land

MDPI

Article

Proposing a Governance Model for Environmental Crises

Evangelia Karasmanaki [1,*], Giorgos Mallinis [2], Ioannis Mitsopoulos [3], Apostolos Karteris [4], Irene Chrysafis [2], Dimitrios Bakaloudis [5], Ioannis P. Kokkoris [6], Fotis Maris [7], Margarita Arianoutsou [8], Johann G. Goldammer [9], Francisco Rego [10], V. Ramon Vallejo [11] and Georgios Tsantopoulos [1]

1 Department of Forestry and Management of the Environment and Natural Resources, Democritus University of Thrace, 68200 Orestiada, Greece
2 School of Rural and Surveying Engineering, Aristotle University of Thessaloniki, University Campus, 54124 Thessaloniki, Greece
3 Natural Environment and Climate Change Agency (NECCA), Leoforos Mesogeion 207, 115 25 Athens, Greece
4 kartECO, Ag. Anastasias & Laertou, Pylaia, 57001 Thessaloniki, Greece
5 School of Forestry and Natural Environment, Lab. of Wildlife & Freshwater Fish, Aristotle University of Thessaloniki, University Campus, 54124 Thessaloniki, Greece
6 Department of Biology, Laboratory of Botany, University of Patras, 26504 Patras, Greece
7 Department of Civil Engineering, Democritus University of Thrace, Kimmeria Campus, 67100 Xanthi, Greece
8 Department of Ecology and Systematics, Faculty of Biology, National and Kapodistrian University of Athens, 15784 Athens, Greece
9 The Global Fire Monitoring Center (GFMC), Fire Ecology Research Group, Max Planck Institute for Chemistry and Freiburg University, Georges-Koehler-Allee 75, D-79110 Freiburg, Germany
10 CEABN, Centro de Ecologia Aplicada "Professor Baeta Neves", InBIO Laboratório Associado, Instituto Superior de Agronomia, Universidade de Lisboa, Tapada da Ajuda, 1349-017 Lisboa, Portugal
11 Department of Evolutionary Biology, Ecology and Environmental Sciences. University of Barcelona, Avda. Diagonal, 643., 08029 Barcelona, Spain
* Correspondence: evkarasm@fmenr.duth.gr

Abstract: During August 2021, a wildfire outbreak in Evia, Greece's second largest island, resulted in a major environmental and economic crisis. Apart from biodiversity and habitat loss, the disaster triggered a financial crisis because it wiped out wood-productive forests and outdoor areas that attract visitors. This crisis highlighted the need for a new governance model in order to respond to environmental crises more effectively. The aim of this study was to investigate the acceptance and attitudes of relevant stakeholders towards establishing a Hub—a proposed governance model responsible for monitoring and restoring the natural capital and biodiversity after environmental crises. Results based on quantitative data collected via questionnaires showed that most respondents were positive to the Hub and perceived that its main functions should be to recommend measures after environmental crises and to facilitate cooperation among involved stakeholders. Moreover, results pointed to preferred funding sources, stakeholder groups that should participate in the Hub and key performance indicators (KPIs) for monitoring Hub's performance. The applied methodology could guide the establishment of governance models both in the study area and other countries facing environmental crises.

Keywords: environmental crisis; environmental policy; stakeholder participation; forest fires; biodiversity recovery; environmental governance; natural capital; ecosystem services

Citation: Karasmanaki, E.; Mallinis, G.; Mitsopoulos, I.; Karteris, A.; Chrysafis, I.; Bakaloudis, D.; Kokkoris, I.P.; Maris, F.; Arianoutsou, M.; Goldammer, J.G.; et al. Proposing a Governance Model for Environmental Crises. *Land* **2023**, *12*, 597. https://doi.org/10.3390/land12030597

Academic Editor: Shiliang Liu

Received: 29 January 2023
Revised: 22 February 2023
Accepted: 27 February 2023
Published: 2 March 2023

1. Introduction

The increased incidence of environmental crises has brought forward the need to develop appropriate governance models as a means to deal with them more effectively. For this reason, there is growing interest in environmental governance and ecosystem governance [1,2]. Environmental crises are framed as exogenous changes which require 'disaster risk reduction' or 'disaster management' in order to build resilience through the reduction of uncertainty and the application of engineering approaches [3,4]. The need for

reducing the risk of disasters is also reflected upon the second priority of the global strategy "Sendai Framework for Disaster Risk Governance 2015-20130" which describes disaster risk governance as the way in which different actors (authorities, society, public servants, media, private sector) coordinate in order to reduce or manage risks related to disasters and the climate. Yet, such crises change with ever-greater pace, and, at the same time, their complexity is increasing [5]. The most common environmental crises include forest fires, floods, earthquakes and droughts, of which, fires are perhaps the most intricate. Even though fires have played a prominent role in the evolution of biodiversity and helped form multiple ecological communities, fire events due to contemporary human activity are now destroying ecosystems and habitats which are not fire prone or fire adapted [6]. In addition, diverse fire regimes lead to the disruption of life cycles or degradation of habitats in different ways, based on the characteristics of different species and ecological communities [7]. Fire regimes have both direct and indirect effects; they not only threaten species directly by decreasing their survival and reproduction, but also harm biodiversity indirectly by changing habitats, interrupting dependencies between species, and aggravating the effects of other risks [7]. Fire regimes, which jeopardize biodiversity, can also degrade ecosystem functions. For instance, they may decrease the capacity of ecosystems to maintain native flora and fauna and reduce their ability to provide ecosystem services which underpin human well-being and livelihoods.

Given that fires require an effective and quick response to alleviate impacts and build resilience to future reoccurrences, it is necessary to pay particular attention to developing effective governance models. In such efforts, it is critically important to consider the contextual understanding of administration because the individual administrative tradition in each country often determines the characteristics that need to be emphasized in governance. For example, in Anglo-Saxon countries, which have a strong tradition of rational management and control of public finances, the emphasis is placed on the manner of planning, control and accountability of public services, whereas in Germany, governance is regarded as the set of actions and measures aiming at improving citizens' quality of life which is measured with established indices [8]. Due to its intricate nature, 'good governance' cannot be evaluated only on the basis of technocratic criteria in the same way that policies are assessed. The substantive criteria of governance focus on the quality of institutions and democracy. This quality is judged by the ability of democracy and institutions to respond to major social, economic and political needs and problems. In governance, there is a co-existence of traditional principles regarding the organization and functioning of the state with the newer administration principles developed in the fields of management and administration science. The need for good governance is reflected in the observed impact of good governance on economic development, poverty reduction and the improved public health [9].

In a period of frequent occurrences of environmental crises, it becomes necessary to develop new governance models in order to build a sustainable future which supports communities and natural resources through science and knowledge. Despite this need, very little has been accomplished so far in governance models and further in communicating these models to stakeholders directly involved in environmental problems. Greece provides a typical example of a country that faces environmental crises whose biodiversity impacts could be addressed more effectively through enhanced governance. In August 2021, a wildfire outbreak in Evia, Greece's second largest island, resulted in a major environmental crisis with severe economic consequences to local economy. This crisis brought forward the need to establish new governance models for responding to environmental crises effectively. Hence, the aim of this study was to investigate the acceptance and attitudes of relevant stakeholders towards establishing a Hub responsible for monitoring the recovery of natural capital and biodiversity after environmental crises. Relevant stakeholders included officers in public bodies and services engaged in environmental management in Greece. Focusing on these stakeholders is pivotal because their perspectives can guide the design and establishment of a governance unit. In addition, the proposed governance model can

have added value as it will result from the views and preferences of stakeholders who are directly involved in environmental management and thus have a precise picture of the characteristics that would render the Hub effective and acceptable.

More analytically, the proposed Hub will coordinate and supervise the design and implementation of actions addressing biodiversity loss, ecosystem degradation and natural capital restoration after environmental crises through a collaborative and participatory design. Its main aim will be to interconnect data, knowledge and activities required to monitor the post-fire recovery of biodiversity and natural capital after severe environmental events as well as to contribute to the planning of recovery. Its actions will be based on concrete scientific knowledge and will be in line with the EU Biodiversity Strategy for 2030 and, more specifically, with the Nature Conservation Plan. Indicatively, such actions could involve the selection of appropriate restoration measures, the design and recommendation of mitigation measures and the monitoring of the recovery process through measurable indicators. The functions of the Hub should not compete with other national agencies and bodies but should assist and collaborate with them. In addition, the Hub will maximize the added value of existing data, knowledge and information from national and European sources. The establishment of the Hub can also avoid unnecessary delays as it will not be developed from zero but will be implemented progressively and its establishment and operation will be monitored with clear and measurable indicators in every stage. In other words, findings from this study can serve as the roadmap for designing and organizing the Hub so that it is able not only to address current governance weaknesses but also to correspond to the needs, preferences and expectations of stakeholders involved in environmental management.

