

World on Fire: An Exploration into Climate Change Policy

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### **Abstract**

This thesis examines climate change policy, specifically the Green New Deal and the Paris Climate Agreement, in relation to Elinor Ostrom's Design Principles for success in governing a common pool resource. This paper aims to describe how climate change is impacting us, what the countries of the world have done to solve this issue in the past, what proposals countries are working on today, and how those proposals fit Ostrom's Design Principles. This project analyzes how design principles are or are not met by both the Green New Deal and the Paris Climate Agreement. This paper discusses questions that are important to ask about the critical analysis of both documents and what was found to be missing. The addition of design principles for a larger scale common pool resource and how that can best be executed is also described.

## **Climate Change Effects**

Our world is at its breaking point with the noticeable effects of climate change. These harmful effects are occurring to billions of people who are not well equipped to handle the severe consequences of our changing climate. This is not a local problem, rather it affects us all in that our way of living will not be sustainable in a few decades. There has been conversation around climate change for years now but there has not been a complete and legally binding contract or treaty that holds countries accountable for unkept promises. The question lies in who is willing to step up and bring in other countries to agree on a method to help Mother Earth and its inhabitants?

Evidence of climate change can be found in melting ice, ocean acidification, severe weather, and floods and droughts. First, the temperature around the globe has gotten to an all-time high in the last seven years, with 2020 being the warmest year on record (Schmunk, 2021). Due to this rise of temperature, we are witnessing the ice sheets melting, which in turn are causing the sea levels to rise. The two ice sheets in existence are those housed in Greenland and Antarctica, we have seen that they have had major changes to their mass over the last two and a half decades. A recent study showed us that there were billions of tons of ice that have melted in each of these locations (Velicogna et al., 2020). On the same note, we have glaciers that are receding in all areas of the globe due to the rising temperatures. Since the 1970's, the most notable loss has been occurring in the United States and Western Canada (World Glacier Monitoring Service [WGMS], 2021). This in turn helps the sea levels rise as well, which contributes to the two existing ice sheet's effect.

The next evidence of climate change comes to us directly from the ocean, ocean acidification. Ocean acidification occurs when carbon dioxide is absorbed by the ocean and it lowers its pH levels, thus making the surface more acidic. The carbon dioxide that is key for this process originates in the man-made carbon emissions from things such as our factories and vehicles. Ocean acidification also affects the creatures that are living in the ocean, specifically those that need calcium to grow their external shells or protective layers. Sea creatures that create their shells use a method of combining carbonate and calcium. The issue here is that the excess hydrogen wants to bind with carbonate so then that offers no carbonate for calcium and shell building. There is a potential if the pH gets too acidic, the shells could dissolve in the water. Some sea animals require the presence of the shelled sea creatures to provide their food source, along with us humans who enjoy eating things like crabs, lobsters, mussels, and clams. If animals do not have their food source then they cannot survive, especially if it is their main food source, it could cause a shortage in the other creatures that they consume to live (Oceanic and Atmospheric Administration [NOAA], 2020).

The final reason we know of climate change's existence is perhaps the only effect that we as humans have been seeing directly over the years. Weather patterns have changed drastically over the last few decades, specifically since the 1950's (Climate Science Special Report [CSSR], 2017). We have lived through increased rainfall, higher and/or lower temperatures, and powerful storms that range from hurricanes to snowstorms. Here in the United States we recently saw a snowstorm that overtook most of Texas and caused damage because the state was not prepared by any degree to handle the outcomes of a vicious snowstorm (The New York Times [NYT], 2021). Wildfires have been raging all over the world, in early 2020 we saw as parts of Australia

were engulfed in flames that were so out of control that it harmed much of their wildlife and scenery (Yeung, 2020).

Floods be disastrous for the coastal cities and islands all around the globe, causing water damage and leaving many without proper homes. On the opposite end of this spectrum are droughts, which stem from the differing amounts of rainfall, or lack of rainfall, every year since the early 2010's (CSSR, 2017). We as humans will suffer from the effects of droughts because we require the rainfall and access of water to help our crops grow, which provides us with fresh produce and our food.

