agents would have bought a ticket but only one won, the outcome luck would be entirely attributed to choice (since the agents are identical and their background was thus equal) (Vallentyne, 2008, p. 73).

5.4 What does Vallentyne’s framework mean for climate change?

So far Vallentyne’s stance on buying (winning) lottery tickets is clear. But what happens if his model is translated into a situation where actions negatively affect the Earth’s system? Suppose there are two agents, A and B. Both agents have a limited budget, and hence drive the same polluting car. They could use that car to drive to work, or choose to take the train, which is significantly less polluting. However, there is a catch. Driving the car to work would take them an hour, whereas taking the train would take them an hour and forty-five minutes. Agent A is highly disposed to take the car (a probability of 0.8), because she dislikes commuting; the longer it takes, the unhappier she gets. Agent B is less disposed to take the car (a probability of 0.5), because she thinks it is important to pollute less in order to mitigate climate change.

Suppose both agents in the end decide to drive their cars to work. According to Vallentyne’s framework agent B is more responsible for commuting by car, and consequently polluting more than she would have done taking the train, than is agent A. This makes sense from Vallentyne’s libertarian point of view; individuals make autonomous choices. For agent B it is irrelevant whether agent A thought about environmental degradation; it matters that agent B has thought it through and decided to not to act upon it.

However, the net effect is the same. Both agent A and agent B pollute more than they would have taking the train. As has been stated before, we are exploring ways of mitigating climate change, based on a conception of responsibility. Assuming Vallentyne's framework could lead to a detrimental situation in which no one would take environmental degradation into account, and consequently no one would be responsible for polluting.

This worst case scenario is a direct consequence of the way in which Vallentyne has set up his framework; he assigns value to options, but not to considerations. That is, as the example of the agents demonstrates, it is possible for people to have options, but behind those options is an array of different considerations which can lead to the choice of an option. In the worst case scenario one could no longer speak of agent-responsibility, but only of causal responsibility (where agents are unaware of the consequences of their actions).

It is possible to escape this scenario. That is, people must be made aware of the consequences of their actions. That way, it cannot be said that people did not take environmental damage into account. As Vallentyne has stated, it depends on the moral theory whether we hold someone morally accountable. In other words, to escape the worst case scenario an additional theory is necessary.

Another problem with Vallentyne's framework is that it is too much of a simplification; the real world is more complex. In section 5.12 I will discuss this criticism on Vallentyne as formulated by Braham and Van Hees in more detail.

Apart from this, the other question that remains is whether an appeal to individual responsibility alone is enough. That is, individuals are not the only ones who pollute. There is also states, small business, multinationals, and so on. This aspect of responsibility, which for matters of simplicity here is called collective responsibility, is addressed by Miller. Before explicating this argument however, it is necessary to first set out Miller's theory with regard to outcome and causal responsibility, as well as moral and remedial responsibility.

5.5 Outcome and causal responsibility

According to Miller (2007, p. 82-83), even though responsibility as a concept is very confusing in moral and political philosophy, there are two specific types of responsibility which are key in the development of ideas of global justice. That is, Miller (2007, p. 83) acknowledges his purpose is not to (re)define the concept of responsibility, but rather his aim is to give an adequate meaning to the concept in order to define global justice. Furthermore, Miller (2007, p. 83) defends the idea that even though human actions and inactions are immersed in a web of causation (where, for example, causes are not related to human action or decisions) this does not necessarily impair the idea of responsibility.

Miller (2007, p. 84) distinguishes outcome responsibility, as first formulated by Honoré (1999), which deals with the production of outcomes, from remedial responsibility, which deals with the outcome of a situation and the question which agent can be held under obligation to make amends. Furthermore, Miller (2007, p. 84) makes a distinction between identifying and assigning responsibility. The former establishes whether someone matches up with conditions for being responsible, while the latter gives out costs or benefits to agents (depending on the outcome and satisfaction of conditions). There are two important side notes here (Miller, 2007, p. 85). First, the assigning of responsibility can be unjustified. Second, it is possible for agents to be assigned responsibility when they are not responsible for an outcome. This may be the case when another actor has assigned them responsibility before the outcome took place.

First we delve into the question what it means for an actor to be responsible for an outcome. According to Miller (2007, p. 86) it is key that we separate outcome responsibility from causal responsibility, even though for an actor to be outcome responsible she at least contributed partly to the outcome. Which condition is considered causally responsible depends on what one is after. Intuitively the difference between causal responsibility (here it is asked why something has happened) and outcome responsibility (here it is asked which agent should be credited or debited based on a specific outcome) is clear (Miller, 2007, p. 87).

The criterion for outcome responsibility is that there must be sincere agency. That is, there should be a "... foreseeable connection between my action and the result" (Miller, 2007, p. 88). However, intentionality is not a necessary requirement; in trying to light a bonfire in my yard I may set the neighbour's shed on fire by accident, even though I took proper precautions (Miller, 2007, p. 88). As a causal chain gets longer it becomes harder to attach responsibility, since we want to either credit or debit an agent (Miller, 2007, p. 88). According to Miller (2007, p. 88) this credit or debit is related to an actor's capacities and the outcome, but it is difficult to be precisely determined.

5.6 When is an actor alleviated of responsibility?

Miller (2007, p. 91-93) gives three reasons for the alleviation of outcome responsibility. The first reason is derangement. That is, an actor at the time of action was not "in his right mind." A second possible reason is manipulation. For example, an actor bases her decisions on someone else's false pretences. The third reason is coercion, which entails that an actor acts on the presumption of a serious and credible threat. According to Miller (2007, p. 93) we should ask ourselves with each type of reason to what extent the outcome is in the agent's power. Accordingly then, there is no reason to conclude that human behaviour can always be interpreted as a case of derangement, manipulation, or coercion.