The remaining paper is structured as follows. Section 2 reviews the literature on governance of environmental crises and focuses on key themes such as participatory and collaborative governance, as well as the challenges and concerns surrounding governance. Then, Section 3 provides an overview of existing governance approaches and models, and Section 4 provides information on the methodology that researchers followed to perform this study. Section 5 is divided into two subsections: Section 5.1 presents results from the survey on the first respondent group and Section 5.2 presents results from the survey on the second respondent group. In Section 6, results are discussed and in Section 7 conclusions are reached. Finally, all literature sources cited in this paper are provided in the last section.

2. Governance of Environmental Crises: Challenges, Participation and Decentralization

In developing an acceptable and effective governance model, participatory governance is a theme that needs to be underlined as it secures the just inclusion in decision-making. If governance includes all relevant stakeholders and sectors in a fair manner, it can successfully find pathways towards planetary sustainability [10]. Participatory governance can also establish rationality between those responsible for the official governance of natural resources and those who use or receive benefits from using natural resources or whose activities affect natural resources [10]. Meanwhile, the ability of people to take part in the processes of social and environmental change is vigorous and can be learnt and built; however, it is not fixed, constant or inherited [11].

Participatory governance enables 'community voice' and offsets imbalances related to gender, race and age. At the same time, it can provide opportunities to learn about natural resources while enabling participants to acquire confidence in speaking publicly, as well as build their network. Palmer et al. [10] emphasized that direct costs of participation must be supported in order to ensure participation particularly in contexts of underprivileged or marginalized communities.

The research work of Llovet et al. [12] can serve as an appropriate example of participatory governance in the setting of environmental crises. In 1979, a massive forest fire led local populations to abandon mountainous areas in Spain. Throughout the 1990s, restoration and management actions (such as pine plantation and thinning of dense areas) were applied in order to facilitate the recovery of the burned region. These actions were evaluated with

an integrated and participatory evaluation protocol. The evaluation included local and regional stakeholders who provided a basic evaluation, recognized and prioritized necessary indices, assessed the data in relation to these indices, and took part in re-evaluation of actions. It should be noted that the group of participating stakeholders was comprehensive and representative. A collaborative inclusion of both biophysical and socio-economic indices was promoted through this process. In addition, stakeholders participated in activities where they exchanged experiences and knowledge. It was concluded that the participatory methodology was fundamentally important in understanding the effect of stakeholders' perceptions and priorities on a technical and non-participatory process.

Collaboration is another theme that should be considered [13]. Collaborative governance can create the conditions under which stakeholders can directly participate in decision-making processes. According to Ansell and Gash [14], collaborative governance is able to bring many stakeholders together in common forums with public agencies thereby engaging them in consensus-oriented decision-making. The same authors have also argued that this type of governance can respond to "the failures of downstream implementation and to the high cost and politicization of regulation" while helping build trust among stakeholders. In addition, they define collaborative governance as a governing arrangement that involves public agencies which engage non-state stakeholders in a collective decision-making process described as formal, consensus-oriented and deliberative. That being said, effective collaboration is difficult. In the setting of water management, Porter and Birdi [15] conducted a systematic literature review of empirical papers with the aim of understanding the factors affecting the effectiveness of collaborative-innovation in water. Their analysis indicated that all relevant stakeholders should be provided with the opportunity to participate in order to avoid doubts to the legitimacy of the process. In addition, stakeholders must have the capacity to act and should be committed. That is, they should be willing to share ideas and experiences and engage in discussions. Before such processes, it is also important to identify possible tensions and address disputes among participants. This is a crucial step because stakeholders may have different perceptions and preferences for the development activities in their area thereby resulting in a mosaic of different patterns of communication, and responsibilities which can be quite challenging. To facilitate collaboration, Averchenkova et al. [16] recommend conducting dialogues and joint action groups with the aim of exchanging experiences about challenges and practices regarding the design, implementation and measurement of impacts as well as examples of the ways in which integration has acted in different sectors and political contexts.

With the significance of citizen and stakeholder involvement in processes in mind, the attention now turns to the conceptualization of governance in the context of environmental crises. Before describing challenges and concerns surrounding environmental crises, it is worthwhile to note that each environmental crisis is a unique case and is dependent on specific dangers, affected people and things, as well as on the extent of effects. For this reason, there can be no single governance model which would be effective and suitable for all cases [2]. There have been some noteworthy efforts to describe the governance of environmental crises. Tierney [17] described it as the type of governance that is associated with risk, environmental and earth system governance and as stemming from certain societal and governance procedures which are specifically designed for disasters. What makes governance structures effective is that they are vested with special authority and powers which enable them to avoid the existing norms and governance processes. This may mean that effective governance can allow for a certain degree of innovation of norms and governance processes. For governments, such structures are turning into the normative model which ensures recovery after disasters [18].

Likewise referred to as 'disaster cycle', governance of environmental crises spans over pre-, trans- and post-disaster periods. During the disaster cycle, decision-making responsibilities and roles are shared by a multitude of state and non-state actors at numerous levels. Moreover, hybrid or adaptive configurations are formed in order to shape actions which will, in turn, address the issues that resulted from the environmental crisis (i.e., losses

and damages) [19,20]. The increase in the occurrence of catastrophic events has created a complicated landscape for governance due to the variety of institutions and actors involved in processes following environmental crises. Such actors often involve international institutions like the United Nations [21], the World Bank, civil society institutions, as well as NGOs [17].

Even though government is not always translated into governance, state-based action is an integral part of governance of environmental crises [17,22]. Successful efforts to achieve recovery are directly linked to the abilities of the state like leadership, planning and organization aimed at reconstruction. In such an ideal context, the goal of public officials after a disaster should be to decrease uncertainty [23].

Certain areas of concern have been pointed out in the relevant literature. A major concern is the impact of governance systems and institutions on the affected communities with the latter often being absent in decision-making processes due to their limited empowerment and participation in governance [24,25]. Another concern is that governance is implemented through a large group of regulatory instruments, policies and procedures which are only slightly related. This decentralization not only leads to repeated efforts and late delivery of help but also results in weak coordination of activities [26].

The role of state authorities in governance of environmental crises is also a cause for concern and, more specifically, there is skepticism about governance without or beyond the state. The role of the state can be subdued when state authorities are substituted by non-state actors [24,25]. This can occur in cases where ineffective governments create gaps often filled by large organizations like NGOs [25,27]. As an example, governments may be competing for the same funding and material resources with highly enterprising NGOs or may lack the support to reinforce their own governance capacity [27]. In addition, it can become problematic when states decide to assign governance responsibilities or decision-making authority to other actors. For instance, problems may occur if international authorities or non-state actors are appointed to perform tasks or assume decision-making through acts of delegation, privatization, outsourcing as well as contracting-out [28,29].

The support of foreign actors in the setting of environmental crises also needs to be re-evaluated. Although national governments are becoming increasingly mindful about the governance of environmental crises, foreign actors should seek to adjust their support roles [28]. Foreign actors ought to start embracing social brokering and technical advisory functions which can contribute to reducing competition, and inconsistencies and meeting common objectives. In addition, they should follow humanitarian principles and provide help without being directly involved in the performance of recovery operations [30].

One more critical aspect is that governance includes governments at many levels in decision-making. Given that governance is divided among local, sub-national and national/federal governments, intergovernmental relations have an acute effect on the effectiveness of governance [17,23,31]. To put this simply, governments at all levels do play a critical role in the designing, formulation, legitimization and implementation of policies, laws, projects and initiatives associated with governance [31]. The problem that often emerges is that the different powers and authorities of local, state and national jurisdictional levels are reflected upon governance of environmental crises [17]. Governance comprises clear but interrelated organizational and institutional procedures, which are oriented towards the reduction of disaster risks and the management of effects. It is also about the wide-ranging actor networks, which involve governments, multilateral organizations, NGOs, local communities, scientists as well as the private sector. All these diverse actors must join forces in order to guide disaster risk reduction and management at all levels [24,25].

Finally, previous research has pointed out that governance is successful if it fosters and underpins certain activities. First, it should secure the consistency of legal, regulatory, and policy frameworks; second, it should specify the roles and the willingness of actors to take responsibilities; and third, it ought to provide stakeholders with incentives and guidance to act [32]. In addition, "good" governance should involve the values of empowerment,

participation, representation, deliberation, alignment and predictability [33]. If, however, governance lacks the above activities and principles, it can lead to organizational and institutional failures, which can increase the susceptibility to disasters.

3. Examples of Governance Approaches and Models

To deal with environmental crises and their far-reaching consequences, certain governance models have been developed in different parts of the world. This section discusses examples of governance models which were established either after severe environmental crises or to deal with longstanding environmental problems. These models may serve as noteworthy examples of policy efforts to support cooperation among jurisdictions. Although there may be some more models, the following examples are presented as they are somewhat closer to the proposed Hub.

