# Understanding Common-Pool Resource Governance Through Broad Sustainability Ambitions

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**Through Broad Sustainability Ambitions**


*Research question:* How do broad sustainability ambitions influence the governance of the commons?

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## Introduction

The climate crisis is the most significant challenge to Earth's life-supporting systems that we, as humanity, have yet to face. In the latest report from the United Nations Intergovernmental Panel on Climate Change (IPCC) the world's leading climate scientist outlined how human-led climate change is causing increased stress on the Earth's life-supporting systems (IPCC, 2023). However, the IPCC (2023) believes that if immediate action is taken to curb our climate impact there is an opportunity to halt the progression of human-led climate change. Climate change mitigation has thus become the defining challenge of the next decades and the need to find solutions that reduce our climate impact is urgent.

Sustainability in resource use is recognized as one of the key strategies in climate mitigation (Tompkins & Adger, 2004). Noting the urgency in the need to find climate impact mitigation solutions, the motivation for this paper is to understand how sustainability ambitions interact with governance practices, particularly in the field of Earth's life-supporting systems. Earth's life-supporting systems, also known as ecological services, are conditions and processes by which Earth's natural ecological cycles maintain human life and well-being (Daily, 1997). Governance of resources comprising Earth's life-supporting systems thus impacts the living conditions of all people. Therefore, there is a need to understand how such resources are affected by shifting priorities for policymakers. To grasp how these resources are governed, one needs to look towards the academic field of common-pool resources (CPRs) governance – also known as commons governance – because many of the resources comprising Earth's life-supporting systems are CPRs (Walker & Gardner, 1992; Colding er al., 2013). Thus, the sustainable management of CPRs provides a potential governance model to curb human impact on Earth's life-supporting systems.

However, the established literature on CPR governance is limited in its understanding of sustainability since it only considers the governance practices of communities concerning select resources. As a result, the practices of a community beyond the CPRs they manage are outside the purview of the academic interests in CPR governance thus far. Therefore, it is unclear if the concept of sustainability within CPR governance can be expanded to address climate impact mitigation policy objectives in the next decades. This paper aims to expand the concept of sustainability applied in CPR governance from the lens of segregated analysis of resources in isolation of the community to the perspective of an integrated ecosystem between resources and communities.

## LITERATURE REVIEW

The field of CPR management is embedded in environmental economics as the issue of CPR depletion has been framed as a failure of market forces to sustainably allocate resources (Walker & Gardner, 1992). The academic interest in CPRs first came about in a paper by Hardin (1968) describing the issue of non-technical solutions facing the collective international community. Hardin (1968) coined the phrase 'tragedy of the commons' when he explained how rational economic beings, i.e., humans, have no incentive to cooperate with others to ensure the sustainability of CPRs. The field of study interested in CPRs can be split into two types of commons – global and local. Seabright (1993) notes greenhouse gas emissions as a form of global commons. Since no single nation-state is incentivized to reduce its emissions without the cooperation of other nation-states resulting in a collective action problem. While reducing global greenhouse gas emissions would mitigate the human impact on the environment, the focus on the global commons is limited in its current state since the sovereignty principles of international law must be considered (Ranganathan, 2016). In other words, finding solutions for climate mitigation in global commons is difficult because there is protection from international law which dictates the actions of individual nation-states, and few legal prerogatives exist for intervention by international organizations. Therefore, this paper argues that more immediate solutions to the climate crisis can be found in the study of the local commons since they are bounded by national law and avoid general issues of sovereignty.

The local commons face community common-pool resource management challenges with differing community incentives, but all are bounded by national law. Therefore, the academic literature has focused on understanding these incentives through the governance practices of communities worldwide (Lockyer, 2017 and Seabright, 1993). Hardin (1968) argued, based on a rationally principled person, that sustainable CPR management is not possible without a heavily regulating state apparatus. Ostrom (1990; 2004) challenges Hardin (1968) idea and sets out to provide evidence to the contrary of Hardin (1968). Ostrom (1990; 2004) finds that community norms and values play a significant role in the governance of CPRs, overcoming Hardin's (1968) strictly rational perspective. Ostrom (2002) illustrates a set of design principles that formulate the governance structures of communities to overcome the 'tragedy of the commons' and need to be present (in whole or in part) for CPR management to be sustainable. Research into local commons has built on the design

principles that Ostrom laid out (Singleton, 2017). Yet, all operate on the same understanding of limited sustainability.

This paper's critique and subsequent addition to the literature on CPR governance lies in broadening the definition of sustainability. The current literature views sustainability from the perspective of the resource (Ostrom, 2002; Singleton, 2017). Consequently, a common-pool resource is sustainably governed if successive generations can appropriately or otherwise use the same CPR. This point of view isolates the resource from community practices beyond the management of the resource. For example, a field for sheep grazing is deemed sustainable in CPR governance if the community agrees on the appropriation and maintenance rules dictating community members' use of the field. However, there is no impact on the sustainability of the field if the farmers continue to drive cars and heavy equipment to the field. Under the current climate conditions, it is understood that the community's overall negative impact on Earth's life-supporting systems will eventually impact the condition and longevity of the grazing field. Yet, this impact is not captured in the understanding of sustainability in CPR governance literature. Therefore, this paper argues that there is a need to understand how a broader understanding of sustainability engages with communities and the common resources they manage.