In addition to these hardships, climate change will likely increase conflict across the globe. The Pentagon has run war game simulations based on conflicts over drought, water, and oil, as well as influx of migration from damaged areas (CSSR, 2017). Developing countries will have the short end of the stick here because they will be suffering at a grave rate, with the least capacity to adapt to a changing climate. This is already a humanitarian crisis, but climate change including drought and flooding will increase, it will gain way for death, disease, and conflict for resources (CSSR, 2017). It is important for us to come together as one at all levels of government to come up with a solution to the climate crisis. This is especially relevant because both the Paris Climate Agreement and Green New Deal highlight the idea and importance of unity and working in harmony. Exploring the past attempts made in order to mitigate the climate crisis and how other efforts have concluded will allow us to view the Paris Climate Agreement and the Green New Deal in conjunction with Ostrom's design principles.

### **Past Attempts to Mitigate**

At the international level, in 1992, representatives from 178 nations met in Rio de Janeiro to create the UN Framework Convention on Climate Change. This agreement set the stage for negotiations among hundreds of nations in 1997, establishing the Kyoto Protocol that was eventually signed by 192 parties. During the first period, the countries agreed to a five percent reduction of greenhouse gasses when compared to the levels of the 1990s (Framework Convention on Climate Change [UNFCCC], 2021). The second period of the Kyoto Protocol was from 2013 to 2020, it had a more ambitious goal of an eighteen percent reduction of greenhouse gasses (UNFCCC, 2021). The Kyoto protocol has failed to fix the climate problem because global powerhouses like the United States, China, and India did not want to take part; this is critical because they are the world's largest polluters. Without the support from these countries, the strides made by smaller countries are overshadowed. The United States' reason for not participating lies in the belief that the economy would suffer greatly from the efforts that it would take to reduce their greenhouse gas emissions (Earth.org, 2021). By the end of the Kyoto Agreement, climate change had not abated. We saw an increase of global carbon emissions from fossil fuels from 1997 to 2012 of about 3,300 million metric tons (United States Environmental Protection Agency [EPA], 2021).

At the national level, The U.S. Federal government has failed to pass any comprehensive climate change legislation. There has been an absence of bills that gained traction on the Senate or House floors, and a reluctance from leaders to act on combating climate change. In order to address this truly global challenge, quick action at both the global and national level is required. The next section describes two recent global and national efforts to address climate change.

### **Recent U.S. and International Efforts**

There is growing consensus that policy at the international level is a critical piece of any strategy to address climate change. Following the end of the first commitment period of the Kyoto Protocol, leaders from around the world began meeting to agree on a replacement international strategy. In 2015, leaders from 196 nations, including the U.S., signed the Paris Climate Agreement. Signatory nations agreed to the overarching goal of reducing the global temperature by 1.5 to 2 degrees Celsius. The Paris Climate Agreement involves the aforementioned 196 countries that is revisited every five years, with many of the countries being those that have the highest impact on carbon emissions (Denchak, 2021). It is under this agreement that the countries involved pledged to help one another via monetary and technological resources (UNFCCC, 2021). The agreement states that the only way to solve climate change is by involving the entire world in the efforts. Not one single country can control or monitor the effects on its own because it will not be enough. We created the issue as a globe and that is the only way to resolve it (Denchak, 2021).

The United States pulled out from the Paris Climate Agreement in November of 2020 at the instruction of then President Donald Trump, who argued that the agreement would destroy economic growth and American government (Friedman, 2021). Trump stated that the United States had a plethora of things to lose if they stayed in the agreement; he stressed the economic impact that it would have on hard-working, tax-paying Americans (National Public Radio [NPR], 2017). A few months later, the United States rejoined after an executive order by President Joseph Biden. Along with rejoining the Paris Climate Agreement, President Biden has pledged to reduce emissions by 2030 and has taken it a step further to make it official by

declaring it a nationally determined contribution that can be validated under the United Nations Framework Convention on Climate Change (White House, 2021).