3.1. Nepal: National Reconstruction Authority (NRA)

In order to coordinate reconstruction after the Gorkha Earthquake in 2015, the Government of Nepal established the National Reconstruction Authority (NRA) 2 months after the earthquake [18]. However, various barriers delayed the beginning of operations of the new authority, which started to operate in January 2016. In specific, the country was facing ethnic conflicts, border isolation and lack of fuel and building materials together with disputes over the leadership of NRA. Meanwhile, NRA lacked formal legal status—a deficiency that was resolved with the Reconstruction Act which was issued in December 2015.

The NRA was established with the purpose of carrying out reconstruction in a sustainable, resilient and planned manner, as well as to promote national interests while offering social justice. The task of the newly formed authority was to recognize reconstruction priorities and distribute funds from the National Reconstruction Fund in line with the identified priorities [18]. Its responsibilities were not only to examine plans and budgets for reconstruction and take relocation decisions but also to cooperate with key stakeholders such as international, governmental, non-profit, private sector and community actors [18]. At the same time, NRA was responsible for developing implementation capacities through technical assistance and training, monitor building standards, and ensuring the highest degree of transparency during the reconstruction process [34]. The NRA would operate for 5 years but the government could expand the agency's term or transfer its operations to another agency. There has been a rigorous debate about whether the NRA will need more time to fulfill its mission effectively or if it should become a permanent organization.

The organizational structure of NRA is also interesting to discuss. The headquarters of NRA are in Kathmandu and the Head of NRA is the Prime Minister. Within the Authority, there are three committees, which are bestowed decision-making capabilities. These committees are the National Reconstruction Advisory Council, a Steering Committee and the Executive Committee [18]. The National Reconstruction Council advises the Steering Committee on formulating reconstruction policies and plans and is responsible for allocating money from the National Reconstruction Fund. The Steering Committee has a number of responsibilities: it ratifies reconstruction plans and policies developed by the Executive Committee, provides guidance to the Executive Committee regarding reconstruction and approves the budget as well as the organizational structure of NRA. The Executive Committee also has decision-making authority as it is responsible for preparing draft reconstruction policies and requesting approval from the Steering Committee. The NRA has a Chief Executive Officer who manages the daily operations, but the Prime Minister is the Head of the Advisory and Steering Committees.

3.2. Japan: Reconstruction Agency

Another noteworthy governance model was established in Japan after the Great East Earthquake on 11 March 2011. The Diet of Japan, which is the national legislature, made certain legal preparations in order to establish an agency, which would supervise the

recovery process in the Tohoku region, which was severely hit by the disaster. Due to legislation obstacles, the agency started to operate nearly 1 year after the disaster [35].

The Agency would act as a nodal entity, which would supervise the recovery process, expedite bureaucratic processes, and become a 'one-stop shop' regarding land-use projects and central help [36]. In addition, the purpose of the Agency was to speed up the process of structural reconstruction and revitalization by bolstering the application of government policies and coordinating reconstruction strategies and initiatives undertaken by different government branches as well as by local municipalities [35]. The agency would moreover ensure the effective and smooth application of reconstruction measures.

The Agency would exist for 10 years because the reconstruction program would also last no more than 10 years. The first period 2011–2015 was termed as the 'Concentrated or Intensive Reconstruction' period and the second period from 2016 to 2020 as the 'Reconstruction and Revitalization' period [35]. However, it was not planned whether some of the operations of the Agency would be transferred to another body at the end of its 10-year life.

In terms of hierarchy, the Agency was positioned at a rank higher than ministries and was referred to as the 'control tower' responsible for coordinating, appointing reconstruction activities and collaborating with local governments [35]. Regarding its organizational structure, the Head of the Agency was the Prime Minister, and its staff members were 500 public officials who were supervised by the Minister for Reconstruction. Public officials were bureaucrats that belonged to different ministries [18]. The headquarters of the Agency were located in Tokyo but there were also bureaus in the prefectures in the affected area [35].

For the recovery of the affected areas, Recovery Funding was established. A centralized set of 40 reconstruction programs was the vehicle with which funds were distributed to local governments. These programs were in line with the Council's recommendations and were developed by a group bureaucrats and advisors who belonged to ministries. It is worthwhile to note that municipal authorities had not played any role in the design of the programs [18]. However, municipalities were involved in the design of reconstruction plans and, to this end, they had to cooperate with the prefectural authorities, relevant ministries as well as the Agency. Each time a municipal reconstruction plan was ready, local governments applied for specific reconstruction programs in order to obtain funding for the implementation of the plan. The Agency was responsible for approving it and reaching the funding decision [37].

3.3. Restoration of Degraded Rural Landscapes in Eastern Cape Province, South Africa

Any discussion on participatory governance would be incomplete without making a special reference to the Tsitsa project which was introduced as a case study of integrated management and governance for sustainability in a complex social-ecological system [38]. In particular, the model of participatory governance that was developed through the project could be used to help restore a degraded rural landscape in the Eastern Cape Province of South Africa. In this area, pernicious colonial policies and practices from the apartheid-era along with intensive un-herded livestock-use led to an alarming reduction of vegetation cover as well as increased erosion. As a result, the rural landscape was degraded, and local communities fell into poverty [10].

The research conducted in the context of the Tsitsa Project involved cross-disciplinary researchers, all levels of government, non-governmental organizations, practitioners as well as residents. In other words, it sought to establish a constellation of stakeholders such as residents and actors involved in research, management, land-use and governance from various scales and institutions in order to support sustainable management of the Tsitsa River Catchment [38]. What makes this effort unique is that a lot of emphasis was placed on local residents, transdisciplinarity and equity. The project also united many concepts in the form of guiding principles. In practical terms, these principles may lead to a different way of working towards landscape sustainability [38]. A main focus of these principles was placed on learning associated with strategic adaptive management and, for this purpose, reflexive learning processes were employed [38]. Efforts to collect knowledge from all

project stakeholders enabled the inclusion of the widest range of knowledge and, in this way, the complicated problems related to social-ecological decline could be addressed. In particular, a capability-development approach for transformation towards participatory governance was co-developed [10].

According to the proposed model, every capability leads to the next while capabilities are expanded through many activities. All capabilities evolve over time and interact with the other. The first process was the Adaptive Planning Process [39], which was performed as a workshop and served to engage stakeholders. The workshop was designed explicitly to ensure that all participants felt being respected with minimum power imbalances. In addition, the workshop encouraged participants to listen actively and sought to develop a common understanding of the presented content and concepts. Participants were also encouraged to feel comfortable while expressing their views. The analysis showed that participants experienced a just and respectful inclusion; however, their understanding of concepts and information was different.

3.4. Caribbean Disaster Emergency Management Agency

A model was developed in the Caribbean where a regional inter-governmental agency was established. In 1991, the Caribbean Disaster Emergency Management Agency (CDEMA) was established to deal with the natural disasters that often hit the Caribbean. This body can be described as a regional inter-governmental agency which focuses on the management of disasters for the Caribbean Community [40]. Nineteen states participate in the agency (such as Bahamas, Cayman Islands, Jamaica, Haiti, Barbados and a Coordinating Unit located in Barbados supports the agency by operating as a secretariat and program implementation entity. The agency is entrusted with the task of empowering participating states and influencing and collaborating with other organizations in order to build disaster resilience in a region that is adversely affected by disasters [40]. The mandate of CDEMA is to place the organization as a force that facilitates, drives, coordinates and motivates for the promotion and engineering of Comprehensive Disaster Management in the 19 participating states.

The governance structure of CDEMA is also interesting to discuss; CDEMA is governed through four entities: a Council, the management committee of the council, a Technical Advisory Committee and the Coordinating Unit [40]. The Council consists of the Heads of the Governments of the Participating States, or their nominees and it is responsible for determining the policies of CDEMA. The Management Committee of the Council can be described as a sub-committee of the Council, which is in charge of administrative oversight issues. The Technical Advisory Committee advises CDEMA for technical and programmatic matters and consists of the National Disaster Coordinators and representatives of other specialized regional organizations involved in technological, meteorological as well as seismological fields. The Coordinating Unit is managed by an Executive Director appointed by the Council. the Coordinating Unit operates within a framework which entirely embraces Comprehensive Disaster Management and deals with long-term mitigation issues [40].

The Comprehensive Disaster Management Strategy tries to decrease the risks and losses stemming from natural and technological dangers, as well as from the impacts of climate change in order to improve regional sustainable development. It also deals with all dangers, involves every stage of the disaster management cycle while including all people and sectors of societies [40]. This indigenous approach to disaster management is directed by the Regional Comprehensive Disaster Management Strategy with the timeframe 2014–2024. The overall objective is to associate Comprehensive Disaster Management more strongly with development decision-making and planning thereby providing wide strategic guidance for dealing with the challenges of disaster risk management in the region. The priorities of the 2014–2024 Comprehensive Disaster Management Strategy are institutional reinforcing, knowledge management in order to underpin evidence-based decision making, mainstreaming Comprehensive Disaster Management in key fields and developing disaster resilience. The key themes in the application of the Comprehensive Disaster Management

Strategy involve gender, climate change, information and communication technologies as well as environmental sustainability [40].