To consider the influence of broad sustainability, one needs to look at communities that have already implemented a broader understanding of sustainability. Research into sustainable communities comes from the body of literature focused on ecovillages. Ecovillages explicitly focus on sustainability beyond the resources they manage (Singh et al., 2019; Meijering, 2012). This places ecovillages in the position where academics can study resource management in an environment where the sustainability of the community plays an equally important role. Therefore, studying ecovillages in the context of local CPR governance may provide policymakers with insights into critical areas of potential transformation on the local level in the climate transition. To garner this insight, this paper asks the research question: *How do broad sustainability ambitions influence the governance of the commons?* This paper uses a single case study approach with three embedded layers to answer the research question. Regarding the design principles Ostrom (2002) set out, this paper analyses how ecovillages govern CPRs in the context of their broader sustainability ambitions to see if changes are necessary to the structure of CPR governance generally outlined in the literature. The expectation is that the broader sustainability ambitions of ecovillages will alter the

design principles outlined by Ostrom (2002) to reflect the integrated dynamic between communities and life-supporting systems.

## Conceptual Framework

This paper combines the literature on common-pool resources with that of ecovillages. To do so, a few terms must be clarified in the literature – common-pool resources, ecovillages, and sustainability. The following section covers the relevant literature that contribute to answering the research question.

### *COMMON-POOL RESOURCES AND MANAGEMENT*

The first term which needs clarification is common-pool resources and, by extension, the different theories on their governance. As alluded to in the introduction, the academic interest in CPR rose from the interest in understanding the global commons (Hardin, 1968). The defining features of CPRs are independent of scale. Ostrom (2002) understands the commons to be resources that are finite in quantity so that one person's use subtracts from the available resources of other users. Hardin (1968) nuances the definition of CPRs by noting that rationality dictates that there is no incentive for any one individual to take into consideration the needs of others. However, subsequent literature has challenged the point made by Hardin (1968) and the definition provided by Ostrom (2002) has become more widely accepted (Ostrom 2008; Colding & Barthel, 2012; Colding et al., 2013; Singleton, 2017). Therefore. This paper uses the definition Ostrom (2002) provided to classify common-pool resources. Colding et al. (2013) explain that most natural resources can be classified as CPRs. Ostrom (2008) further details that forests, pastures, irrigation systems, etc., are examples of CPRs. Therefore, CPRs can be understood as natural and human resources, which is important when considering the types of resources used by communities.

There is less consensus in the literature on measuring the governance of CPRs. The aim of CPR governance relates to the allocation of resources among members of a community. Ostrom (2002) believes governance regimes perform six functions for the community. A governance regime determines (1) the recognized user of the resource, (2) methods of appropriation, (3) maintenance obligations, (4) monitorization, (5) conflict resolution, and (6)

mechanisms for rule changes (Ostrom 2002). Colding et al. (2013) critique Ostrom (2002) by highlighting the social aspect of CPR governance by defining common property regimes as the social agreements and interactions regulating common-pool resources. Schlager and Heikkila (2011) align with Colding et al. (2013) in their understanding of CPR governance while further emphasizing that the success of CPR governance is determined by the context (biophysical and social) in which the regime is applied.

Therefore, this paper focuses on the six main purposes of a CPR governance regime posited by Ostrom (2002), paying special attention to the social factor outlined by Colding et al. (2013). It is important to consider the factors to success indicated by Schlager and Heikkila (2011) since this paper focuses on determining the influence of sustainability goals, the context in which the governance regime operates is significant in evaluating its success.

The primary literature on CPR governance stems from Ostrom (1990), who illustrates the eight conditions under which sustainable CPR management is possible. The design principles focus on the elements which explain the sustainable management of CPRs over several generations through the rules in use by a community (Ostrom 1990). Ostrom's design principles can be summed up in the categories of trust, reciprocity, and communication (Agrawal, 2014). It is important to note that the design principles Ostrom (1990) describes do not cause sustainable governance of CPRs, but rather as shared features among communities that can maintain CPR management over several generations.

Challenges to Ostrom's (1990) design principles have come in the form of modifications and clarification, yet the design principles are agreed upon in the literature as the basis for the governance of CPRs (Singleton, 2017; Colding et al., 2013; Ostrom, 2002; Agrawal, 2014). However, it is important to understand the modifications and clarifications to the design principles because several key distinctions are made by the subsequent studies that contribute to analyzing CPR governance in ecovillages.

The first clarification of the design principles contributes to determining the community governing the CPR. Since this paper focuses on ecovillages, there is a need to explain the conditions under which the ecovillages can be considered examples of CPR governance. Ostrom (2008) herself recognizes the difficulty in determining the recognized users of a common-pool resource. Thus, determining who has rights to a common-pool resource is contested in the literature. According to Colding et al. (2013), Ostrom (2002) fails to make a distinction between two types of property which might be considered as including CPRs, Colding et al. (2013) make the distinction between common property and open access

or non-property. In making the distinction between the two types of property, Colding et al. (2013) characterize a community of CPR appropriators as having the ability to include and exclude others from using the CPR. This categorizes CPR governance as being bounded to community property, i.e., property with defined limits and legal users. Ostrom (2002) only goes so far as to explain that, in modern economies, CPR governance regimes are rarely independent of the overarching legal structure of the regional and national governments. Through recognizing the boundaries of the legal property and, by extension, the communities that hold legal access to the resources, a second challenge to Ostrom's (2002) design principles arise.