Although the U.S. lacks current federal law on climate change, there is a proposal gaining attention at the national level, The Green New Deal. It is legislation that would make the United States an eco-friendlier place, thus, removing a large percentage of the carbon emissions that we place into the air. This proposal was introduced by Alexandria Ocasio-Cortez, who has remained the face of this 14-page document that has been trying to gain bipartisan acceptance its introduction in 2015. The Green New Deal is ambitious with its plans for the next decade. The main idea from this bill is that we need to reduce all emissions and run on green energy completely by the year 2030. Proponents argue that the amount of work this would take to make happen is an area of benefit for the United States because of the number of jobs it would provide. There would be a need for new vehicles, power grids, reparation of current infrastructure that would be designed to withstand extreme weather, changes to public transit, and clean-up of hazardous wastes (D'Souza, 2021). Critics argue similar points to that of the Paris Climate Agreement; the Green New Deal is an ineffective economic disaster waiting to happen, job-killer, and an overall impractical proposal (Haskins, 2019). The same question of costs comes into play at the national level, the American people have been told several numbers ranging in the billions to the trillions. Some Americans do not believe it is necessary due to their stance on the existence of climate change. It is difficult to ease and provide bipartisanship to this because the estimate cost is in the trillions range and there is no set plan on how the government will pay for this complete overhaul of going from coal-based power to green energy (D'Souza, 2021).

## Mitigation Utilizing Ostrom's Principles

While popular media attention to climate change policies such as the Green New Deal and Paris Climate Agreement typically focus on the politics surrounding who is for or against them, it is important to take a closer look at the policies themselves. To analyze these policies, we can draw on scholarship in the field of common pool resources, or CPRs. These are resources that are either created by humans or are naturally available (Indiana University, 2009). Two key features of CPRs are that it is hard to prevent people from using them and they are subtractable, meaning they are depleted through use. Thus, without a way to constrain use, the CPR can eventually be exhausted. Climate change itself is a common pool resource due to the fact that we all share the climate here on earth. As more people put greenhouse gases into the atmosphere without constraint, they deplete the atmosphere's capacity to absorb the gases into a stable climate. We are at risk of running out of our CPR, stable climate, due to our use and what we place into the world to try to make up for losses experienced. Climate change affects other subsets of CPRs like forests, agriculture, and bodies of water (Indiana University, 2009). In order for the commons to be managed effectively, we must figure out how to limit the human behaviors that overuse them.

Nobel prize winning scholar Elinor Ostrom developed a framework for analyzing CPRs and suggesting how to effectively manage them. In her 1990 book, Ostrom developed eight design principles for successfully managing CPRs: (1) Well-defined boundaries, (2) congruence between appropriation and provision rules and local conditions, (3) collective-choice arrangements, (4) monitoring, (5) graduated sanctions, (6) conflict-resolution mechanisms, (7) minimum recognition of rights, and (8) nested enterprises (Cox et al., 2010). A few years later,

the principles were modified and had another three principles added to clarify some of the already defined principles (Cox et al. 2010). These included distinguishing between user and resource boundaries, monitoring users and the resource itself (Cox et al., 2010). Together the principles contribute to successful management of commons. In the next section, we will be analyzing the Paris Climate agreement and the Green New Deal under these principles.

**Organization of PCA and GND for Ostrom’s Principles**

Design Principles 1A and 1B involve clearly defined boundaries; individuals or households who have rights to withdraw resource units from the common-pool resource (CPR) must be clearly defined (Ostrom, 1990). Ostrom (1990) says that we have to close the boundaries of our CPR to outsiders and if not done, there are risks of people enjoying benefits of resources that they did not help upkeep or create. In other words, there has to be a set boundary between the CPR and the outsiders; we have to be able to keep people out and keep those contributing to the success of the CPR inside. This cannot be applied in the case of climate change as we all on Earth share the atmosphere, so they are not met by the Paris Climate Agreement or the Green New Deal. We cannot exclude people from the atmosphere on Earth. (See Table 1)

**Table 1:** Presence of Ostrom's Design Principles in the Paris Climate Agreement and the Green New Deal

<b>Ostrom’s Principles</b>	<b>Paris Climate Agreement</b>	<b>Green New Deal</b>
1A. Clearly defined boundaries: Individuals or households who have rights to withdraw resource units from the common-pool	No	No

resource (CPR) must be clearly defined.		
1B. Clearly defined boundaries: The boundaries of the CPR must be well defined.	No	No.
2A. Congruence between appropriation and provision rules and local conditions: Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions.	Yes	Yes
2B. Congruence between appropriation and provision rules and local conditions: The benefits obtained by users from a CPR, as determined by appropriation rules, are proportional to the amount of inputs required in the form of labor, material, or money, as determined by provision rules.	No	No
3. Collective-choice arrangements: Most individuals affected by the operational rules can participate in modifying the operational rules.	No	No
4A. Monitoring: Monitors are present and actively audit CPR conditions and appropriator behavior.	Yes	No