3.5. New Zealand: Canterbury Earthquake Recovery Authority

Another example of an institution that was established explicitly for managing the recovery after catastrophic events would be the Canterbury Earthquake Recovery Authority (CERA) in New Zealand. CERA was a government department and was established on 29 March 2011. Its mission was to guide and coordinate the state's response and recovery operations after the earthquakes of 2010 and 2011 in Canterbury [41]. CERA was disestablished in 2016 as the government transitioned to the next phase, which was to establish long-term, locally based recovery and regeneration arrangements.

During its operation, CERA developed a recovery model that consisted of four stages: emergency, restoration, reconstruction and improvement. However, during the initial stages, the local intervention of CERA induced substantial confusion due to the unclear division of responsibilities between different state and non-state actors [1]. In specific, CERA changed the allocation of resources between central and local governments and as a result, the roles of the local governments and civil society were in some way marginalized. It also assumed a guiding role in the city and undertook the solution of problems, which were typically the responsibilities of the local government, such as land-use planning. This led to a highly centralized recovery scheme, which did not take into account the local knowledge and needs. As an example, CERA was highly focused on the re-development of the center even though residents in the suburbs still resided in emergency conditions and consequently could not participate in any public engagement activities organized by CERA. Indicatively, Skrimizea et al. [1] conducted interviews with residents in Christchurch and found that interviewees felt that they were not part of the recovery process and thus felt disempowered. At the same time, the government utilized the creativity of the projects in order to rebrand the city as part of a post-disaster strategy aiming to attract visitors and investors.

3.6. The Netherlands: National Coordinator Groningen

In Groningen, earthquakes attributed to gas drilling brought forward the total lack of earthquake preparedness. Although new institutions were established, these lacked an appropriate societal debate and local support resulting in a vague institutional setup which presented only limited accountability and transparency in terms of the role of the public and private interests [1].

In 2015, the National Coordinator Groningen (Nationaal Coördinator Groningen, NCG) was established. Its task was to connect the different actors in dealing with the consequences of the earthquakes: the national government, the province, the municipalities, the company undertaking gas extraction and the local residents. Another effort to fine-tune the institutional setup was the launch of the National Programme Groningen (Nationaal Programma Groningen, NPG) whose task was to trigger sustainable and resilient developments in Groningen, whereas the end-of-gas exploitation was planned between 2022 and 2030. Although this was considered as a positive step, it came after a long time and did not succeed in preventing the loss of trust and neither alleviated residents' feeling of being at risk. In addition, NCG's ability to address the effects of the earthquakes rather than the causes, together with its focus on the vulnerability of the built environment instead of community resilience, worsened public frustration and disengagement [1].

Skrimizea et al. [1] noted that, in the case of Groningen, the multi-level governance and institutions managed to mobilize and exhibited considerable adaptiveness and flexibility. However, this adaptiveness was compromised by the problems that occurred in the multi-level collaboration, the emergence and changing nature of social-ecological needs and the limited participation and co-production of knowledge.

3.7. U.S.A.: Integrated Resource Restoration

A special reference should also be made about the new policy tools supporting collaborative restoration across different actors and jurisdictions in the United States. These tools involved, inter alia, a pilot change in the budgeting of the National Forest System referred to as Integrated Resource Restoration (IRR). In order to understand how the IRR was affecting approaches to strategic planning and whether it was effective, a third-party evaluation was undertaken through the performance of interviews and a web-based survey with agency personnel and partners [42]. It was found that the IRR had indeed influenced strategic planning both at the forest and regional scales. According to officers' responses, the IRR had enhanced the integration and prioritization of forests, and in a broader context, the IRR improved planning, relationships and contributed to a greater utilization of capacity and increase in innovation. In addition, policies that offer more focused investment for landscape approaches to restoration together with standards for interagency coordination can have positive effects and may lead to a new era in forest policy in the US [43].

In view of the above governance structures, it may be argued that countries across the globe are realizing the need to adopt new governance approaches to respond more effectively to environmental crises. Such structures may be a feasible solution in countries that are particularly vulnerable to the impacts of climate change and are required to adopt a more effective approach. As Greece faces an unprecedented frequency of environmental crises, the establishment of a governance model could be promising for the country's response to environmental crises.

4. Methodology

The population under study consists of stakeholders engaged in environmental management in Greece and respondent groups were (a) stakeholders in the Ministry of Environment and Energy as well as stakeholders in Natural Environment and Climate Change Agency (NECCA) and (b) stakeholders employed in other ministries, decentralized authorities, regional and local authorities, environmental NGOs, public institutions, universities and research institutes. In order to examine their views and attitudes towards the establishment of the Hub, two structured questionnaires were designed which had some common items but also differed in some aspects [44,45]. The main difference between the questionnaires addressed to these two respondent groups was that the questionnaire addressed to the first respondent group contained an additional section that examined additional areas; that is, their views on key performance indicators (KPIs) for monitoring the performance of the proposed Hub as well as the data that should be provided by the physical structure of Hub's geospatial platform.

In order to design the questionnaires, both the existing situation and findings from the relevant literature were taken into account. In relation to the latter, the attention was placed on studies examining the structure and organization of governance models as well as the challenges and problems that governance models face in their effort to manage natural ecosystems after environmental crises [4,5,10,18,27,28,46,47].

The questionnaires consisted of closed-ended items as this type requires minimum effort and time from respondents who merely mark their response on a list of standard responses that suits best their answer. In addition, questionnaires can be easily coded for statistical analysis. Response items employed the Likert scale, which is the most widely used scale to measure views and behavioral disciplines while allowing respondents to define with great precision the level to which they agree or disagree with the examined propositions [48]. In particular, items employed five-point Likert scales which allowed stakeholders to express how much they agreed or disagreed with a particular statement or to rate the importance of a subject. To ensure the accuracy and coherence of the questionnaire, it was pilot tested in a small number of respondents having similar sociodemographic characteristics to the study population [49]. Based on the pilot study, a few items were reworded and the scale response in two items was modified. After these modifications, the final version of the questionnaire was ready and collection could begin. Regarding the

content of questionnaire, the first section included introductory questions that aimed at introducing respondents to the topic of the study. These items explored their agreement with the establishment of the Hub, their view on public access to the Hub's information and funding sources. The items of the second section examined respondents' preferences on specific aspects of the proposed Hub. In particular, respondents evaluated various parameters in Hub's establishment and operation, participating bodies and the functions that the Hub should serve. In the third section, respondents assessed the type of data and information that should be provided by the Hub whereas the fourth section collected respondents' demographic and employment information such as gender, age, years of service, education level and the type of their agency/body. The questionnaire addressed to stakeholders in the Ministry of Environment and Energy and NECCA included an additional section in which respondents evaluated KPIs for monitoring the performance of the proposed Hub.

It was considered appropriate to collect questionnaires online because respondents were dispersed throughout the country since they serve in different bodies and agencies. Hence, an internet-based questionnaire was designed by using Google Forms and, in order to recruit respondents, the research team of the project prepared a list of officers along with their contact information which was retrieved from the websites of these bodies. Respondents were invited via email to participate in the survey by following a link. The online version of the questionnaire included an informed consent section which had to be accepted before respondents could proceed to complete the questionnaire. The invitation containing the link to the study was sent to potential respondents three times and was sent once every week. Although a considerable number of responses was received after the first invitation, the next two invitations yielded a very low number of responses and almost no responses were collected after the third invitation. For this reason, it was decided to conclude the study after the third invitation. The response rate for stakeholders in the Ministry of Environment and Energy and NECCA was 56.1% (55 respondents) and the respective response rate for stakeholders employed in other agencies and bodies was 65% (39 respondents). The survey was open from March 15 until April 15, 2022.

The data was then coded and analyzed with the Statistical Package for the Social Sciences (SPSS). First, descriptive statistics was applied to all variables because this method is able to organize and describe the characteristics and the factors of a sample [50]. This type of analysis can also define the midpoint of distribution also referred to as central tendency [50]. Based on the results from descriptive statistics, the non-parametric Friedman test was then applied to certain multivariate questions. This test can compare the values of three or more correlated groups of variables. Its distribution corresponds to χ^2 with degrees of freedom (df) df = k − 1, where k represents the number of groups or samples. This test ranks the values of variables for each subject separately and estimates the mean rank of ranked values for each subject.