However, these three cases do not necessarily demonstrate how outcome responsibility can be identified. Two uncertainties remain (Miller, 2007, p. 95-97). First, it is difficult to establish exactly how causalities alleviate actors of responsibility, since judgments with regard to a specific person (and her behaviour) remain highly normative. This analogy also exists in national responsibility, where it is for example difficult to establish whether an entire population should be held responsible if the oppressive regime they fall under attacks other peoples and they have not resisted this regime. The second uncertainty that remains comes down to what extent actors should be held responsible for remoter consequences of their actions. According to Miller, we should "... apply a reasonable foresight: an agent is outcome responsible for those consequences of his action that a reasonable person would have foreseen, given the circumstances" (Miller, 2007, p. 97).

At this point it is possible to draw some analogies between Miller and Vallentyne. What Vallentyne considers broad responsibility is not much different from what Miller considers outcome responsibility. Recall Vallentyne's three preconditions for broad responsibility: autonomous choice, the outcome is a consequence of the choice, and it is reasonably expected of the individual to believe that the outcome is related to the choice. Let us apply this framework to the example of the garden shed presented by Miller. I made the autonomous choice to light the bonfire in my backyard; I did not intend to set fire to my neighbour's shed, but due to my negligence it was lit anyway. Hence, the outcome is a consequence of the choice. And lastly, I could have reasonably foreseen that this was a possible outcome of my choice, even if I did not intend it.

Hence, Miller's concept of outcome responsibility of sincere agency is very similar to Vallentyne's concept of broad responsibility. However, the advantage of Vallentyne's argumentation is that it provides the possibility of partial responsibility through determinism, something Miller's theory does not account for. Miller's theory on the other hand, provides the possibility of remedial responsibility, which will be explained in the next section.

5.7 Remedial responsibility

Whereas Miller (2007, p. 108) considers outcome responsibility as concerned with actors, remedial responsibility is concerned with patients. That is, in the latter situation where responsibility is to be assigned people are either deprived in some way or suffering. Here the question is who should help them. A key criterion for remedial responsibility is that it is considered morally unacceptable to continue the situation of the deprived (Miller, 2007, p. 98). The problem lies in the allocation of responsibility for making amends (Miller, 2007, p. 98). Miller (2007, p.100-103) puts forward six ways in which an actor can be held remedially responsible for the condition of another actor, the first being moral responsibility. Here, actor A deprived actor B either on purpose or dangerously or was unable to (whilst having the obligation) provide for B.

Additionally, remedial responsibility can be determined through outcome responsibility. Actor A can be outcome responsible for the condition in which actor B finds herself without being morally responsible at the same time. Suppose both actors find themselves in some sort of competitive arena, where actor A wins fair and square against actor B. If actor B goes bankrupt as a consequence, she should be compensated by actor A, since her good business lies at the heart of the bankruptcy of actor B.

Thirdly, an actor can be remedially responsible for another actor through causal responsibility. That is, actor A is responsible for the deprivation of actor B, but cannot be regarded as outcome responsible, since there was no sincere agency in establishing the deprivation. Even though sometimes it is impossible to prevent an action, the fact that an action lead to an outcome establishes a connection between actor A and B, and *ceteris paribus* makes the former remedially responsible for the situation the latter finds herself in.

Furthermore, actor A can be remedially responsible for actor B if she benefits from B's deprivation. For example, actor A acquires benefits, by no action of her own, that would have otherwise have gone to B. Actor A thus has no causal contribution. However, she is linked to some extent to B.

Besides moral responsibility, outcome responsibility, causal responsibility and benefit, actor A can also be responsible for actor B's situation through capacity. That is, if actor A is the only actor capable of remediating B, she is responsible. If several actors are responsible, all to a different extent, remedial responsibility should be assigned either to the actor who is most capable, or on the basis of the abilities of each actor.

Finally, an actor can be held remedially responsible through community. The key here is that in communitarian relationships members have obligations to one another, and hence, when actor B needs assistance it is only obvious to turn to fellow-member actor A.

While Miller provides six different ways in which remedial responsibility can be determined, it remains unclear when or why we should choose one of them. For example, suppose I own a book store which burns down. Who is responsible to remediate my loss? According to Miller's theory, it might be the person who burned it down on purpose (moral responsibility), or the other book store in town who makes a larger profit as a consequence of my store burning down (benefit), or it might be the national association of book stores (community).

Miller (2007, p. 107) indeed concedes that often in the real world it will be difficult assigning remedial responsibility, since multiple, also vague, criteria have to be applied. However, if we want to come up with a framework we have to consider all actors involved and assess to what extent they can be connected to the deprived actor. Still, this does not change the fact that once we have assessed all

actors involved we do not know who should remediate the deprived actor, since Miller does not set out any criteria for this.

While it is clear that Miller's theory is limited in this sense, its advantage is that it provides more than solely determining individual responsibility. Tackling climate change will require more than individual actions, and hence, a framework with the ability to determine states' responsibility is necessary. The next sections will explicate how Miller's model of remedial responsibility can be transferred to groups. First, I will explain the two models that Miller sets out for collective responsibility. After that, I will go into how Miller argues for national responsibility as a form of collective responsibility.

5.8 Collective responsibility

Miller (2007, p. 114) distinguishes two models of collective responsibility, the like-minded model and the cooperative practice model. These models are not necessary conditions for assigning national responsibility (as a form of collective responsibility). Rather they provide a framework for assessing the responsibility of nations to the extent that they are characterized by the one or the other. Furthermore, it is important to note that these two models should be considered as ideal types, and in fact, nations may display characteristics of both models (Miller, 2007, p. 114).