4B. Monitoring: Monitors are accountable to or are the appropriators.	No	No
5. Graduated sanctions: Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offense) by other appropriators, officials accountable to these appropriators, or both.	No	No
6. Conflict-resolution mechanisms: Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.	Somewhat	No
7. Minimal recognition of rights to organize: The rights of appropriators to devise their own institutions are not challenged by external governmental authorities	Yes	Somewhat
8. Nested enterprises: Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.	Somewhat	Somewhat

Design Principle 2 was split into 2A and 2B by Cox et al (2010), both involve the overall idea of congruence between appropriation and provision rules and local conditions. Design Principle 2A describes appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions (Cox et al., 2010). In relation to climate change, we see that this is met because both documents consider the local level abilities all the way from the smallest of communities that are often displaced by large or profitable changes, as well as when speaking about developing countries as a whole. On page 14, the Green New Deal highlights the indigenous peoples of the United States; obtaining the free, prior, and informed consent of indigenous peoples for all decisions that affect indigenous peoples and their traditional territories, honoring all treaties and agreements with indigenous peoples, and protecting and enforcing the sovereignty and land rights of indigenous peoples (Congress, 2019). The Paris Climate Agreement, article 4, says that the least developed countries and small island developing States may prepare and communicate strategies, plans and actions for low greenhouse gas emissions development reflecting their special circumstances (UNFCCC, 2015).

Design principle 2B is the benefits obtained by users from a CPR, as determined by appropriation rules, are proportional to the amount of inputs required in the form of labor, material, or money, as determined by provision rules (Cox et al., 2010). This is dealing with the equity of the give and take from the CPR; essentially, we are trying to figure out if every single person putting in more or less effort is getting that amount of benefit back from the CPR. Climate change action will take a collective effort which means that we will all be contributing but it is important to highlight that those who are actively working in jobs to cut down carbon

footprints will receive the same if not similar benefits from the CPR. The Green New Deal states that there will be millions of jobs created, in section O of the final page, it says that all people will be provided with high-quality health care, affordable, safe, and adequate housing; economic security; and clean water, clean air, healthy and affordable food, and access to nature. These benefits are to be shared not according to participants' inputs, but for all people (Congress, 2019). Similarly, the Paris Climate Agreement does not provide additional benefit to those doing more to reduce greenhouse gases. We only see that the Paris Climate Agreement reiterates various times that all the work to lower the global temperature will be done in a form where all countries are helped and given special consideration if the resources are not available (UNFCCC, 2015). Thus, principle 2B is not met by the Paris Climate Agreement or the Green New Deal because while there will be benefits for all, the benefits are not granted according to level of participants' input nor is it really possible at the global scale.

Design Principle 3 is not met in either policy. This principle describes collective-choice arrangements where most individuals affected by the operational rules can participate in modifying the operational rules (Cox et al., 2010). Ostrom (1990) says that "... the individuals who directly interact with one another and with the physical world can modify the rules over time so as to better fit them to the specific characteristics of their setting." (p. 93). I believe that this is Ostrom telling us that the conditions of anything are everchanging so we need to bear in mind that whatever changes are made are done so with the consideration of all people who are involved within the CPR. Not only that but also ensuring that there is inclusion of those that are indirectly affected by any changes made to a CPR. The Paris Climate Agreement does not meet this design principle because it does not outline making changes to the agreement by having all

countries involved. Although all countries wishing to participate in creating the Paris Climate Agreement were allowed to do so, there are no provisions in the Paris Climate Agreement to subsequently allow countries to modify the agreement (UNFCCC, 2015). The Green New Deal only partially meets this because it states that the government officials working on this bill will take communities like Natives into consideration as they have been historically excluded from anything regarding their land, as stated in the final page of the Green New Deal in section M (Congress, 2019). They do not exactly outline who will be making the final decision or ruling on conditions nor do they specify how they will go about making changes over time.