The second modification to the design principles is made by Singleton (2017), who argues that Ostrom's (2002) design principles lack significant consideration of the social relationship that governs common-pool resources. A similar argument is levied by Colding et al. (2013) and Schlager and Heikkila (2011) in considering the aim of CPR governance regimes. However, Singleton (2017) goes beyond the aforementioned authors, believing it necessary to clarify the design principles through the lens of cultural theory. Ostrom (2002) separates the individual from the context of their environment, limiting the analysis of people interactions within the CPR governance regime (Douglas and Ney, 1998, in Singleton, 2017). Cultural theory is focused on analyzing people as dependent on their environment and their interaction with the environment informs the norms and values of the community (Singleton, 2017). Moreover, Cox et al. (2010) and Berkes (2005) concur with Singleton (2017) by adding that in an ever-increasingly interconnected global system, it is difficult to define the local environment as being impacted only by its immediate surroundings, rather socioeconomic factors both local and global will have an impact on the management of CPRs. Caution must thus be applied to the generalization of the design principles. Since climate change is recognized as a local and a global problem, the socio-cultural modification presented by Singleton (2017) and others is especially important. The socio-cultural modification frames the context through which resource management decisions are made but does not argue for applying the design principles to community decisions outside of resource management.

Overall, this paper characterizes the design principles as a hierarchy of rules meaning governance of resources within communities is structured according to legal or formal agreements and actions by community members are protected within the parameters of the agreed upon rules.

*ECOVILLAGES*

Characterizing ecovillages is a difficult task since ecovillage is a self-designated term and does not describe a specific set of parameters within which a community fits (Wagner, 2012). That said, ecovillages are categorized in the academic literature as a type of intentional community, meaning certain attributes are shared among all ecovillages (Dias, 2017). Intentional communities aim to provide an alternative way of life to mainstream societal practices (Meijering et al, 2007). In the case of ecovillages, the academic literature has focused on the ambition of realizing a system of sustainable living. Dias (2017) defines ecovillages as communities that specifically focus on practicing sustainability. However, other authors expand on Dias's (2017) understanding of ecovillages. Van Schyndel Kasper (2008) defines ecovillages through the characteristics of a human-scale community with the aim of minimizing the impact of human activities on the environment. Singh et al. (2019) agree with Van Schyndel Kasper (2008) in emphasizing the relationship between human activities and their impact on the natural environment. Meijering (2012) further explains that ecovillages allow community members to realize an alternative lifestyle. This paper takes into consideration the different perspectives on understanding ecovillages. It defines ecovillages as small-scale intentional communities which strive for sustainable integration between the natural environment and human activities.

The sociocultural modification described above makes clear the need to separate the contextualize the experience and actions of community members beyond the local environment of the community (Singleton, 2017; Cox et al., 2010; Berkes, 2005). Since ecovillages view the natural environment as reaching beyond their immediate surroundings, the argument can be made that they actualize the socio-cultural modification.

In addition to the shared sustainability goals, one important aspect of ecovillages that connects them to the literature on common-pool resources is explained by Singh et al. (2019). Beyond the shared goal of sustainable practices, ecovillages are owned by community members (Singh et al., 2019). This categorizes ecovillages as a type of common property and allows community members to exude control over the CPRs belonging to the community. This is important to recognize since it connects the sustainability goals to the governance of CPRs. It is important to recognize the difference between governance and political practices. Governance is the process by which political practice is ordered, whereas political practice is the mechanism by which that order is executed (Colebatch, 2014). In other words,

governance is the principles, i.e., the design principles, which order a community. At the same time, political practices, such as democracy, are the mechanism by which the design principles are carried out. This paper argues that ecovillages share a common governance model integrated into which is the ambition to be sustainable. Where ecovillages can differ is in their political practices. Yet, it can be argued that the different political practices are not significant in classifying ecovillages.

A further aspect of ecovillages which allows for analyzing the ambitions rather than the political practice, is characteristic of outreach to the general society. Most ecovillages' explicit goal is to reach out to the public. This aligns with their ambition to promote an alternative lifestyle (van Schyndel Kasper, 2008; Singh et al., 2019). Dais (2017) agrees with the previous authors and adds by explaining the specific methods used by ecovillages to conduct our reach programs. The methods indicated by Dias (2017) include replication, scaling up, and translation. Replication is the activities relating to sharing information and teachings with people already interested in the practices of ecovillages. Scaling up refers to reaching out to people and organizations outside the ecovillage interest groups but only to the extent of people and groups generally interested in learning about alternative lifestyles. Finally, translation refers to reaching out to policy implementers to adopt the practices of ecovillages. The focus on outreach makes it easier for academics to study ecovillages over other communities focusing on environmental sustainability, such as religious organizations, which do not provide the same level of information about their practices.

*SUSTAINABILITY*

Ultimately this paper is about the definition of sustainability. Therefore, understanding the conceptual difference between different types of sustainability will help determine the influence of sustainability goals on CPR governance. Dias (2017) accepts that sustainability is related to the longevity of a resource and the actions that allow for the maintenance of a system. Among scholars of CPR management, sustainability is understood as the maintainability of common-pool resources by a community through different generations (Ostrom, 1990; Ostrom, 2002). Therefore, the sustainable governance of CPRs refers to the ability of a community to adapt to changing environmental conditions to ensure the longevity of the resource for the next generation. Such an understanding of sustainability presents a challenge when sustaining a resource becomes more difficult in the face of the climate crisis.