5. Results

5.1. Results of the Survey on Stakeholders in the Ministry of Environment and Energy and NECCA

Information on respondents' sociodemographic characteristics was first collected. Female respondents (50.9%) slightly outnumbered their male counterparts, and a high share (45.5%) was aged between 41 and 50 years and considerable shares were aged between 51 and 60 (27.3%) and 31 and 40 years (25.5%). As for their years of service, more than half of the respondents reported having 9–15 years of service and a substantial share (29.1%) reported having 16–25 years of service. The education level of respondents was high as 47.3% of respondents were master's degree holders, 38.2% were bachelor's degree holders and 14.5% were PhD holders. Regarding their position in their organization, the majority reported being employees (81.8%) and a share of 12.7% reported being heads of division.

Respondents were then asked whether they agreed with the establishment of a Hub which will be responsible for monitoring the current environmental state and post-fire

impacts on biodiversity and natural capital. The overwhelming majority (by 90.9%) agreed whereas no respondents disagreed with this proposition (Table 1).

Table 1. Frequency and percentage units regarding stakeholders' agreement with the establishment of a Hub (*N* = 55).

	Frequency	Percentage (%)
Strongly disagree	-	-
Disagree	-	-
Neither agree nor disagree	5	9.1
Agree	21	38.2
Strongly agree	29	52.7
Total	55	100.0

Next, respondents' opinion on the importance of public access to information (i.e., information about the economic status, efficiency, establishment plan, activities, achievements, etc.) regarding the Hub was investigated. In Table 2, it can be seen that the strong majority of stakeholders (by 80%) in NECCA and the Ministry of Environment and Energy regarded public access to this information as important or very important.

Table 2. Frequency and percentage units in relation to the importance of public access to Hub's information (*N* = 55).

	Frequency	Percentage (%)
Not at all important	-	-
Slightly important	2	3.6
Moderately important	9	16.4
Important	33	60.0
Very important	11	20.0
Total	55	100.0

Stakeholders' opinion on the funding sources for the Hub was also examined. According to Table 3, most respondents perceived that the Hub should be financed by European funds (by 87.2%) and research projects (by 80%). In addition, a substantial share of respondents (by 76.3%) thought that the funding should be from state subsidies. The non-parametric Friedman test was applied to detect statistical differences among responses. It was shown that the most important funding sources were European funds (mean rank 3.57) followed by research projects (mean rank 3.49) and state subsidies (mean rank 3.36). Conversely, funds from the private sector were ranked in the last position (mean rank 2.11) (Table 3).

Table 3. Percentage units and differences among respondents' rankings regarding Hub's funding sources.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean Ranks *
European funds	-	3.6	9.1	52.7	34.5	3.57
Public donations	5.5	9.1	29.1	47.3	9.1	2.46
State subsidies	1.8	5.5	16.4	41.8	34.5	3.36
Funds from the private sector	7.3	18.2	34.5	29.1	10.9	2.11
Research projects	0.0	3.6	16.4	41.8	38.2	3.49

* Friedman test: N = 55, Chi-Square = 55.379, df = 4, $p < 0.001$.

The questionnaire involved a section with questions that examined specific aspects regarding the operation and structure of the Hub. Respondents evaluated various aspects in the establishment and operation of the Hub and, as it can be seen in Table 4, all aspects received high evaluations. The highest evaluations were recorded for the aspects concerning technological skills (83.6%) as well as scientific excellence (78.2%).

Table 4. Percentage units regarding respondents' evaluation of the importance of various aspects in the establishment and operation of Hub (N = 55).

	Not at All Important	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Very Important**
	1								**9**
Staffing	-	-	1.8	1.8	1.8	12.7	10.9	40	30.9
Experience	-	-	-	3.6	1.8	12.7	21.8	43.6	16.4
Technological skills	-	-	-	-	-	1.8	14.5	54.5	29.1
Scientific excellence	-	-	-	-	-	5.5	16.4	49.1	29.1
Flexibility in decision-making	-	-	1.8	-	3.6	10.9	25.5	41.8	16.4
Transparency	-	-	-	1.8	3.6	12.7	5.5	40	36.4
Communication	-	-	1.8	1.8	1.8	7.3	21.8	41.8	23.6
Governance	-	-	3.6	5.5	3.6	14.5	27.3	30.9	14.5

Respondents' view on the bodies that should participate in the Hub was also examined. Table 5 shows that most respondents perceived that participants should involve the Directorate of Natural Environment and Biodiversity Management, Directorate-General for Environmental Policy (by 96.3%), the Directorate of Environment, Spatial Planning and Climate Change, Directorate-General for Agricultural Development (85.5%) as well as executives of forest services and offices (83.7%). The non-parametric test confirmed these evaluations. In specific, the Directorate of Natural Environment and Biodiversity Management was ranked in the first position with a mean rank of 11.13. This was followed by the Directorate of Environment, Spatial Planning and Climate Change (mean rank of 9.45) and officials of forest services and forest offices (mean rank 9.36). Conversely, the Technical Chamber of Greece (mean rank 4.87) and representatives from business associations (mean rank 4.07) received the lowest rankings.

Table 5. Percentage units and differences among respondents' views on the bodies that should participate in the Hub.

	Strongly Disagree	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Strongly Agree**	**Mean Ranks ***
Directorate of Natural Environment and Biodiversity Management, Directorate-General for Environmental Policy (Ministry of Environment and Energy)	-	-	3.6	32.7	63.6	11.13
Directorate of Environment, Spatial Planning and Climate Change, Directorate-General for Agricultural Development (Ministry of Rural Development and Food)	-	-	14.5	45.5	40.0	9.45
Universities/Research institutes	-	3.6	16.4	43.6	36.4	8.96
Green Fund (Ministry of Environment and Energy)	-	7.3	18.2	47.3	27.3	8.08
Geotechnical Chamber of Greece	-	12.7	36.4	32.7	18.2	5.80
Technical Chamber of Greece	1.8	16.4	45.5	25.5	10.9	4.87
Nature 2000 Committee	-	3.6	20.0	40.0	36.4	8.73
Environmental NGOs	3.6	12.7	27.3	47.3	9.1	5.75
Officials of forest services and forest offices	1.8	1.8	12.7	38.2	45.5	9.36
Independent scientists	1.8	5.5	27.3	45.5	20.0	7.00
Representatives from business associations	5.5	18.2	45.5	27.3	3.6	4.07
Local administration	-	9.1	34.5	36.4	20.0	6.70
Representatives of local associations (i.e., agricultural associations, forestry worker associations, hunter associations, beekeeper associations and so on)	-	3.6	18.2	49.1	29.1	8.10
Local residents	1.8	7.3	23.6	47.3	20.0	7.00

* Friedman test: N = 55, Chi-Square = 212.523 df = 13, $p < 0.001$.

Respondents also evaluated the functions that the Hub should be engaged in. Table 6 shows that all respondents (by 100%) perceived that the Hub should recommend appropriate measures and actions after fires in order to secure biodiversity in affected areas. Moreover, the overwhelming majority perceived that the Hub should become a cooperation mechanism among involved agencies for the recovery of biodiversity and natural capital (98.2%) as well as ensure knowledge transfer from the research community to relevant stakeholders and vice versa (98.1%). According to results of the non-parametric Friedman test, the recommendation of post-fire appropriate measures and actions for local biodiversity conservation emerged as the most important function of the Hub as it received the highest ranking (mean rank 7.64). The provision of valid (spatial and temporal) and homogenized data and information (spatial and descriptive information) on wildfire disasters, biodiversity and natural capital was ranked in the second position with a mean rank of 7.45. The lowest ranked function was the organization of educational meetings/seminars and conferences at local/regional level (mean rank 4.95).

Table 6. Percentage units and differences among respondents' views on Hub's functions.

	Not at All	Slightly	Moderately	Much	Very Much	Mean Ranks *
Sharing lessons, case studies and expert knowledge	-	1.8	9.1	41.8	47.3	6.40
Monitoring and presentation of results from recovery actions across the country	-	-	5.5	32.7	61.8	7.41
Organizing educational meetings/seminars and conferences at local/regional level	-	5.5	14.5	50.9	29.1	4.95
Organizing/hosting a group/community of experts or professionals for the recovery of biodiversity and natural capital after disastrous fires	-	-	18.2	52.7	29.1	5.45
Becoming a cooperation mechanism among the involved agencies for the recovery of biodiversity and natural capital	-	-	1.8	45.5	52.7	7.07
Knowledge transfer from the research community to relevant stakeholders and vice versa	-	-	1.8	43.6	54.5	7.25
Management of a website (which will be a repository of proceedings from seminars, conferences, multimedia material, etc.)	-	-	16.4	50.9	32.7	5.37
Contribution to public awareness about the protection and conservation of the country's biodiversity and natural capital	1.8	1.8	9.1	41.8	45.5	6.29
Provision of valid (spatial and temporal) and homogenized data and information (spatial and descriptive information) on wildfire disasters, biodiversity and natural capital	-	1.8	40.0	58.2	-	7.45
Provision of protocols and standards for monitoring the recovery and improvement of biodiversity and natural capital	-	3.6	5.5	30.9	60.0	7.13
Recommendation of post-fire appropriate measures and actions for local biodiversity conservation	-	-	-	38.2	61.8	7.64
Facilitate comparative research/studies of sites affected by fires	-	-	12.7	54.5	32.7	5.60

* Friedman test: N = 55, Chi-Square = 75.625, df = 11, $p < 0.001$.