Design Principle 4 was the final principle that was split into two by Cox et al (2010). 4A deals with monitors being present and actively auditing CPR conditions and appropriator behavior. “Monitoring makes those who do not comply with rules visible to the community, which facilitates the effectiveness of rule enforcement mechanisms and informs strategic and contingent behavior of those who do comply with rules” (Cox et al., 2010, p. 9). There is a direct effect between the number of monitors versus the amount of positive change we see in the CPR (Cox et al., 2010). This means that if there are monitors around to keep track of changes then there is an active system of people following the rules that were previously set for the CPR. Design Principle 4A is met in the Paris Climate Agreement due to the existence of a secretariat who is set to be reported to of any changes made to the agreement and keeps records of the emission levels by each of the Parties. According to Article 4, the secretariat shall “...notify the secretariat of the terms of that agreement, including the emission level allocated to each Party within the relevant time period, when they communicate their nationally

determined contributions” (UNFCCC, 2015, p. 3). These reports are used to generate the Paris Agreement’s global stocktake, which are the long-term goals that are reported upon every five years as a way to actively audit CPR conditions. The reason Design Principle 4A is met is due to the secretariat keeping records for the changes or measures each country is taking to combat climate change and informing the other Parties involved in the agreement. Each country participating in the Paris Climate Agreement promises to reduce greenhouse gas emissions by a pledged amount, and each country self-reports its reductions to the secretariat. In the Green New Deal, monitors are not pointed out explicitly, which means they fail to meet the basic criteria.

Design Principle 4B, monitors are accountable to or are the appropriators, is not met by either one of the policies. The Green New Deal cannot meet this because it lacks the prerequisite monitors. The Paris Climate Agreement does not meet this either because it does not have any rules or consequences in place for the secretariat. There is no official monitoring system, only a record keeping secretariat and an agreement to meet every five years to discuss the long-term goals; the reporters are the countries representatives to the secretariat. If the secretariat or the people reporting on behalf of their represented country make a mistake or are found to be biased in some form, they are not held accountable by the Paris Climate Agreement or by any of the Parties involved. However, it is insinuated in Article 7 Section 14 that there is subject for review of how the long-term goals are achieved but no solid language can be found to completely prove this assumption. In this section, the Paris Climate Agreement says the Secretariat shall “...Review the adequacy and effectiveness of adaptation and support provided for adaptation; and review the overall progress made in achieving the global goal on adaptation...” (UNFCCC, 2015, p. 7). Cox et al. (2010, p. 9) states that, “...it may be important that monitors are

accountable to those who most depend on the resource.” I think they mean that there has to be accountability and responsibility as a two-way street, those who look after the CPR and those involved within the CPR, it is a mutual understanding that can make it possible for all to benefit. The monitors may benefit from the CPR or a form of monetary payment, while the community enjoys the fruits of the CPR.

Design Principle 5 centers around graduated sanctions, specifically appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offense) by other appropriators, officials accountable to these appropriators, or both (Cox et al., 2010). This is the principle that Ostrom says ties together all of the design principles thus far, she states, “When the CPR appropriators design their own operational rules (design principle 3) to be enforced by individuals who are local appropriators or are accountable to them (design principle 4), using graduated sanctions (design principle 5) that define who has the rights to withdraw units from the CPR (design principle 1) and that effectively restrict appropriation activities, given local conditions (design principle 2), the commitment and monitoring problem are solved in an interrelated manner.” (Ostrom, 1990, p. 99). What I believe Ostrom means by this in the context of graduated sanctions is that we must have a point where we bring everything together to work as a cohesive machine. There has to be resource users who are in charge of overseeing the CPR and people are to be punished by a method that uses graduated differences over time. For example, repeated infractions would mean a bigger penalty after each violation of the rules.