5.8.1 The like-minded model

Miller (2007, p. 114) illustrates the first model, the like-minded group, with the example of a rampaging mob. The mob loots shops, intimidates people, destroys property, and so on. What is important here is that the mob's participants act in various manners. One member attacks people, while another is only shouting at them. According to Miller (2007, p. 115) the entire mob is collectively responsible for the outcome the riot has brought about, and hence, together the members of the mob should repair the damage done. What a rioter's intentions were at the start are irrelevant. Instead, the fact that all rioters had the same general attitude combined with the fact that each of them made a causal contribution to the outcome is what we should focus on according to Miller (2007, p. 115). Moreover, Miller deems it impossible to establish some individual contributions:

Consider several members of the mob throwing bricks at a plate-glass window at roughly the same moment: we cannot say that any particular brick thrower was (causally) responsible for smashing the window, but we *can* say that the group as a whole is outcome responsible for the damage they brought about. (Miller, 2007, p. 115)

According to Miller (2007, p. 116) we need not only to attribute responsibility to the entire mob based on collective will, but furthermore the responsibility must also be borne by its individual

members. Relevant is not only who should make up for the cost, but moreover the attribution must be justified. Since individual members of the mob were part of a collective activity it is irrelevant whether they actually inflicted damage; they should have reasonably foreseen the consequences of this activity. Hence, they are outcome responsible (Miller, 2007, p. 116). Miller argues that there is a good chance we cannot precisely establish to what extent each individual member of the mob is responsible for the final outcome, and hence, our starting point should be that "... the group is collectively responsible, that other things being equal they are remedially responsible for the damage they have caused, and that every participant bears an equal share of that responsibility" (Miller, 2007, p. 116). Questions of power structures and in-group relations Miller leaves to the group itself, since his focus lies with establishing a "fair distribution of costs and benefits between the rioters and their victims" (Miller, 2007, p. 117). Based on the discussion of Vallentyne's argumentation we already know that it is in fact possible to assess partial responsibility of individuals. Nevertheless, we continue to explore Miller's argument, since the idea of a group as a whole being responsible has not yet been addressed.

5.8.2 The cooperative practice model

The second model Miller (2007, p. 118) distinguishes is the cooperative practice model. Here, Miller (2007, p. 119) gives the example of a firm that dumps chemicals in a river. The firm is controlled by employees, who differ as to continue this practice, or choose another (more expensive) solution. In the end the employees decide on the former. According to Miller (2007, p. 119) the employees are now collectively responsible for the damages done to the river. Accordingly, the repairing costs should be paid collectively. According to Miller (2007, p. 119) this includes the minority that disagrees, since this minority also benefits from working at the company and has the opportunity to influence the decisions made by the company. The difference here is that this minority is not morally responsible (it deserves no blame), but it is outcome responsible (Miller, 2007, p. 119).

There are reasons for alleviating a member from her group-based responsibility. Speaking up and voting against some measure are not part of those (Miller, 2007, p. 121). Instead, a member "... must take all reasonable steps to prevent the outcome occurring" (Miller, 2007, p. 121). Furthermore it is important to add that the membership of a community is not based on voluntariness: it may just be bad luck if one belongs to a racist political community. However, this too does not alleviate responsibility (Miller, 2007, p. 123).

Now that it is clear how Miller pictures collective responsibility section 5.9 will show Miller's argument in favour of national responsibility. I will discuss *inter alia*, why Miller argues against separating state and national responsibility, how Miller characterizes nations, and how the previously discussed models are applicable to nations. After that, section 5.10 will criticize Miller's argument and argue against national responsibility and in favour of state responsibility.

5.9 From collective responsibility to national responsibility

As has been stated before, Miller views national responsibility as a form of collective responsibility. Consequently, nations (and their individual members) can be held remedially responsible for their actions (Miller, 2007, p. 113). How can we move from the first model, the rampaging mob and its responsibility for done damages, to national responsibility? According to Miller (2007, p. 117) members of groups recognize the like-mindedness of their group, and hence they act in certain ways in which they will know they will get support from other group members. This argument is based on the work of May (1987), who argues that individuals act differently in groups than they do alone, because they are influenced by others around them. Accordingly, this helps us to make the jump from a group that is only a collection of individuals who share a same goal to a group whose members together realize an outcome. In other words, we can make the jump to national responsibility (Miller, 2007, p. 117). Miller (2007, p. 118) here gives the example of racism in the American South at the time of slavery. Every member taking part in this community is responsible for racism, even if she disapproves of it, since participation stimulates "... the climate of opinion in which the actions in question take place, even if they voice their opposition to the actions themselves" (Miller, 2007, p. 118). I will criticize this view in the next section, but first I will discuss whether both models are applicable to national responsibility.

According to Miller (2007, p. 111), not only is national responsibility defensible, it is also more appropriate than state responsibility. Even though it is easier to establish the latter than the former, since states are often the actors involved in international politics, Miller (2007, p. 112) sets out three arguments against separating both types of responsibility.

First, viewing states as acting on behalf of nations makes it easier to establish collective responsibility. In other words, were we only to look at state responsibility, we would run into problems if we were to demonstrate in which way individual citizens are responsible in compensating those whom have been harmed by their state. Second, we might want to hold nations responsible for an outcome by states that have ceased to exist. And third, even though national and state responsibility may be interwoven, this is not necessarily always the case. Miller's aim is "... to show that national responsibility, as a species of collective responsibility, makes (ethical) sense, and therefore that the people who make up a nation may sometimes properly be held liable for what their nation has done" (Miller, 2007, p. 112-113).

The first characteristic of a nation is that it is partially constitutive of the identity of each of its members (Miller, 2007, p. 124). Second, members have things in common, such as a public culture and an understanding of what collective life should look like, leaving open the possibility of (significant) cultural differences (Miller, 2007, p. 124). Third, members of a nation are aware that they have special obligations to other members, in the sense that their membership is not

instrumental (Miller, 2007, p. 123-124). Additionally, members should consider the continuation of the nation valuable, in the sense that they would be against its discontinuation as well as having to become members of another nation (Miller, 2007, p. 124). Finally, and crucial in establishing collective responsibility, a nation should be politically self-determining (Miller, 2007, p. 126). To what extent a nation is self-determining varies from a total lack of self-determination, to an authoritarian form of government, to a democracy (Miller, 2007, p. 126).

According to Miller (2007, p. 127), at first it would be logical to think of nations as corresponding to the like-minded group model, since members share a common identity and public culture. However, to what extent collective actions are a consequence of these characteristics is dependent on the level of political self-determination, and hence, the latter is crucial in determining collective responsibility (Miller, 2007, p. 127). Consequently, the more democratic a community is, the more it can be justified that we hold its members responsible (Miller, 2007, p. 130).