Stakeholders in the Ministry of Environment and Energy as well as stakeholders in NECCA were asked to state the level that they agreed with various statements, which concerned the current state of biodiversity management and the utilization of existing knowledge and data. According to Table 7, the majority agreed that there is lack of integrating fire ecology into the conservation of ecosystems and policies for natural capital management (e.g., prescribed burning or other management measures) (78.2%). Moreover, most respondents agreed that the assessment of ecosystem services (biophysical and/or economic) would facilitate the planning and selection of management measures and actions for the recovery of biodiversity and natural capital (76.3%). At the same time, around half respondents neither agreed nor disagreed as to whether there is knowledge about the ability to adapt species to new fire regimes. According to the rankings of the Friedman test, in the first position was the statement that concerned the assessment of ecosystem services, which could facilitate the planning and selection of management measures and actions for the recovery of biodiversity and natural capital (mean rank 7.59). In the second position was the statement about the limited integration of fire ecology into the conservation of ecosystems and policies for natural capital management (e.g., prescribed burning or

other management measures) (mean rank 7.35). In the third position was the limited operational utilization of data from remote sensing in the planning and monitoring of post-fire management measures and actions aimed at encouraging the natural recovery of biodiversity and natural capital (mean rank 6.72) (Table 7).

Table 7. Percentage units and differences among respondents' agreement with statements (N = 55).

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean Ranks *
There is limited operational utilization of data from remote sensing in the planning and monitoring of post-fire management measures and actions aimed at encouraging the natural recovery of biodiversity and natural capital	-	5.5	30.9	45.5	18.2	6.72
Fire ecology is scarcely integrated into the conservation of ecosystems and policies for natural capital management (e.g., prescribed burning or other management measures)	1.8	-	20.0	58.2	20.0	7.35
The assessment of ecosystem services (biophysical and/or economic) would facilitate the planning and selection of management measures and actions for the recovery of biodiversity and natural capital	-	1.8	21.8	52.7	23.6	7.59
There is substantial knowledge about the vulnerability of ecosystems and biodiversity characteristics under different fire conditions (fire frequency and intensity)	3.6	12.7	49.1	30.9	3.6	5.37
The monitoring and assessment of post-fire biodiversity recovery measures and actions are satisfactory	16.4	32.7	34.5	16.4	-	3.47
During the implementation of immediate recovery projects in affected areas, there is focus on the mitigation of ecologically important secondary impacts	9.1	27.3	38.2	23.6	1.8	4.23
There is knowledge and support for the planning of special recovery actions according to affected areas' ecological characteristics	3.6	32.7	36.4	25.5	1.8	4.59
There is availability of spatial information on the immediate and precise assessment of biodiversity and natural capital damages	3.6	29.1	41.8	23.6	1.8	4.61
There is knowledge about the types of habitats and the species whose protection must be prioritized after a disaster	5.5	18.2	23.6	43.6	9.1	5.97
There is knowledge about the ability to adapt species to new fire regimes	5.5	20.0	36.4	34.5	3.6	5.10

* Friedman test: N = 55, Chi-Square = 137.774, df = 9, $p < 0.001$.

Respondents also evaluated three types of data that should be provided by the physical structure of Hub's geospatial platform. As Table 8 shows, the strong majority of respondents perceived that the Hub should provide data and information on all examined types of data, that is biodiversity, natural capital, damage levels and course of ecosystem recovery.

Table 8. Percentages regarding respondents' views on the data and information that should be provided by Hub (N = 55).

	Not at All	Slightly	Moderately	Much	Very Much
Provision of valid (spatial and temporal) homogenized data and information about biodiversity, natural capital and the status of ecosystems in Greece	-	-	3.6	38.2	58.2
Provision of valid spatial and temporal) homogenized data and information about the levels of damage either through in situ measurements or through data from remote sensing (area of burnt forest land, fire intensity.)	-	-	5.5	34.5	60.0
Provision of valid spatial and temporal) homogenized data and information about the course of ecosystem recovery/restoration either through in situ or remote sensing measurements	-	-	5.5	32.7	61.8

Finally, stakeholders in the Ministry of Environment and Energy, and NECCA selected relevant KPIs for monitoring Hub's performance as well as the suggested time frame for monitoring each KPI. More than half respondents (56.4%) perceived that a short-term KPI

should concern the area and number of habitats and number of species for which action plans or management plans have been implemented. The economic valuation of ecosystem services was another highly rated KPI that should be monitored in the medium term (10–20 years) (45.5%). For KPIs monitored in the long-term, 25.5% of respondents rated the KPI that concerns changes observed in the structure of the landscape (abiotic), i.e., terrain, soil properties, soil depth, carbon storage, whereas another 21.8% rated KPI regarding potential fire gains and potential changes in ecosystem type and condition. Results of the non-parametric Friedman test detected statistical differences among responses. In specific, KPI on potential changes in ecosystem type and condition (mean rank 13.83) was ranked in the first position and was followed by KPIs on the economic valuation of ecosystem services (mean rank 13.00) and the number of habitat types/species that present an improvement of conservation status (Natura 2000 sites) (mean rank 12.71) (Table 9).

Table 9. Percentage units and differences among respondents' views on the selection of KPIs.

	Initial Phase (1–2 years)	Short-Term (2–10 Years)	Medium Term (10–20 Years)	Long-Term (>20 Years)	Mean Ranks *
Area and number of habitats/number of species for which action plans or management plans have been implemented	16.4	56.4	12.7	14.5	9.80
Size of the area that has been restored	10.9	45.5	29.1	14.5	11.31
Parameters already used for setting conservation objectives for species and habitat types per Natura 2000 site in the vicinity of the area affected	16.4	47.3	27.3	9.1	9.98
Number of habitat types/species that present an improvement of conservation status (Natura 2000 sites)	7.3	41.8	32.7	18.2	12.71
Richness and/or relative abundance of flora and fauna index-species	5.5	49.1	27.3	18.2	12.06
Ecosystem services provision (i.e., soil protection, watershed protection, etc.)	9.1	38.2	36.4	16.4	12.60
Economic valuation of ecosystem services	5.5	34.5	45.5	14.5	13.00
Potential fire losses	18.2	41.8	21.8	18.2	10.64
Potential fire gains	16.4	43.6	18.2	21.8	10.89
Potential changes in ecosystem type and condition		43.6	34.5	21.8	13.83
Potential changes in ecosystem flammability-fuel models	18.2	45.5	20.0	16.4	10.56
Monitoring of potential biological invasions by alien species	30.9	32.7	25.5	10.9	9.15
Changes observed in the structure and the functions of the ecosystems, i.e., density, canopy cover, key species dominance, rare/endemic species dominance	7.3	43.6	30.9	18.2	12.47
Changes observed in the structure of the landscape (abiotic), i.e., terrain, soil properties, soil depth, carbon storage, etc.	14.5	32.7	27.3	25.5	12.40
Role/impact of land use/economic activities (tourism, cultural, grazing, resin tapping, fuel management/use of fuels, mechanical treatment) considered advantageous or detrimental for habitat restoration or maintenance	7.3	43.6	32.7	16.4	12.23
Changes in socioeconomic factors (i.e., financial resources mobilized by public or private funds, new employment positions, stakeholders involved, participatory actions)	16.4	45.5	25.5	12.7	10.48
Biomass recovery rate	12.7	40.0	32.7	14.5	11.40
Human resources involved in Hub activities (number of scientists and/or other professionals involved)	29.1	36.4	25.5	9.1	9.28
Information resources (satellite information, data collection)	34.5	34.5	20.0	10.9	8.78
Financial resources used for Hub operations (amount and rapid availability for action)	25.5	40.0	23.6	10.9	9.42
Educational meetings/seminars and conferences organized	32.7	45.5	12.7	9.1	8.00

* Friedman test: N = 55, Chi-Square = 106.605, df = 20, $p < 0.001$.

5.2. Results of the Survey on Stakeholders in Other Services

This section presents the results from the survey on stakeholders employed in other public bodies and agencies such as ministries (except from the Ministry of Environment and Energy), decentralized authorities, forest services and offices, regional and local authorities, environmental NGOs, public institutions, universities and research institutes.