The Paris Climate Agreement does not meet the design principle 5 because it leaves out specific details on how it will deal with the countries that do not follow through on their pledges,

meaning it fails to include the sanctioning part of the design principle. The Paris Climate Agreement mainly deals with the suggestions and some basic outlined rules that it has for the reporting of the progress that countries have made of their goals (UNFCCC, 2015). The monitoring is present but the accountability part is not. The Green New Deal only calls attention to what type of issues climate change has caused the United States and how the Green New Deal has goals that can help solve those problems (Congress, 2019). This Design Principle intertwines with the base of Design Principle 4A & B where monitors are important to the success or the implementation of graduated sanctions because there is an element of accountability for breaking rules set for the CPR.

Design Principle 6 is regarding the conflict resolution abilities of the policies, it states that appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials. Ostrom says that the rules must be seen as fair across the board for all or else the amount of people following the rules will fall dramatically. I think this means that there has to be equal give and take with those who are monitoring and those being monitored because mediation could be what makes or breaks the success of the CPR. Additional support is provided by Cox et al (2010) who state that conflict is unavoidable when managing the CPR; there needs to be a system in place for ensuring that conflicts are taken care of in a low-cost fashion. The Paris Climate Agreement somewhat meets this Design Principle because it encourages countries to find a balance, cooperate, and adopt a sort of trial and error method to act as lessons learned (UNFCCC, 2015). But this language is used in a fleeting manner and does not describe how countries should go about finding a solution to conflicts within or between countries. The Paris Climate Agreement says "...Sharing

information, good practices, experiences and lessons learned, including, as appropriate, as these relate to science, planning, policies and implementation in relation to adaptation actions...”

(UNFCCC, 2015, p. 6). The Green New Deal does not meet Design Principle 6 because this document does not go over any type of conflict that could arise based on the goals listed or the science that is reported within the document.

Design Principle 7 is the minimal recognition of rights to organize: The rights of appropriators to devise their own institutions are not challenged by external governmental authorities. Ostrom (1990) says that if government officials outside of the CPR believe that they are the only people able to make and implement rules, then the people who are maintaining the rules from within the CPR will find it to be an impossible task to upkeep the CPR over time. This points to a potential power dynamic that is not desired by the people closely affected by the CPR. If there is more input from an outside source, then those on the inside will not feel as they have a voice and be discouraged in maintaining their CPR at its optimal functioning level and will fall apart.

The Paris Climate Agreement meets the Design Principle 7, in fact, many of the Articles within the Agreement have positive language towards Parties of the Paris Climate Agreement. For example, Article 13 says that “In order to build mutual trust and confidence and to promote effective implementation, an enhanced transparency framework for action and support, with built-in flexibility which takes into account Parties’ different capacities and builds upon collective experience is hereby established” (UNFCCC, 2015, p. 10). It provides a clear area for the Parties to make their own choices on how to accomplish the goals they’ve set out and the Agreement has solidified. There is a push to work together, find solutions, share solutions or

missteps, and alter the way they design their country's response to ensure that the countries themselves have as much autonomy as possible.

The Green New Deal somewhat meets Design Principle 7 because it considers the local, State, and Federal levels. On page 11 section 4A, we see that any steps that are to be taken will be done so at the consideration of those aforementioned government levels. Specifically, "...to achieve the Green New Deal goals and mobilization, a Green New Deal will require the following goals...Federal, State, and local government agencies... working on the Green New Deal mobilization." (Congress, 2019, pp. 10-11). Achieving their goals will require aid at all levels, which means working cooperatively on what is best for the area itself and the people in the area can decide how to best implement their suggested actions. At the end of the day, the Green New Deal provides suggestions based on what they believe should be done about the climate problem, they do not force communities to complete their suggestions in a certain manner. There is an issue listed and a solution proposed but it is not the ultimate key for said issue.

Design Principle 8 applies to larger CPRs: appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises. If regulations are omitted from all but one levels or multiple levels, then the CPR will not last in the long run (Ostrom, 1990). Ostrom is describing how local levels should be in charge of some local rules, but these levels should send representatives to a larger scale governing body that makes rules for the broader area within the boundaries of the CPR. She also talks about how a CPR can have nested levels but they are all nested within the local, regional, and national government. The Green New Deal somewhat meets this design principle because it