The literature on ecovillages takes a much broader approach to the definition of sustainability. Ecovillages consider sustainability to include social, cultural, ecological, economic, and system design (Singh et al., 2019). This broad approach to sustainability means that policies that do not address more than one level of sustainability are considered inadequate for implementation (van Schyndel Kasper, 2008). This shifts the focus away from ecological sustainability, which only considers the human-to-nurture relationship, to whole system sustainability, integrating the community into sustainable practices. The literature on CPR management defines sustainability according to the isolated resource managed by a community. This paper argues that this limits the application of CPR governance theory because the unaccounted-for practices by the community still impact the longevity and survival of CPRs. Therefore, the broader definition of sustainability used by ecovillages is better suited to consider the possible implications of sustainability goals on CPR governance since all community practices are seen as related to resource longevity and maintenance.

## Methods

### *RESEARCH DESIGN*

A case study approach is common in the literature on ecovillages, with 2.7 cases being the average number of cases analyzed (Wagner, 2012). While a multiple case study approach is beneficial for comparison between different ecovillages, this is not the aim of this paper. This paper considers the influence of sustainability on existing theory; therefore, a single case study is better suited to answering the research question. A multiple case study design would compare cases with each other in relation to CPR governance theory rather than compare ecovillages as a collective. A single case study approach allows for critically analyzing the existing theory (Yin, 2003; Eisenhardt, 1989). Applying a single case study approach is beneficial for analyzing the research question because it allows for a direct comparison of ecovillage governance and the design principles of CPR governance.

As demonstrated in the section above, ecovillages share common features. Consequently, ecovillages should be treated collectively compared to CPR governance theory. Adding three embedded layers within the single case study increased the internal validity of the research design. Yin (2003) argues that embedded layers within a single case study allow for a deeper analysis of the selected case. In this paper, ecovillages are considered a collective single case with generalized parameters comprising three ecovillages as embedded subunits. Using this research design brings the challenge of overgeneralization. However, special attention is paid to the subunit case selection so that the cases hold consistent with the prior research on ecovillages described by Wagner (2012).

### *CASE SELECTION*

The population from which the sample is taken is defined by the parameters outlined in the literature. Given that ecovillage is a self-designation, there is a need to limit the number of factors contributing to population size (Wagner, 2012). Using the theory-based parameters for defining the ecovillage research population will limit the variation and generalizability (Eisenhardt, 1989). This paper makes use of purposive sampling through the typical case method. Purposive sampling is highly relevant to the research question (Sharma, 2017). The typical case method illustrates the shared and most common features among the research population (Patton, 2002). This paper aims to expand theory; therefore, the typical case

method best fits the purpose since it prioritizes generalization. This is necessary since the embedded layers of the single case study design represent the research population. The limitation of purposive sampling is its susceptibility to researcher bias. While this needs to be considered, the selection of cases is informed by the criteria constituting ecovillage characterization minimizing researcher bias.

The literature informs the major criterion for typical cases of ecovillages and focuses on broad sustainability practices, community-owned property, and outreach programs. Note that types of common-pool resources do not inform the case selection since ecovillages can be located in various geographical areas. Thus, determining typical commons for an ecovillage does not denote its sustainability ambitions. Based on these criteria, the subunit cases selected include Twin Oaks Community (est. 1967), Ecovillage at Ithaca (est. 1991), and White Hawk Ecovillage (est. 2008).

*DATA COLLECTION AND ANALYSIS METHOD*

Data is collected from two sources: semi-structured interviews and internet webpages. The multiple data sources allow for triangulation of the relevant data and improve the generalizability of the findings (Eisenhardt, 1989). The inclusion of semi-structured interviews is consistent with other studies conducted on ecovillages (Wagner, 2012). One key difference between the interviews in this study and those in other studies is the lack of participant observation (Wagner, 2012). Participant observation in this study is not possible due to the geographical separation. However, by including data from the internet webpages of the ecovillages, the lack of participant observation is mitigated in its effect on the findings. Furthermore, the nature of semi-structured interviews allows participants to provide details about their answers that would otherwise be missing. As a result, the interviews are all slightly different, yet all interviews include the same nine base questions to ensure internal validity. Through this structure, there is continuity among all the interviews, thus ensuring the generalizability of the findings. Moreover, the personal experience of the interviewee informs most of the follow-up questions since the broader definition of sustainability implemented by ecovillages generates practices influenced by the perception of each community member. It is important to note that only one member of each community member is interviewed. However, this paper argues that their answers indicate larger community perceptions since

each community member has equal influence over the practices of the community (Singh et al., 2019).

The data analysis is conducted through a coding frame based on four categories – limited sustainability governance, broad sustainability governance, community norms and values, and hierarchy of rules. The four categories broadly derive from the literature on ecovillages (broad sustainability & community norms and values) and CPR governance (limited sustainability & hierarchy of rules). The coding frame is applied based on speech act theory which stipulates that language creates social and cultural meaning and goes beyond the mere information translated into the words themselves (Halperin & Heath, 2020). The nuance of speech act theory that language creates a worldview and is influenced by people's social and cultural experiences is important when considering the modifications to the design principles outlined by Singleton (2017) and others. As a result, coding is conducted based on sentence level. Still, special attention is given to the context in which statements are made – sometimes resulting in paragraphs being included in the coded data. The coding frame and the base interview questions are in the appendix.