In the case of determining the responsibility of a disagreeing minority the cooperative practice model should be applied, since this model has made clear that members who "...benefit can be held responsible for the outcomes of those practices despite their opposition to the policies which produced those outcomes" (Miller, 2007, p. 130). There are two preconditions (Miller, 2007, p. 132). First, it should be determined whether the nation the minority falls under distributes its benefits in a fair manner. The second precondition is that the minority group has to share at least to some extent the same beliefs and values that are constituent of the national culture.

5.10 State responsibility instead of national responsibility

Miller acknowledges that assigning collective responsibility may "set liberal alarm bells ringing" since it "goes against an intuition that it is only what a person does herself that can make her responsible for harmful outcomes" (Miller, 2007, p. 120). This, however, is not the main point why we should move away from national responsibility and opt for state responsibility. Before addressing this point, this section will first criticize the like-minded model that Miller sets out. After that, it will argue for the use of the cooperative practice model in state responsibility rather than national responsibility.

The like-minded model of collective responsibility is based on the idea that we cannot distinguish actions of different members of the group. Recall the example of the broken window in section 5.8.1. According to Miller, we cannot distinguish who broke the window, so we hold all members responsible. By being members, they all share the same attitude, and consequently, they are all responsible. There are several points of criticism with regard to this argument. First of all, we cannot know whether they had the same attitude. Miller said himself that the members of the rampaging mob behaved differently. Some were looting, some were only yelling. How would it be

possible to determine with certainty that each member has the same attitude underlying her actions? And if the attitude were the same, how would it be possible for members to come different actions? Second, it may be hard to practically determine who exactly is responsible for the broken window. However, it is not impossible. Judges in court answer questions like this every day. Furthermore, the fact that it is difficult in practice does not mean we cannot formulate a theoretical answer to the question. Section 5.12 will in fact show how this can be done based on the argument presented by Braham and Van Hees.

Another reason to drop the like-minded model is the argument that since members recognize the like-mindedness of their group they will act in ways through which they will get support from other members. Being part of a group does not entail that you will always seek support for your actions. It should be possible for a member to defect from a group's norms; something Miller's argument leaves no room for.

Pierik (2008) also considers the like-minded model inappropriate for collective responsibility. He does find the collective practice model useful, but not for conceptualizing national responsibility. Pierik (2008, p. 473-474) distinguishes two types of mistakes with regard to ascribing responsibility (whether it is individual or collective). With Type 1 mistakes it is difficult to establish to what extent a participant contributed to an outcome. Hence, the normative relevance of collective responsibility is denied. In the case of a Type 2 mistake, collective responsibility is too loosely assigned, thus including people as part of the collective who are in fact no real participants. In other words, the costs and benefits are not shared in a fair way between wrongdoers and alleged wrongdoers.

According to Pierik (2008, p. 473) members of a collective are only collectively responsible when three criteria are fulfilled. First, they are able to deliberate, as well as decide and act as a unified actor. Second, there is no discussion as to who is part of the collective and who is not. And third, everyone who is part of the collective has the opportunity to participate in the decision making. Hence, these conditions set out to prevent Type 2 mistakes (Pierik, 2008, p. 474).

The cooperative practice model satisfies the criteria formulated by Pierik, in the first place because (if we stick with the example of the employee-controlled firm that dumps toxins into a river) the collective can deliberate, decide and act as a unified agent (Pierik, 2008, p. 474). Furthermore, it is clear that everyone on the payroll is part of the collective (and consequently, it is also clear who is excluded from the collective) and all employees have the possibility to participate in the firm's decision making. As a consequence the employees, including the disagreeing minority, are responsible for the dumping of the toxins (Pierik, 2008, p. 475).

When it comes to like-mindedness leading to collective responsibility however, Pierik (2008, p. 475) argues that while it can potentially contribute significantly, it cannot be a sufficient condition

for two reasons. First, the example of a rampaging mob leads to a Type 2 mistake, since in this case it is unclear who is and who is not part of the mob. And second, like-mindedness is in itself never a sufficient condition for collective responsibility, since a person's behaviour in a like-minded group can be very different from the outcome that is established by the group.

According to Pierik (2008, p. 478) Miller's cooperative practice model can be translated into agency terms, which is consistent with his view of personal agency as a prerequisite of personal responsibility. However, this translation of agency does not hold in the case of the like-minded group model, since it "...wrongly holds persons liable for outcomes collectively incurred by the collectives of which they are members" (Pierik, 2008, p. 478). Another reason to not take the like-minded group model into account, is that like-mindedness is "too loose a bonding element" in defending collective responsibility, and consequently for national responsibility (Pierik, 2008, p. 479).

Furthermore, the cooperative practice model would be appropriate, were it not that it does not really synchronize with national responsibility, but more with state responsibility, given the formal organization in institutions in states (Pierik, 2008, p. 480). However, Pierik (2008, p. 481) does not argue in favour of state responsibility, but for the responsibility of political communities for two reasons. First, states and nations are so interwoven that they cannot easily be separated, and the same goes for state and national responsibility. Second, in the field of global justice the debate on nation states and political communities is relatively unaltered for quite some time.

The second point seems odd. When a debate has been stable over time, it can also easily be argued it is in need of some new ideas. However, what is more problematic is Pierik's first argument. There is no reason to not hold states responsible based on Miller's cooperative practice model. Pierik's argument for political communities comes from Miller's (2007, p. 111-112) defence of the separation of national and state responsibility based on two cases; either when a state is defeated or when a state does not yet exist (a nation that wants to secede). While it is true that in the case of these two exceptions the argument of political communities comes in handy, it does not mean we have to let go entirely of state responsibility. In fact, in the second case one can also argue for state responsibility.

Recall that Miller's cooperative practice model leaves room for members to be alleviated from their group-based responsibility; they must take all reasonable steps to prevent an outcome. Even if they do not take these measures, they can still be only outcome responsible, and not morally responsible. In the case where a political community in a state want to secede, we can use this argument to alleviate this community's members from their collective responsibility which is a consequence of their state's actions. Also, in the case where a state ceases to exist we can still hold its former members responsible, since during their membership they had the opportunity to alleviate themselves from collective responsibility.