talks about how local, state, and federal government should all be working together so that each state can have their local governments working together on a plan to reduce climate change. We see collaboration mentioned from government officials working with farmers and ranchers as well as working with one another at community, Federal, State, and local government levels (Congress, 2019). But this is only somewhat met because there is not a set-up of how local communities should aggregate the state government leaders, and how the state can communicate with the national level of government. It says that we should see action at all levels, which is not considered to be nested. The Paris Climate Agreement somewhat meets this design principle, stating that the parties are “recognizing the importance of the engagements of all levels of government and various actors, in accordance with respective national legislations of Parties, in addressing climate change.” (UNFCCC, 2015, p. 1). The Paris Climate Agreement declares that in order for the agreement to be enacted and function at a global level, there has to be a consensus of working together with all governmental levels. Countries can be considered nested inside the globe since our common pool resource is large.

Both documents stress how much working together across levels will be beneficial for a real progressive change in the climate; how working in collaboration with one another can make it so that we do not make similar mistakes and achieve the more ambitious goals together. But they fail to describe what the boundaries are of working with one another, whether we can pair up counties and other states or states and other countries. Thus, it does not make it completely nested because of the lack of a hierarchical structure within the nested enterprises; in theory, King County could work with the country Germany and the state of Oregon could work with the Gambia since there is no clear nesting hierarchy.

## Discussion

While analyzing both of these documents, I've found that pieces of policies can be well-thought out or well-meaning but can miss foundational aspects that could allow the document to be more successful. Many of Ostrom's design principles could be beneficial for the Paris Climate Agreement or the Green New Deal to begin implementing or enforce. The Paris Climate Agreement and the Green New Deal need monitors, graduated sanctions and conflict resolution mechanisms. Neither document goes into very much detail, if any at all, about these three design principles. As a reader, I can see the intent of the goals they are trying to create and act on but many important details are lacking. For example, how can I solve a problem if it arises in my community or in my state? How will there be governmental aid? How will we keep track and keep each other honest? How can we establish accountability between community members that doesn't tear our community apart? The same questions can be applied towards a larger or international scale as well. I've noticed that the United States has a history of not being bipartisan in many topics, so how can we get countries like that to agree to make such drastic changes? What are the incentives and should those who emit the most carbon be the folks who are leading by example with drastic changes? How can we convince people that the science is not altered or fake? There are a variety of questions that need to be asked in order to implement these needed design principles, but the first question to ask is if we are determined as a human population to cooperate with one another and allow ourselves to try new methods of solving issues that are being brought up by scientists.

Across the 8 Design Principles, patterns emerge in comparing the Green New Deal with the Paris Climate Agreement. We can see based on the table above that the majority of the design

principles are either met, somewhat met, or not met similarly by the Paris Climate Agreement and the Green New Deal. They diverged only on design principles 4A, 6, and 7; where they tend to favor the Paris Climate Agreement in meeting the design principle.

Not all of the design principles are required for successful CPR management, Baggio et al (2016) compared results from 69 cases of forestry, fisheries, and irrigation CPRs to determine how different combinations of design principles made the resource more likely to be successful. They found that in most successful cases, design principles 1A and 1B as well as 2A & 2B were necessary for success. For my analysis of climate governance policies, these design principles are mostly not met Baggio et al (2016) also concluded that the presence of at least 1A & 1B design principles greatly increased the odds of success. Baggio would predict that neither the Paris Climate Agreement and the Green New Deal would have success when lacking one of two co-occurring design principles. In my analysis, the Paris Climate Agreement has three design principles present plus two somewhat met, while and the Green New Deal has one design principles met plus two somewhat met. Thus, the combinations and quantity of design principles present in the Paris Climate Agreement and the Green New Deal do not bode well according to Baggio et al's (2016) findings about overall success. However, it is not known if design principle combinations and quantity for success of a large-scale CPR like global climate are fundamentally different than those in forestry, fisheries, and irrigation. Future papers could analyze the present or missing design principles in successful climate change policy from other countries and compare it to that of the United States, as well as how the general public opinion on climate change can sway how well a piece of legislation functions.