Stakeholders' sociodemographic characteristics were gathered, and it was shown that male respondents (66.7%) outnumbered their female counterparts significantly. Most

respondents were aged between 51 and 60 (43.6%) and 41 and 50 (35.9%), whereas as few as 2.6% were between 31 and 40 years. In addition, the majority (59%) reported having 16–25 years of service and a considerable share (35.9%) reported having more than 26 years of service. Unlike the previous respondent group, respondents were distributed fairly evenly throughout all education level categories with most of them being master's degree holders (35.9%) followed by PhD holders (33.3%) and bachelor's degree holders (30.8%). Regarding respondents' position in their agencies/bodies, considerable shares were heads of division (33.3%) and employees (30.8%). Finally, 33.3% of respondents were employed in decentralized administration units, 25.6% were employed in universities or research institutes and 23.1% were employed in local administration units. Very few respondents were employed in environmental NGOs (7.7%) and ministries (7.7%).

Stakeholders were first asked whether they agreed with the establishment of a Hub, which will monitor the current state and the potential post-fire effects on biodiversity and natural capital. As with the previous respondent group, the overwhelming majority (92.4%) expressed its agreement with such a proposal (Table 10).

Table 10. Frequency and percentage units regarding respondents' agreement with the establishment of Hub (*N* = 39).

	Frequency	Percentage (%)
Strongly disagree	1	2.6
Disagree	-	-
Neither agree nor disagree	2	5.1
Agree	18	46.2
Strongly agree	18	46.2
Total	39	100.0

Next, respondents were asked whether it is important to provide the public with information on Hub's economic status, efficiency, organization chart, activities and achievements, etc. As it can be seen in Table 11, 66.7% of respondents perceived it as important or very important. However, an appreciable share of 28.2% regarded the provision of such information to the public as moderately important.

Table 11. Frequency and percentage units regarding public access to Hub's information (*N* = 39).

	Frequency	Percentage (%)
Not at all important	1	2.6
Slightly important	1	2.6
Moderately important	11	28.2
Important	15	38.5
Very important	11	28.2
Total	39	100.0

Respondents' views on Hub's funding sources were next examined and it was shown that the majority perceived that the Hub should be financed by European funds (94.9%), followed by research programs (89.8%). The non-parametric Friedman test was performed to detect statistical differences among respondents' views and, according to results, the most important funding source was European funds (mean rank 3.54) followed by research projects (mean rank 3.42). The least important funding sources involved public donations and funds from private sector (each with a mean rank of 2.67) (Table 12).

Respondents assessed a series of specific aspects regarding the operation and structure of the Hub. In Table 13, it can be seen that staffing (74.4%), transparency (74.4%), experience (66.7%) and flexibility in decision-making (64.1%) were regarded as important by most respondents (Table 13).

Table 12. Percentage units regarding the funding sources from which the Hub should be financed (*N* = 39).

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean Ranks *
European funds	2.6	0.0	2.6	51.3	43.6	3.54
Public donations	7.7	7.7	12.8	46.2	25.6	2.67
State subsidies	0.0	15.4	12.8	41	30.8	2.71
Funds from the private sector	7.7	10.3	17.9	35.9	28.2	2.67
Research projects	0.0	5.1	5.1	46.2	43.6	3.42

* Friedman test: N = 39, Chi-Square = 22.705, df = 4, $p < 0.001$.

Table 13. Percentage units regarding the aspects of the operation and structure of the Hub (*N* = 39).

	Not at All Important 1	2	3	4	5	6	7	8	Very Important 9
Staffing	2.6	-	-	-	2.6	7.7	12.8	28.2	46.2
Experience	-	-	2.6	-	2.6	12.8	15.4	28.2	38.5
Technological skills	-	2.6	2.6	2.6	-	15.4	17.9	12.8	46.2
Scientific excellence	-	-	2.6	-	-	2.6	30.8	23.1	41.0
Flexibility in decision-making	-	-	2.6	-	2.6	10.3	20.5	38.5	25.6
Transparency	-	2.6	2.6	-	2.6	5.1	12.8	30.8	43.6
Communication	-	2.6	2.6	-	2.6	12.8	12.8	41	25.6
Governance	2.6	2.6	2.6	-	5.1	10.3	25.6	25.6	25.6

Respondents' views on the bodies and agencies that should participate in the Hub were then examined. As shown in Table 14, the bodies that should participate in the Hub involved the Directorate of Natural Environment and Biodiversity Management, Directorate-General for Environmental Policy (Ministry of Environment and Energy) (92.3%), universities and research institutes (89.7%), officials of forest services and forest offices (89.7%) and the Green Fund (79.5%). Respondents, however, seemed to be divided over the participation of representatives from business associations (41%), representatives of local associations (i.e., agricultural associations, forestry worker associations, hunter associations, beekeeper associations and so on) (35.9%), environmental NGOs (33.3%), Nature 2000 Committee (30.8%) and the Technical Chamber of Greece (28.2%). According to the rankings of the non-parametric Friedman test, in the first position was the Directorate of Natural Environment and Biodiversity Management, Directorate-General for Environmental Policy, which falls under the Ministry of Environment and Energy (mean rank 10.81). This was followed by universities and research institutes (mean rank 10.35) and officials of forest services and forest offices (mean rank 9.60).

Respondents were then asked about the functions that the Hub should serve, and, as shown in Table 15, all functions were rated highly. In particular, the overwhelming majority of respondents (94.8%) perceived that the Hub should be engaged in the monitoring and presentation of results from recovery actions across the country. This function was followed by the provision of valid (spatial and temporal) and homogenized data and information (spatial and descriptive information) on wildfire disasters, biodiversity and natural capital (92.3%), knowledge transfer from the research community to relevant stakeholders and vice versa (89.9%), becoming a cooperation mechanism among the involved agencies for the recovery of biodiversity and natural capital (89.7%) and recommendation of post-fire appropriate measures and actions for local biodiversity conservation (89.7%). The application of the non-parametric test was applied to detect statistical differences and it was shown that the highest ranked functions were the provision of valid (spatial and temporal) and homogenized data and information (spatial and descriptive information) on wildfire disasters, biodiversity and natural capital (mean rank 7.42). In the second position, the function of the Hub as cooperation mechanism among the involved agencies for the recovery of biodiversity and natural capital was ranked (mean rank 7.37). Finally, the third and fourth positions were the functions that concerned knowledge transfer from the research community to relevant stakeholders and vice versa as well as the recommendation

of post-fire appropriate measures and actions for local biodiversity conservation (both functions had a mean rank of 7.05).

Table 14. Percentage units and differences among responses regarding stakeholders that should participate in the Hub.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean Ranks *
Directorate of Natural Environment and Biodiversity Management, Directorate-General for Environmental Policy (Ministry of Environment and Energy)	2.6	-	5.1	30.8	61.5	10.81
Directorate of Environment, Spatial Planning and Climate Change, Directorate-General for Agricultural Development (Ministry of Rural Development and Food)	2.6	5.1	20.5	30.8	41.0	9.26
Universities/Research institutes	-	5.1	5.1	28.2	61.5	10.35
Green Fund (Ministry of Environment and Energy)	-	-	20.5	38.5	41.0	9.42
Geotechnical Chamber of Greece	7.7	23.1	15.4	25.6	28.2	6.69
Technical Chamber of Greece	15.4	25.6	28.2	25.6	5.1	4.23
Nature 2000 Committee	-	5.1	30.8	33.3	30.8	8.28
Environmental NGOs	15.4	20.5	33.3	20.5	10.3	4.78
Officials of forest services and forest offices	-	7.7	2.6	48.7	41.0	9.60
Independent scientists	2.6	7.7	25.6	30.8	33.3	7.81
Representatives from business associations	10.3	23.1	41.0	20.5	5.1	4.35
Local administration	12.8	15.4	25.6	25.6	20.5	6.21
Representatives of local associations (i.e., agricultural associations, forestry worker associations, hunter associations, beekeeper associations and so on)	5.1	5.1	35.9	38.5	15.4	6.41
Local residents	7.7	10.3	20,5	41.0	20.5	6.81

* Friedman test: N = 39, Chi-Square = 168.472, df = 13, $p < 0.001$.

Table 15. Percentage units and differences among responses for the functions that the Hub should serve.