5.11 What does Miller's framework mean for climate change?

As has been argued Miller's framework has some serious setbacks. Nonetheless, what would happen to mitigating climate change if we were to take it into account, bearing in mind that we consider state responsibility rather than national responsibility appropriate? Its strongest point is its argument for remedial responsibility, because of its practical implications. That is, in order to mitigate climate change the most important practical aspect is assessing remedial responsibility rather than outcome responsibility. However, before remedial responsibility could actually be put into practice, it would need to be able to prioritize its different types.

This argument is easily made clear with an example. Country A's water has been polluted by country B and country C. Country B polluted it by dumping toxins on purpose into country A's river. This deed makes country B morally responsible. Country C polluted country A's water through an accident in a nearby power plant. This was not on purpose, but still country C is causally responsible for the pollution. Both country B and C are remedially responsible for the pollution. However, Miller's theory does not make clear who should remediate country A.

Another argument not addressed by Miller is what we should do when both (and sole) actors who are remedially responsible are not capable of remediating the deprived. Suppose that country B and C are both low developed countries, on whom this type of remediation would put a heavy burden. If we consider the fact that climate change needs effective measures, maybe we should think less in terms of "the polluter pays."

5.12 Degrees of causation

In section 5.10 I already criticized Miller's argument in favour of collective responsibility, by arguing that it is in fact possible to distinguish between group members. This section will show in more detail how exactly it is possible to assign individual responsibility. In fact, Braham and Van Hees (2009, p. 323) argue that it is precisely this gap in legal and moral theory that they are looking to fill; their aim is to say to what extent actions of persons are of influence in bringing about a certain outcome. Especially in cases of collective action (where the outcome of actions is a consequence of individual action specifically), such as the case of remedial responsibility that Miller distinguishes, this is important (Braham & Van Hees, 2009, p. 324).

Why is it important to assess to what extent an individual has contributed to an outcome, when it is already clear that this is not a necessary condition for remedial responsibility? Miller's conception of remedial responsibility is focused on nations, or in the framework as it is adapted it here, states. From a practical point of view it immediately becomes clear why a focus on the contribution of states

would reach a stalemate. States such as India and China are large polluters. However, their capacity to mitigate climate change is much lower than that of many other states. That is, they both have a large population to feed and therefore investing in less polluting industries is not a realistic option at this point. Miller's argument makes for a strong case here; effectively mitigating climate change on a (relatively) short term requires immediate action. There is no time to wait on these countries, even though they are outcome responsible.

However, Miller's theory with regard to individual responsibility in relation to collective action is in need of some revision. Recall my criticism on the like-minded model of collective responsibility; we cannot distinguish who broke the window, so we hold all members responsible. Continuing this line of argumentation in the case of climate change, it could be argued that since we do not know which SUV-driving American is responsible for climate change, we hold all Americans responsible, on account of them being members of the same state. However, it is possible to determine in what way the causal contributions of American citizens differ. States are important, but it also matters what you do as an individual. By the end of this section it will be clear that it is possible to assess, for example, that the SUV-driver has at least to some extent contributed to the production of her car, which in turn lessens the causal contribution of the (low-income) countries where the car factory is hosted.

Braham and Van Hees (2009, p. 325) argue that degrees of causation find little ground in everyday language, since here terms such as "principal" or "main" or "chief" are used, and these effectively do not say to what extent an outcome is the consequence of one specific cause. Therefore, Braham and Van Hees (2009, p. 325) continue, in order to determine to what extent an action can be attributed to a certain outcome, two issues need to be settled.

First, actions that brought about a certain outcome need to be defined by units of measurement. And second, a method to aggregate these units needs to be established. Apart from Lewis (2000), Halpern and Pearl (2005) and Vallentyne (2008) so far philosophical literature has not been able to establish whether some action is causal to an outcome, but these authors have failed to establish a way of assessing the causal value of an action compared with other actions (Braham & Van Hees, 2009, p. 325).

Furthermore, Braham and Van Hees (2009, p. 325) argue that the three exceptions to this existing void in the literature do not justify a difference in contributing to an outcome, rather they assume it. Braham and Van Hees (2009, p. 326) underline the importance of distinguishing between notions of causation and notions of responsibility. Since their focus is on establishing to what extent contributions of agents are of influence on an outcome, they are concerned with retrospective

responsibility rather than prospective responsibility, the latter relating to what extent an agent has the obligation to bring about some outcome (Braham & Van Hees, 2009, p. 326).

Braham and Van Hees's (2009, p. 326-327) definition of causality is formulated in terms of necessity and sufficiency and is based on the Necessary Element of a Sufficient Set (NESS) test, which was first formulated by Wright (1988, p. 1020). The general idea behind the NESS test is that it makes possible to think of a cause as necessary feature of a sufficient set (Braham & Van Hees, 2009). Furthermore, it provides us the possibility to clarify and assign meaning to different causal contributions which together realize a certain state of affairs (Braham & Van Hees, 2009, p. 323).

First, Braham and Van Hees (2009, p. 327) distinguish the weak NESS test. That is, there is a set of occurrences that is sufficient for an effect such that, (i) an ancestral occurrence is a member of the set; (ii) all elements of the set obtain; (iii) an ancestral occurrence is necessary for the sufficiency of the set. Or to put it another way, an ancestral occurrence is a causal condition for an effect if it occurs (Braham & Van Hees, 2009, p. 327). Second, Braham and Van Hees (2009, p. 328) distinguish the strong NESS test. That is, there is a set of occurrences that is sufficient for an effect such that, (i) an effect is a member of the set; (ii) all elements of the set obtain; (iii) all elements of this set are necessary for its sufficiency.

According to Braham and Van Hees (2009, p. 331) units of measurement are established (and thus we can speak of degrees of a causation) through the concept of overall causal contribution (as expressed by the NESS test), which can be empirically established. Now that we know this, we have to come up with a way to accumulate these units of measurement. Braham and Van Hees (2009, p. 332) establish a measure expressed in degrees of causal contribution, fitted in a game theoretic framework. Their definition is as follows:

Weak NESS test: given a play s_N , an individual strategy s_t is a weak NESS condition for A if, and only if, there is an event $s_T \subseteq s_N$ such that (i) s_T is a critically sufficient condition for A , (ii) t is A -critical for s_T .