The Green New Deal as a proposal is set-up to provide many ideas of how to combat climate change, where to start, what to implement, and most importantly it makes it a point to spend several pages discussing how climate change directly impacts the United States. What it does not mention is how to carry out the suggestions or how the United States government will be able to pass a bill of this content in a bipartisan manner. Nor does it address the challenge that the political divide in America is so strong that some political groups deny the science of climate. The proposal states in section 1C on page 5 that the Green New Deal aims to invest in the infrastructure and industry of the United States; there is a focus on the foundation and jobs, which is what I find are aspects that could gain bipartisan support (Congress, 2019). With this foundation, a solution for this would be to create institutions at a smaller scale, utilizing Ostrom's Design Principles. Allowing cities or states to collectively develop locally-focused versions of the Green New Deal, with attention to Ostrom's Design Principles, could increase policy effectiveness. In fact, Ostrom (2009, p. 2) argued that addressing climate change at multiple levels and scales of governance was needed.

The Paris Climate Agreement provides a larger stage for goal making and achieving. It stresses that capabilities are different, working together is the way to accomplish anything, and that in order to fix any problems there will need to be communication between the countries of the world (UNFCCC, 2015). The Paris Climate Agreement is an interesting document because it does not outline or instruct each country on how to combat climate change, instead it sets up a stage where countries can create their own plans to combat climate change, what their goals are in relation, and how it ties to the collective goal of limiting the increase of overall temperature to that of 1.5 °C above pre-industrial levels (UNFCCC, 2015). The main road bump that I noticed is

that the Paris Climate Agreement needs to be less broad in its suggestions and more direct with how countries could combat climate change and there also needs to be a firm form of accountability; it could actually benefit from some of the language of the calls to action used in the Green New Deal. The Paris Climate Agreement already highlights communication and working together to keep track of positive or negative changes to our climate. The agreement states how imperative it is to stop climate change in its tracks due to the harm it is causing to all persons on this earth, specifically via our food productions as noted in the first page of the agreement (UNFCCC, 2015). It encourages broad choices of positive incentives, sharing scientific discoveries and experience, collaboration with technology and money, and mitigation strategies for countries to take on when creating their legislation.

Trying to apply Ostrom's Design Principles to a larger scale common pool resource was incredibly difficult due to the nature of a traditional common pool resource. There are a few things I noticed along the way in this process, one being that there needs to be added Design Principles for larger scale common pool resources or at the minimum additional addendums to each, where the Principles are separated by large versus small scale. There should also be a consideration of the worst fit design principles for large scale common pool resources. For example, the first design principle is not a good fit because setting physical boundaries can be difficult or in this case, somewhat impossible. A suggestion for an additional Design Principle deals with exiting a common pool resource governance agreement. The U.S. formally withdrew from the Paris Climate Agreement in 2019, following a process which the Agreement specified included a waiting period of two years and rules about re-entering the Agreement, which the U.S. did in 2021. This exit process should allow a party that is no longer interested, or that does not

benefit from participating, to exit without creating additional problems for the other parties still in the CPR agreement. I believe that an arrangement like this should be a process of reflection, which isn't necessarily easy but not hard either. There should be a process that parties must go through to ensure that they want to leave the common pool resource agreement and ample time given for those who are staying in the CPR to adjust and adapt to their new routines and rules without the leaving party. The leaving party must contribute to the common pool resource in their withdrawing process, should make a formal statement as to why they are leaving the CPR, and should have already attempted to bring up their concerns and tried ways to solve them.

Climate change is causing serious challenges for billions of people across the globe. Despite a lack of federal statutes in the U.S. addressing climate change, there is policy action at the international level, the Paris Climate Agreement, and a proposal that would strive to make the U.S. an eco-friendlier place, the Green New Deal. If we view global climate as a common pool resource, we can apply Ostrom's (1990) design principles to analyze these two policies' likelihood of success. As described above, both the Green New Deal and the Paris Climate Agreement are broad in their explanations of how they plan on implementing changes and it reflects on which of the design principles were not met. Baggio et al (2016) would conclude based on their previous findings that both documents do not meet the criteria to create a successful CPR due to their missing co-occurring design principles. Specifically, noting that the Green New Deal had the majority of design principles absent, making it less likely to be an efficient way of running a CPR. Thus, policies such as the Paris Climate Agreement and the Green New Deal, while well intended, should address shortcomings identified in this analysis. If these policies don't consider changes or reinforcements now, we will all pay the price later.

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