## Results

Appling the coding frame to the interview and webpage data resulted in a gradient from weaker to stronger influence of sustainability on CPR governance between the three ecovillage subunits. White Hawk Ecovillage showed the least influence, while Twin Oaks Community showed the greatest influence of broad sustainability ambitions on CPR governance. The coding frame (see Appendix 1a) highlights the data with the expectation that greater influence of sustainability ambitions on CPR governance is reflected in the categories aimed at broad sustainability governance and community norms and values. In the case of this paper, less influence of sustainability on CPR governance means the data is reflected more in the established theories of CPR governance – limited sustainability governance and hierarchy of rules. While these ecovillages may still be sustainable, they illustrate the lack of significant influence sustainability goals have on the governance of CPRs.

Generalizing the embedded subunits of the single case study demonstrates at least some influence of broad sustainability on the governance of common-pool resources. The dataset indicates that within ecovillages, the broad sustainability ambitions influence their governance structure beyond what is described in the design principles of established CPR governance theory. To emphasize in further detail, three major patterns emerge from the dataset – community as a resource to be governed, sociocracy over democracy, and a strong conflict resolution mechanism.

### *COMMUNITY AS A RESOURCE TO BE GOVERNED*

The first pattern which emerges from the data is how the community itself is treated as a resource. Two of the key elements of the broad sustainability approach championed by ecovillages are the value of social and cultural sustainability (Singh et al., 2019) These types of sustainability expressed themselves in the decisions of an ecovillage to maintain the community over successive generations (van Schyndel Kasper; 2008). As posited above, common-pool resources and finite in quantity and resource appropriation is zero-sum (Ostrom, 2002). Traditional theories of CPR management view communities as being outside of the resources they govern. This is not the case for ecovillages, who view the community as part of the resources they govern by considering the community as a resource itself.

The broader definition of sustainability, which includes social and cultural sustainability, defines community as a finite resource and appropriation is zero-sum. More specifically, there are limits to the geographical size and population of an ecovillage. Ecovillages construct communities where social bonds and the overall cultural ethos of the community are on par with ecological sustainability. In general, the interviewed ecovillages understand that people need social relations to thrive and are equal to the other basic life needs of food, shelter, and security. In this manner, the community is a limited resource since communities can only provide basic services for a limited number of community members before social bonds disintegrate in the name of efficiency. For the same reason, the community is a zero-sum game since the number of connections a person can form is limited, and by extension, a social bond with one individual limit the social connections with other individuals.

Consequently, ecovillages demonstrate that viewing the community in isolation from other CPRs hinders the ability of a community to sustainably manage resources since there are no parameters whereby community members can assess how each other's actions affect wider community sustainability practices.

### *SOCIOCRACY OVER DEMOCRACY*

Sociocracy as a political structure is practiced in ecovillages, with preference over democracy. Sociocracy can be generally described as the governing of people with close social ties as opposed to democracy which governs by the general population (Saxena & Jagota, 2016). Sociocracy is present in ecovillages through the formation of small sociocratic groups that make collective decisions based on consensus for the community. In other words, small groups of people manage a CPR, the appropriation of which can be done by all community members.

One element of the design principles in traditional CPR governance states that recognized community members who share in the costs and benefits of resource appropriation can adopt new rules. This is known as collective choice arrangements (Ostrom, 2002). Ecovillages demonstrate this is not beneficial to achieving sustainability goals since population size and make-up change over time decisions made through democratic governance structures can leave a significant share of the population unhappy about the implemented practices. A broad view of sustainability includes the sustainability of system

design, i.e., community members' relationship with their community as a collective (Singh et al., 2019). As a result, ecovillages view CPR governance as ineffective in the long term if a large minority of the people are unhappy with decisions (van Schyndel Kasper, 2008; Meijering, 2012).

*STRONG CONFLICT RESOLUTION MECHANISM*

Traditional CPR governance theory describes a conflict resolution mechanism as a key element of the design principles (Ostrom, 2002). A conflict resolution mechanism allows community members to express their grievances with each other through formally recognized procedures. Ecovillages demonstrate the importance of a strong conflict resolution mechanism in relation to achieving sustainability outcomes. Following a similar sliding scale between all three ecovillages analyzed, ecovillages with a weak conflict resolution mechanism have a harder time achieving sustainability outcomes since the community members face little consequence for breaking the perceived norms and values. On the contrary, ecovillages with a strong conflict resolution mechanism were able to implement sustainability goals more smoothly and resolve grievances between community members more efficiently since community members face a higher cost for breaking the perceived norms and values of the community.

In this manner, a broad understanding of sustainability does not alter the traditional theory of CPR governance, rather, it strengthens the already existing notions.

Overall, the results derived from the dataset illustrate the influence of broad sustainability ambition present within ecovillage on the governance of CPRs. The findings demonstrate that the design principles outlined in traditional CPR governance theory undergo some alteration when a broader notion of sustainability is implemented. Referring to the conceptual framework, the design principles of CPR governance can be broadly summarized into the themes of trust, reciprocity, and communication (Agrawal, 2014). The findings included in this paper indicate that the theme of trust undergoes the greatest alteration to accommodate broad sustainability because more importance is placed on social and cultural ties within a community. Moreover, the findings indicate that the theme of communication undergoes the least alteration to accommodate broad sustainability. Rather the principles comprising the theme (graduated sanctions and conflict resolutions mechanism) are deeply anchored in achieving broad sustainability ambitions.