Strong NESS test: given a play s_N , an individual strategy s_t is a strong NESS condition for A if, and only if, there is an event $s_T \subseteq s_N$ such that (i) s_T is a minimally sufficient condition for A , (ii) t is a member of T . (Braham and Van Hees, 2009, p. 332)

Returning to the units of measurement, Braham and Van Hees (2009, p. 332) indicate that the goal of their framework is to make statements with respect to legal and moral responsibility and furthermore, since these statements should be geared towards punishment, rewards, or burdens, the measurement should be cardinal. That is, it is to be expressed quantitatively, as opposed to ordinal measurement, which ranks different categories. According to Braham and Van Hees (2009, p. 333) the problem with ordinal measurement is that it is unable to tell by how much one impact is larger or smaller than another. Thus, Braham and Van Hees (2009, p. 333) continue, a cardinal value function

always has a sum of values of 1, where each action that influences (or not) the total causal condition gets assigned a value between 0 and 1 (0 being no influence, and 1 being the only necessary and sufficient action). Furthermore, each time an action is critical gets counted, no matter to what extent other actions made a causal contribution (Braham and Van Hees, 2009, p. 335). In general game-theoretic terms, Braham and Van Hees (2009, p. 333) want to establish a function through which the share of the total set of NESS conditions on a particular instance of an outcome is expressed.

The example that Braham and Van Hees (2009, p. 335) give is that of three firms that dump different toxins in a river, with each amount of toxin dumped being enough to kill every fish in the river. In this case, each firm gets assigned one third of causal contribution to the outcome (the fish being dead) (Braham & Van Hees, 2009, p. 335). Furthermore, a built in clause makes an inner game form possible. Hence, it would still be possible to assign degrees of causation if, for example, Firm 3 moves its activities to Firm 1, and Firm 1 decides to dump the toxins in the river (Braham & Van Hees, 2009, p. 335).

Additionally, it is possible to quantify actions that are performed in the same manner, but to a different extent. Thus for example, Firm 1 (two liters) and Firm 2 (half a liter) dump the same toxin in the river, where a threshold value of one liter will kill all the fish (Braham & Van Hees, 2009, p. 338). In this case the inner game form is established by assuming there are five players, where each player either dumps half a liter (since this is the greatest common denominator) or nothing (Braham & Van Hees, 2009, p. 338). Despite the fact that Firm 2 is unable to kill the fish by itself and furthermore, it is unable to prevent the fish from being killed, we can still establish that Firm 2 has part in the causal contribution (Braham & Van Hees, 2009, p. 339). Of course, this raises the issue of the relation between causal contribution and power. This relation can be defined as: “the overall causal contribution to some outcome made by an individual equals the sum of the power of the actions performed by that individual” (Braham & Van Hees, 2009, p. 341).

The first remark that can be placed with respect to the framework presented by Braham and Van Hees is that degrees of causation do not hold any value with regard to the degree of responsibility, since the latter is often a matter of blameworthiness, and hence more often viewed as a qualitative characteristic rather than a quantitative characteristic (Braham & Van Hees, 2009, p. 341). Consequently, establishing to what extent (expressed in terms of degrees) an actor is responsible for an outcome comes down to more than establishing his causal contribution (Braham & Van Hees, 2009, p. 341). Other dimensions also play a part: “... degrees of initiative, degrees of authority, the gains from the activities involved, and perhaps most difficult of all, the degree of voluntariness” (Braham & Van Hees, 2009, p. 341). Thus, Braham and Van Hees continue, a causation index will only be useful for distinguishing between individuals in cases where the culpability of the actions are alike or where responsibility and causal contribution are taken to be synonymous” (Braham & Van Hees, 2009, p.

342). Consequently, in the example where Firm 3's toxins are transferred to Firm 1, and Firm 1 thus dumps two thirds of the toxins into the river, whilst Firm 2 dumps one third of toxins, Firm 1 is more responsible than Firm 2, if we think dumping toxins is blameworthy (*ceteris paribus*) (Braham & Van Hees, 2009, p. 342).

The second remark that Braham and Van Hees (2009, p. 342) place with regard to their framework is that an actor may not have a causal contribution to some outcome, but is nonetheless blameworthy and thus morally responsible. According to Braham and Van Hees (2009, p. 342) an actor can potentially be blameworthy if her action may be a causal factor. Furthermore, Braham and Van Hees (2009, p. 343) indicate that they have only addressed retrospective responsibility, whilst responsibility is also about prospective outcomes, and thus, the question remains to what extent we can derive from their framework how we must assess these prospective outcomes.

5.13 What are the implications of the formulated view of responsibility?

Throughout this chapter different types of responsibility have been assessed, leaving us with determining their implications and consequences. While the proposed solution of super wicked problems is geared towards a change of attitude, and therefore seems more applicable to individuals and their responsibility, this chapter has also argued for state responsibility through a revision of Miller's argument for two reasons. First, while individual actions matter, they alone will probably not be enough for making a serious effort to mitigate climate change. Miller's argument in favour of remedial responsibility on a state level not being dependent on outcome responsibility is convincing, since the lack of capacity of many states will hinder effective policies. However, in the end his argument for remedial responsibility from a theoretical point of view remains vague. A first step in future research would be to prioritize which state is remedially responsible at what time.

Second, as has been stated, Miller (2007, p. 113) argues that members of nations can be held remedially responsible for their actions. I have argued that only citizens of states can be held remedially responsible based on Pierik's (2008) account of agency as a prerequisite of personal responsibility. Nonetheless, through the argument of state responsibility it has become clear that citizens of states have a responsibility as well. Thus, this can also aid a change of attitude.

Furthermore, the advantage of state responsibility over national responsibility is that it is easier for other actors than citizens to hold an institution such as a state responsible rather than a nation, even with the lack of an authority in an anarchic system. I do not wish to proclaim it will not be difficult, however at least the entity one would appeal to exists.

As will hopefully be clear from this chapter the responsibility that citizens have as a consequence of them being citizens, is a different form of responsibility than the one they have as a

consequence of their own actions. With the use of Vallentyne I have argued for broad individual responsibility. Additionally, the framework by Braham and Van Hees adds to this that now we can not only establish whether an action is causal to an outcome, but also what the value of this action compared to other actions is.