## Discussion

The research question of this paper asks, how do broad sustainability ambitions influence the governance of common-pool resources? The findings presented in this paper indicated that broad sustainability ambitions had at least some influence on CPR governance in ecovillages. However, discussions should be had about what such findings mean for a CPR governance model as a climate impact mitigation solution. Any policymaker can rightfully ask questions about how such findings impact policy beyond intentional communities. The following subsections discuss three considerations based on the findings presented in this paper. An outline of the potential limitations of the findings follows these subsections.

### *THE INFLUENCE OF TIME*

An important observation derived from the data is the difference in influence between the different ecovillages analyzed. On the one hand, White Hawk Ecovillage has existed for the shortest amount of time, and its CPR governance practices showed little influence of broad sustainability. On the other hand, Twin Oaks Community has existed for the longest period, and CPR governance practices reflected the influence of sustainability ambitions in the broadest sense. Ecovillage at Ithaca fit in between the two cases whereby in some areas, such as sociocracy, the community was very strong, but in other areas, such as the legalistic power of the organization, the influence of broad sustainability was much weaker.

As a result, an argument can be made that time is an important factor in observing the influence of sustainability ambitions. Such a result is not surprising since sustainability, by definition, is about longevity, yet interestingly, newer ecovillage communities are not adopting the practices of older communities. This would go against the idea of broader sustainability's inclusion of system design sustainability which considers the community's connection with other communities (Singh et al., 2019). As expressed in the sections above, it is difficult to isolate a community and its immediate geography from the national and even global connections through globalization (Cox et al., 2010; Berkes, 2005). Therefore, it is difficult to argue that ecovillages and their practices are unknown to other communities.

Moreover, caution should be used when generalizing this argument since communities, like nation-states, are affected by path dependency, meaning that decisions seen as sustainable at one point in time might be expressed as unsustainable in another point in time. It is noteworthy to remember that sustainability is an ambition and, in that sense, can

never be truly fulfilled. Therefore, establishing good cultural and social sustainability are paramount in building sustainable communities since they address the community's longevity outside of any resources.

For policymakers, the findings do not suggest a specific period that must pass for sustainability ambitions to become present in a community. This would make it difficult to pass legislation changing how common-pool resources are governed since social and cultural bonds are built over time and are hard to address through policy implementation.

### *DURABILITY OF THE DESIGN PRINCIPLES*

Ostrom's (2002) design principles show remarkable durability when challenged with the rapid changes of the climate crisis. This paper does not make the argument for the replacement of the design principles of CPR governance. Rather, as the results indicate, there is an argument to be made that a broader understanding of sustainability further modifies the design principles beyond what previous scholars have already done. In this regard, the influence of sustainability ambitions is expressed in adding or modifying the design principles.

That being said, the results also indicate that some elements of the design principles enhance a community's ability to adapt to changes in the climate - most particularly the principle of a conflict resolution mechanism. This paper argues that this durability speaks to the importance of design principles for policymakers. CPR governance can be used as a model for governing natural resources with a broader understanding of sustainability, expanding the areas to which CPR governance applies. Viewing the community as a resource to be governed makes it so that policymakers need to consider the social and cultural bonds which formulate that community. In this sense, policymakers need to recognize the potential risks to the sustainability of the community resource when considering policies governing natural resources.

Furthermore, the climate crisis and our understanding of the natural environment are ever-changing. Consequently, the argued durability of the design principles offers academics the opportunity to test the effects on governmental institutions in future climate conditions, allowing for a greater understanding within a generally uncertain future. Most interestingly, broad sustainability emphasizes the need for human community as an operative for sustainability. Therefore, the argument can be made that climate change solutions can be found in non-technical solutions rather than technical solutions. This would concur with the

argument made by Hardin (1968). However, it would reject the notion of a rationally principled human, which Ostrom (2002) also argues for.

Overall, the durability of the design principles illustrates the importance of human interaction in providing solutions for climate change.

*THE ECOVILLAGE MODEL IN THE CLIMATE CRISIS*

The answer would be no when asked if the generalized results utilized in this paper can apply to communities larger than ecovillages, say cities. Local CPR governance functions well because the social bonds between community members required for the necessary communication channels are close, and reciprocity is built into the system. The sustainability ambitions of ecovillages further emphasize these social bonds, going beyond the notion that social bonds are necessary for sustainable resource management. Furthermore, arguing that social bonds are necessary for the sustainability of an integrated community system. The results in this paper make clear that for a community - as a resource - to be sustainably governed, there is a limitation to the number of people who can be recognized as community members. Therefore, applying the model of ecovillages to larger groups of people will be ineffective.

This is not to say that policymakers receive no benefit from understanding the findings included in this paper. On the contrary, it only recognizes the power of communities to offer a solution for climate change mitigation. Some natural resources, like forests, oceans, and the atmosphere, are reversative. However, the rate at which those resources are used is paramount to the sustainability of the resource. The findings from ecovillages demonstrate that the level of resource use is correlated with the needs and wants of the community. Increasing the connection between the community and the resources they use reduces the blindness to resource production experienced in large populations.

The findings highlight the need for an integrated community ecosystem implementation for CPR governance. In traditional CPR governance theory, the two are views in isolation of each other (Ostrom, 2002). An integrated community ecosystem rejects the traditional notion, believing that all community practices have an impact on CPR resources and CPR resources, likewise, impact the community practices. Policymakers and academics alike benefit from a

greater understanding of the influence of broad understanding of sustainability on CPR governance regimes. However, there are some limitations to the findings.

*LIMITATIONS OF THE FINDINGS*

There are three limitations to the findings included in this paper. While the limitations do not minimize the findings, given the limitations, caution should be taken when generalizing the findings beyond the subcases studied. Below, the three limitations are outlined and described.

The first limitation present in this paper is that of sample size. Certain constraints of time, geography, and scope of the project influenced the case selection process. However, the nature of ecovillages often makes them remote from other inhabited areas, and a stable internet connection is hard to come by. Therefore, the sample size is limited to ecovillages whose internet connection is consistent enough for video calling. While this limiting factor does not necessarily dictate the location of the ecovillage, this paper recognizes that the ecovillages under consideration in this study are all located on the Eastern seaboard of the United States. Factors deemed to have significant influence, such as cultural ties, could be affected by the geographical location and relative proximity of the ecovillages studied.

Furthermore, the sample size is limited to English-speaking ecovillages. Speech act theory which is used in the analysis of the dataset recognizes that a worldview permeates language. As a result, some consideration must be given to the fact that a shared common language has been the interviewer and interviewees place the conversation within a certain worldview. While the interview questions are constructed using prior academic literature from various sources, caution is still advised since a worldview is often an unconscious additive in speech.

The20econdd limitation present In this paper Is researcher bias. Closely related to the language prerogative in the sample size, researcher bias is inherent in semi-structured interviews. Careful consideration went into designing the research methods, and semi-structured interviews allowed participants to clarify their answers and for deeper integration into the practices of ecovillages. Such as the data collection method is best suited to consider the influence of a particular factor on a set of principles, however, it also introduced the potential for researcher bias. The nine basic research questions (see Appendix 2a) are derived

from the literature on ecovillages and CPR governance, yet the follow-up questions are only loosely based on the literature from my recollection at the time of the interview. The coding frame, again based on the literature, will have reduced the potential for researcher bias. It must, nonetheless, be recognized that some topics were unequally explored in each interview.

Furthermore, the coding system applied is based on speech act theory. In other words, the context of a conversation plays an important role in creating meaning. There is also potential for research bias to influence which passages are encoded and into what category. Ultimately, this process is a judgment call based on the literature reviewed in this paper. Still, participants cannot clarify their answers after the interview is over, meaning there is the potential for mis-categorization based on the researcher's interpretation.

The third limitation present in this paper is the changing nature of the academic understanding of the climate crisis. This paper uses the IPCC 2023 report on the state of our academic knowledge of climate change. As alluded to in previous sections, our understanding of sustainability shifts depending on our understanding of the climate crisis. This paper considers the influence of sustainability ambitions on CPR governance regimes. Therefore, how those sustainability ambitions are expressed in the ecovillage is done with the current understanding of sustainability. For example, natural gas was seen as a sustainable alternative to coal and oil. However, today it is understood that natural gas harms the climate environment. While the ambition to be sustainable has not changed, such a shift in our understanding of sustainable practices may influence system design sustainability championed by ecovillages. Therefore, some caution must be taken when interpreting the perceptions of current community members and the actions of members in previous generations.

## Conclusion

The ongoing climate crisis is the problem, the consequences of which people will have to live with for decades, if not longer. The world's leading climate scientists have urged for policymakers to address the human-led climate crisis with policies that mitigate the human impact on Earth's life-supporting systems. This paper believes that strategies for mitigating the human impact on the environment can be found in the field of common-pool resource governance. However, the current literature on CPR governance views sustainability from a limited perspective, isolating the community from the resources they manage. This paper argues that CPR governance should move towards an integrated ecosystem approach to sustainability whereby the community and its resources are viewed as interconnected the sustainability in one cannot be achieved without sustainability in the other. Yet, shifting the view from limited to broad sustainability made it unclear how the design principles of CPR governance would be influenced – if at all. Therefore, the answer to the research question, how do broad sustainability ambitions influence the governance of common-pool-resources, is that traditional CPR governance principles experience at least some modification from the influence of broad sustainability ambitions.

This paper looked at ecovillages through a single case study design with embedded layers to answer the research question. The generalized data analysis found that broad sustainability ambition did impact the design principles of CPR governance. The embedded layers revealed a gradient of weaker to greater influence of sustainability ambitions between ecovillages. Moreover, the findings suggest that policymakers need to consider how a broader understanding of sustainability modifies the design principles of CPR governance. Due to the limitations of the research scope, it is argued that the findings only work for highly localized communities whose social bonds are well formed and realized through decision-making. In other words, the researcher believes the findings do not provide evidence for altering sustainability policy in communities that lack the necessary social bonds, i.e., cities. Nevertheless, the findings in this paper provide vital insights for policymakers into the conditions under which traditional governance structures should reflect broad sustainability to better cope with rapid changes in the climate environment.