Establishing responsibility in practice will remain difficult. Nevertheless, this chapter has presented a sound theoretical argument that individuals do have responsibility. A question that remains however, is to whom we are responsible. Obviously, as has been argued throughout this chapter, it holds for each person in the present. However, this chapter has not yet addressed future generations. Responsibility for future generations is often couched in terms of stewardship, as formulated by Christian Democratic political parties. Also, it is often found in a justice discourse. For example, Page (2006) argues for intergenerational responsibility in the following manner:

- P1. The changes in the climate system that are being brought about by human action threaten the well-being of members of future generations.
- P2. Human action that threatens the well-being of members of future generations is unjust and unethical (I use these terms interchangeably).
- C. The changes in the climate system that are being brought about by human action are unjust and unethical. (Page, 2006, p. 9)

The starting point of this chapter was responsibility. Some aspects of it are not compatible with justice. With justice come questions of legitimacy, and this is not what this thesis appeals to. Rather, as has been addressed in the introduction, this thesis appeals to what people themselves are capable of. That is, their agency. However, even if we cannot address whether it is just to alter our ways in favour of future generations, we can address whether we are responsible for future generations.

This however, is very difficult with the argument as it is. That is, Vallentyne, Miller and Braham and Van Hees all address retrospective responsibility. As Braham and Van Hees point out:

... responsibility is [...] not just about what has happened, but also about prospective events and outcomes. What remains open is the derivation of a measure that captures what we can do, not just what we have done. This is vital to our understanding of our positive duties to others. (Braham & Van Hees, 2009, p. 343)

The framework presented by Braham and Van Hees loses some of its value with regard to prospective responsibility. That is, if one does not yet know the outcome one cannot precisely establish one's causal contribution to it. However, there is a practical solution, despite that it is imperfect. With our actions we emit CO₂, without knowing the exact consequences. For example, agent A does not yet know to what her polluting slightly more than agent B will make her causal contribution greater. It could be a flood that causes a lot of damage, or a heat wave that gives

everyone in the United Kingdom an unexpected but lovely summer (despite the sunburns). Of course, this is slightly exaggerated. The point is that it is impossible to interpret agent A's actions based on the consequences. However, taking the amount of CO₂ that agent A emits as a starting point makes it possible to say something about her responsibility. Admittedly, we cannot assess for what she is responsible, so we must be very careful. However, it is possible to say that emitting CO₂ is bad for the climate, and therefore, agent A has the responsibility to limit her emissions.

5.14 How can we call upon individuals to take their responsibility?

In the previous chapter it has been established that a weak spot of the concept of a super wicked problem is its focus on path dependency and a momentum. However, its usefulness lies in its use of causal processes. The starting point of bringing about a change in causal processes is a change in attitude. This chapter has provided us with a strong argument to change our attitude with regard to our own responsibility. That is, it legitimizes a call on individual remedial responsibility, as well as state responsibility.

Now the question remains how individuals can be called upon their responsibility. Responsibility comes from an autonomous choice. Hence, we cannot make individuals do anything. However, developing norms in order to make individuals aware of their responsibility as well as act upon it, requires a different manner in which individuals can be called upon to change their ways. That is, individuals have different values, and consequently, they will respond differently to an appeal on responsibility. It is beyond the scope of this thesis to assess which appeals will work for which individuals. However, the next paragraphs will build upon the strategic policy instrument provided by super wicked problems literature in order to provide a start for future research.

Remember the importance of norms (how we should act) in super wicked problems. In bringing about causal processes Levin *et al.* formulated three diagnostic questions, with an emphasis on norms in questions two and three.

Diagnostic Question 1: What can be done to create stickiness making reversibility immediately difficult?

Diagnostic Question 2: What can be done to entrench support over time?

Diagnostic Question 3: What can be done to expand the population that supports the policy?
(Levin *et al.*, 2012, p. 129)

Responsibility is the starting point of a change in attitude to live more sustainably. But how can norms be formulated in such a way that people in fact take their responsibility? If the plurality of views are taken into account as to what constitutes a good life, a good society, justice, and so on,

it becomes clear it is not altogether easy to formulate a conception of responsibility for the environment that will consequently supported, and gains more supporters in the process.

As Dobson (2007, p. 15) explains, there are two main reasons why people should care about the environment. Either it is in their interest to do so, or the environment has intrinsic value, regardless of whether it is a means to human ends. The argument that the environment has intrinsic value is not something that intuitively appeals to everyone. An appeal to people's self-interest (in terms of preferences), even though chapter three has shown that people are not necessarily self-interested, will probably be more effective.

In order for emissions to become less, alternative routes to live sustainably have to be taken. The discussion in everyday life is often couched in terms of consuming less, or consuming green(er). If the goal is to increase support as well as firmly establishing it over time, it is important to not be dogmatic about the manners in which people choose to live and alter their ways, as well as the way the environment is managed. For example, some airlines offer to compensate your flight by planting extra trees. Maybe car lease companies should give these options to their clients as well. If the sustainability debate is facilitated and expanded, it may offer different methods or technologies for sustainability that provide for a more viable alternative than consuming less does for many people. That is, there is no reason to assume beforehand that technology is any less of an alternative than the current routes the sustainability debate provides. However, if these technologies are to be further explored, they must be given the opportunity.

6 – Conclusion

After the introduction chapter 2 of this thesis set out to explain the basic physics of the greenhouse effect, as well as the (potential) consequences of climate change. Furthermore, this chapter addressed in what ways climate change can be assessed, as well as how climate change research is conducted. Here, its potential pitfalls were also addressed. Additionally, the arguments presented by climate change sceptics were discussed. Finally chapter 2 argued that these arguments are irrelevant, since it is the combination of high stakes and odds which should form the basis of our precautionary measures against climate change. Hence, chapter 2 provided the basis from which the research in this thesis was conducted. That is, recall that the aim of this thesis was to come up with (a build-up towards) a potential solution for anthropogenic climate change. The research problem was formulated as follows:

While climate change can be considered a tragedy of the commons, the solutions the commons debate puts forth are difficult to realize. Can we turn towards the theoretical perspective of “super wicked problems” as an alternative, and if so, how?