Two suggestions for further research can be provided. First, I recommend broadening the scope of the research. This study has several limiting factors that could be addressed by

conducting a large-N study on ecovillages worldwide. Such a study might reveal that the scale between the weaker and stronger influence of sustainability ambitions is less expressive than suggested in this study since including more cases will minimize the researcher bias inherent in a single case study.

Second, I suggest replicating the findings in small communities, which are not intentional. The heavy reliance on social and cultural bonds might suggest that the general findings break down when those two factors are missing. This would suggest the potential for overgeneralization of the broad sustainability goals. Therefore, replicating the findings in a non-ecovillage environment would further cement the findings in this paper.

Overall, this research paper contributes to the literature on CPR governance by demonstrating the need for the design principles to be modified for a broader understanding of sustainability to be sufficiently implemented.

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## Appendixes

**Appendix 1a** coding frame

| Category | Description | Subcategories | Indicators | Code |
|---|---|---|---|---|
| Limited sustainability governance | This is the type of Sustainability which is described by Ostrom (2002) which is limited to the sustainability of resource appropriation. Limited Sustainability goverance considers only the year over year use and appropriation of a resource(s) by a community but does not recognize the practices of a community unrelated to the maintenance and appropriation of the resource | Resource sustainability | participant mentions the use of CPRs without the context of the wider community<br><br>Community is limited to resource appropriators<br><br>Participant mentions rules and regulations only in the context of resource appropriation and use | LSG |
| Broad sustainability governance | This type of Sustainabillity describes 5 elements that contribute to resource use and appropriation over time. Broad sustainability goes beyond limited sustainability by recognizing the practices of a community beyond parameters of maintained and appropriated resource | Social sustainability | Participant contects the community and population beyond the community in the context of CPR management<br><br>Participant is concerned with the relationship between people inthe community | SS |
| | | Cultural sustainability | Participants activiely considers the importance of maintaining the community in the communities practices and decisions | CS |
| | | Economic sustainability | Participant considers the importance of shared financial contribution by | ES |

| | | | | |
|---|---|---|---|---|
| | | | members and benefits form resource appropriation | |
| | | Ecological sustainability | Participant considers the impact of the community on the wider natural resources | ECOS |
| | | System design sustainability | Participant is concerned with the relationship between community and others | SDS |
| | | | Participant is concerned with the nature of relation between people and their community | |
| Community norms and values | The community norms and values are the practices of a community which are beyond the agreed upon rules. The community norms and values contribute not only to the experienced living standards inside the community but also infom how rules and regulations are expressed and followed, therefore norms and values can be seen as going beyond the hierarchy of rules | | Community standards are determined by norms and values<br>Participant experiences a disconnect between written rules and the enforcement as a result of changes in norms and values | CNV |
| | | | Decision making within the community is influenced by the extra-legalistic power of community members | |

| | | | | |
|---|---|---|---|---|
| Hierarchy of rules | The hierarchy of rules are informed by the 8 design principles layed out by Ostrom. 6 of the principle concern themselves with how community goverance manages the resources and regulated how resource appropriation should be conducted. | Clearly defined boundaries | Community members are clearly recognized by other community members | CDB |
| | | | Legal agreements determine decision making power within the community | |
| | | | Resource use is shared by community members according to agreed upon principles | |
| | | Congruence | Resource use is shared by community members according to agreed upon principles | CGN |
| | | | Cost and benefits are shared between members of the community according to pre-agreed principles | |
| | | Collective choice arrangements | Those that are recogocnized community members and resources appropriators have the ability to adapt and adopt new rules | CCA |
| | | Monitoring | Community members are designated with the task of ensuring fair resource appropriation by the members of the community | MON |
| | | Graduated sanctions | There are rules and regulations in place for sactioning misuse of resources | GS + |
| | | | There are no formal rules in place for sanctioning the misuse of resources by | GS - |

| | | | |
|---|---|---|---|
| | | community members in which case norms and values are determining factors in the sanctioning process | |
| | Conflict resolution mechanism | There are formal opportunities for community members to resolve their grievances | CRM |

**Appendix 2a** Basic interview questions

1. Both in international and local politics, conversation in recent years have centered around the topic of sustainability. However, it seems to be difficult to grasp the meaning of sustainability. I wanted to ask you, what does sustainability mean in your community? Do you focus only on ecological sustainability or is there more elements that you believe are important in a sustainable community?

2. In environmental economics the concept of common-pool resources comes up often. These are resources such a community garden which are not owned by a single individual, but each person can still make use of. From your experience what are the most frequently used common spaces in your community?

3. From my understanding of ecovillages, individuals have the opportunity to become owners in the community. What I mean to say by this is that each member of the community can have a financial stake in the collective property of the community and sometimes pay a monthly or yearly fee. How does (or does) your community incorporate residence into the legal structure of the community?

4. Building on your understanding of sustainability, in what areas does the community try to achieve sustainability? Examples can include innovative agricultural practices, forest rejuvenation, or innovative housing design.

5. In your experience when collective decisions are made by the community, how the does the community balance the concrete rules versus the norms and values build over many years when deciding?

6. If a community member is seen as breaking the rules or norms are there pre-determined ways on how to deal with the situation? Are there any examples of norms in the community that in your experience enhance residential life in the community?

7. How much influence does each member of the community have over the decisions made in the community?

8. How do you see the community's relationship with nature change as the community grows?

9. Do you believe ecovillages are a good model for cities around the world to follow? If yes, how so?