Chapter 3 started out with an explanation of two seminal articles in the commons debate, by Hardin (1968) and Ostrom (1999). From thereon I have shown that Ostrom was right in her criticism of Hardin. That is, empirical evidence supports her claim that users of a commons can come to cooperation as long as reciprocity and trust can be established. However, I have also shown that in the case of global commons so far no cooperation has been established.

Nonetheless, since reciprocity and trust is the only potential fruitful solution the commons debate provides, I have explored several political theoretical debates to establish whether these could be of help in bringing reciprocity and trust about. First, I have addressed the realism versus cosmopolitanism debate. Here I concluded that debating the commons problem from a cosmopolitan point of view enables us to think of each and every user as equals and members of the same community. Furthermore, I have addressed the Johnson (2003; 2011) (who argues for structural changes on a socio-economic level that will change aggregate behaviour) versus Hourdequin (2010; 2011) (who argues for viewing individuals as selves in relation to others) debate. I agreed with Hourdequin that a moral community (where individuals view themselves not only as a rational actor) is favourable over the framework put forth by Hardin. Finally, I have explored whether public virtues could be of help in bringing about trust and reciprocity.

My revision of the tragedy of the commons shows that it is in fact possible to argue from a commons perspective and take factors other than rationality into account. I have also shown that from a theoretical point of view it makes sense to argue for the establishment of a community amongst commons users. However, the question remains whether this is realisable.

This is where super wicked problems literature is of use, since it argues that it provides policy makers with tools more useful than traditional policy analysis. It addresses the problem of herdsmen that keep adding cattle to their herd, or in super wicked problems terms, hyperbolic discounting. Furthermore, the concept of a super wicked problem provides us with the option of building a larger population who adheres to certain principles. This makes it more robust than the appeal to a community.

To answer the main question: *In what way can the concept “super wicked problem” contribute to establishing responsibility in climate change?* It is now possible to say that while super wicked problems literature promises much it does not really come through. It makes sense to argue for neutralizing hyperbolic discounting, since this pushes problem-solving into the future, and solutions are needed on the short term. However, where we go from there remains unclear. This is in part a consequence of scenario based forward thinking; each situation is different for policy makers, and therefore there is no general causal mechanism. On the other hand it is a consequence of Levin *et al.* (2012) arguing it is beyond the scope of their article. The argument for super wicked problems would have been stronger if they had provided more guidelines. Especially when it comes to the development of norms, ultimately needed to create a large population that adheres to the idea that is put forward by neutralizing hyperbolic discounting (in this case responsibility). Ultimately, solving climate change requires many people. Hence, it is vital it becomes clear in what way norms can be developed properly.

Super wicked problems literature argues that it differs from traditional policy analysis and that herein lies its value. Scenario based forward thinking does look promising, certainly to the extent that it is able to alter policy responses on the basis of changes in a non-linear system. However, while knowledge of causal processes is useful, the focus lies too much on path dependency in the sense of a momentum. The idea of a momentum goes against one of the characteristics of super wicked problems, that time is running out. If we would somehow miss the lock-in of effective climate policy, we would be left with another policy, while time is ticking away. If we follow the argument of Levin *et al.* or path dependency in general, it would take quite some time, if it is even possible, to create a new momentum.

While super wicked problems thus faces some setbacks chapter 5 evolved around creating a starting point of a change in attitude, by making an appeal to people’s responsibility. I argued on the basis of Vallentyne’s (2008) consequentialist account of responsibility that brute luck should be compensated on the basis of what is most effective. However, Vallentyne’s framework too much depends on people’s awareness of their actions, instead of the causal value of actions themselves. This criticism is also put forward by Braham and Van Hees (2009) who give us the possibility to assess each contribution to an outcome and compare it to other contributions as well.

Apart from individual responsibility chapter 5 also argued for state responsibility, on the basis of Miller's (2007) argument for remedial responsibility, which is focused on remediating the situation of the deprived rather than assessing who is outcome responsible. Furthermore I have argued that citizens of states can be held remedially responsible if the criteria that Pierik (2008) sets out with regard to agency are fulfilled.

In the introduction agency was addressed. I argued that this thesis appeals to what we can do, rather than what we cannot do. Nonetheless I am aware that there are limitations. However, as I pointed out at the end of chapter 5, when we are debating different routes to live sustainably it is important to not be dogmatic. In my view it works the other way around as well. We may think we are limited in our actions. For example, someone with a low budget wants to start a vegetarian diet to limit her emissions but cannot afford meat substitutes. If she were to think in options instead of limitations she could see how, by means of compensation, she could also limit her cheap meat intake to once or twice a week. That is not to say it is always easy to find an alternative. However, letting go of dogmas at least is a start.

Several other caveats with regard to responsibility still exist and provide us with opportunities for future research. Though this thesis has made clear that we can precisely establish each and everyone's individual contribution to climate change (at least theoretically), a downside is that here only retrospective responsibility has been addressed. Therefore the most important direction for future research is prospective responsibility. Obviously, establishing responsibility for an outcome we are yet unaware of will be very difficult. I suggest to build an argument for prospective responsibility on what is the reasonably expected outcome. Second, it remains unclear when a specific state can be held remedially responsible. A framework through which we can prioritize Miller's six different types of remedial responsibility is necessary. The final suggestion for future research is more practical. In what way, through the use of the strategic policy instrument presented by Levin *et al.* can we establish a norm for the responsibility to live sustainably? As has been pointed out, this will be difficult, considering the array of different individuals and their views. However, it is vital if we want to deal with climate change.

It may be clear, we are not there yet. Much research is still needed. However, the scientific importance of this thesis mostly lies in linking the field of super wicked problems to commons literature. As we now know the commons debate, with regard to global commons tragedies such as climate change, was at a dead end. This thesis has put super wicked problems to the test and has shown that, while it needs some brushing up, it can be of help. It gave this thesis the possibility to make an appeal to responsibility, which will hopefully be the start of effectively dealing with climate change.

7 – Literature

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