	Not at All	Slightly	Moderately	Much	Very Much	Mean Ranks *
Sharing lessons, case studies and expert knowledge	-	-	12.8	41	46.2	6.55
Monitoring and presentation of results from recovery actions across the country	2.6	-	2.6	53.8	41	6.81
Organizing educational meetings/seminars and conferences at local/regional level	-	-	28.2	28.2	43.6	6.00
Organizing/hosting a group/community of experts or professionals for the recovery of biodiversity and natural capital after disastrous fires	2.6	2.6	25.6	38.5	30.8	5.27
Becoming a cooperation mechanism among the involved agencies for the recovery of biodiversity and natural capital	-	5.1	5.1	33.3	56.4	7.37
Knowledge transfer from the research community to relevant stakeholders and vice versa	-	2.6	7.7	38.5	51.3	7.05
Management of a website (which will be a repository of proceedings from seminars, conferences, multimedia material, etc.)	-	7.7	17.9	43.6	30.8	5.42
Contribution to public awareness about the protection and conservation of the country's biodiversity and natural capital	-	2.6	10.3	38.5	48.7	6.88
Provision of valid (spatial and temporal) and homogenized data and information (spatial and descriptive information) on wildfire disasters, biodiversity and natural capital	-	2.6	5.1	35.9	56.4	7.42
Provision of protocols and standards for monitoring the recovery and improvement of biodiversity and natural capital	-	7.7	17.9	35.9	38.5	5.78
Recommendation of post-fire appropriate measures and actions for local biodiversity conservation	-	5.1	5.1	41.0	48.7	7.05
Facilitate comparative research/studies of sites affected by fires	2.6	2.6	12.8	38.5	43.6	6.38

* Friedman test: N = 39, Chi-Square = 36.949, df = 11, $p < 0.001$.

6. Discussion

The increasing occurrence of forest fires and other environmental crises has underlined the need to establish effective governance models which can shape the appropriate conditions for preventing reoccurrences and mitigating impacts [1,2]. Due to its location in the Mediterranean zone, Greece is particularly prone to the effects of climate change and is

faced with an increasing incidence of environmental crises such as forest fires and floods. From this perspective, the establishment of a governance model is of vital importance in order to build resilience to future reoccurrences and to ensure the recovery of biodiversity, natural capital and ecosystem services. This need was acknowledged by stakeholders in this study who had a positive attitude towards establishing a Hub whose task will be to monitor the current environmental state along with post-fire impacts on biodiversity and natural capital. Stakeholders' positive attitude to the proposed Hub suggests that a formal decision to establish it would be accepted and probably supported by relevant agencies and bodies.

To ensure successful operation, governance models need to integrate stakeholders' preferences and perceptions [2]. To that end, findings from this study can be particularly useful as they have revealed stakeholders' preferences for the proposed Hub's functions, funding sources, parameters, KPIs and participating bodies as well as their views on current weaknesses in environmental management. In relation to the latter, stakeholders in the Ministry of Environment and Energy and NECCA perceived that, at present, the conservation of ecosystems and relevant policies do not integrate fire ecology and also viewed that the assessment of ecosystem services should facilitate the planning and selection of management measures and actions for the recovery of biodiversity and natural capital. As a governance model oriented towards environmental monitoring and post-fire recovery, the proposed Hub should thus prioritize these weaknesses.

Stakeholders' responses have also pointed to the functions that the Hub should serve and, interestingly, both respondent groups highly evaluated the same functions. That is, both perceived that the Hub should provide valid and homogenized data and information about wildfire disasters, biodiversity and natural capital as well as recommend appropriate post-fire measures for local biodiversity recovery. A notable difference, however, between the two respondent groups was that stakeholders in relevant agencies and bodies evaluated higher the function that concerned the Hub's ability to act as cooperation mechanism among the involved agencies for the recovery of biodiversity and natural capital. This suggests that these stakeholders may be more aware of the lack of cooperation that exists in efforts to address environmental crises. The lack of cooperation is often stemming from stakeholders' different perceptions and preferences for the development activities as well as the differences in their level of authority [13]. In other words, a considerable number of agencies and bodies have responsibilities that are relevant to environmental management, which, however, often translates into difficulties in coordinating efforts during times of crises. Hence, stakeholders in this study seem to have been aware about coordination issues which often inhibit the effectiveness of efforts.

Another difference concerned the evaluation of aspects in the establishment and operation of the Hub. In particular, stakeholders in the Ministry of Environment and Energy and NECCA perceived that the most important aspects involved technological skills and scientific excellence whereas stakeholders from the other bodies attached greater importance to staffing and transparency. This difference could perhaps be ascribed to stakeholders' differences in responsibilities. Their views, however, were convergent about the funding sources of the Hub with both respondent groups perceiving that the Hub should be financed by European funds, research projects and state subsidies rather than funds from the private sector.

Participation is another critical component in the establishment of environmental governance models such as the proposed Hub. To put this differently, if governance integrates relevant stakeholders and sectors in a just manner, it can successfully find pathways towards planetary sustainability [10]. For this reason, it is important to identify that should participate in governance. This study revealed those stakeholder groups that are both suitable and necessary for the Hub. Both respondent groups perceived that the Hub should involve the Directorate of Natural Environment and Biodiversity Management, Directorate-General for Environmental Policy, which falls under the Ministry

of Environment and Energy, as well as to forest offices and officials of forest offices/agencies should participate in the Hub.

Finally, certain study limitations and directions for future studies should be noted. Prior research examining stakeholders' views on the establishment of governance models was scarce and therefore it was difficult to form the basis of our literature review to help understand our research subject. Another limitation was that the sampling method used to recruit respondents was not random and, as a result, our results cannot be generalized to all stakeholders in Greece. In addition, the timeframe for completing the study was very short and has perhaps affected sample sizes. Moreover, in the first respondent group, we do not know how many respondents were from NECCA and the Ministry of Environment and Energy and, therefore, it is difficult to ensure that their views are convergent. Regarding future research work, it is recommended to examine the viability of the proposed Hub's funding model as this study captured a clear preference for funding from European funds and research projects which, however, are time-bound and research-based.

7. Conclusions

In a period that climate change is expected to induce more environmental crises than in the past, it becomes necessary to develop governance models in order to build resilience while supporting the recovery of natural and socio-economic environment. The aim of this paper was to investigate the acceptance and attitudes towards the establishment of a governance model in the form of a Hub whose task will be to interconnect data, knowledge and activities necessary for monitoring the recovery of biodiversity and natural capital, in general, after environmental crises. The main contribution of this study was that a novel governance model has been developed, with the critical involvement of relevant stakeholders, to face environmental crisis threatening biodiversity in Greece and other Mediterranean countries. Overall, stakeholders' views were convergent although there was some level of differentiated opinion. Most importantly, stakeholders agreed with the establishment of the Hub, suggesting that they are likely to accept and support it. Stakeholders also perceived that the public should have access to information including the Hub's economic status, activities and funding sources. In addition, both respondent groups perceived that the Hub should provide valid and homogenized data and information about wildfire disasters, biodiversity and natural capital as well as recommend appropriate measures for local biodiversity conservation. At the same time, stakeholders in the second respondent group attached greater importance to the ability of the Hub to act as cooperation mechanism among the involved agencies for the recovery of biodiversity and natural capital. Moreover, the aspects on which the Hub should focus involved technological skills, scientific excellence, staffing and transparency. In order to serve these recommended functions effectively, the Hub must seek to become the central point for validated and reliable data on the recovery of degraded areas as well as on updated information about recent directives, ministerial decisions, laws, recent research findings and scientific innovations. It should also provide information about actions, interventions and events related to citizen participation in environmental governance. To achieve such a high level of information, the Hub must act as a network of all relevant stakeholders involved in environmental monitoring, protection and management. According to respondents' views, the participating stakeholders should primarily be the Directorate of Natural Environment and Biodiversity Management, Directorate-General for Environmental Policy, which falls under the Ministry of Environment and Energy, as well as to forest offices and officials of forest offices/agencies. Finally, policymakers should pay attention to the form of the Hub and ensure that it has a clear institutional structure so that it is empowered to perform monitoring and restoration activities.

Author Contributions: Conceptualization, G.T., E.K. and G.M.; methodology, G.T. and E.K.; formal analysis, E.K. and G.T.; investigation, E.K. and G.T.; writing—original draft preparation, E.K. and G.T.; writing—review and editing, G.M., I.M., A.K., I.C., D.B., I.P.K., F.M., M.A., J.G.G., F.R., V.R.V. and

G.T.; supervision, G.T.; funding acquisition, G.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the European Commission, Directorate-General for Structural Reform Support (DG REFORM), grant number "REFORM/MVC2021/007".

Data Availability Statement: Not applicable.

Acknowledgments: The authors would like to thank all respondents for participating in this study. Without their support this study would have been impossible.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Skrimizea, E.; Bakema, M.; McCann, P.; Parra, C. Disaster governance and institutional dynamics in times of social-ecological change: Insights from New Zealand, the Netherlands and Greece. *Appl. Geogr.* **2021**, *136*, 102578. [CrossRef]
2. Trias, A.P.L.; Cook, A.D.B. Future directions in disaster governance: Insights from the 2018 Central Sulawesi Earthquake and Tsunami response. *Int. J. Disaster Risk Reduct.* **2021**, *58*, 102180. [CrossRef]
3. Gotham, K.F.; Powers, B. Building Resilience: Social Capital in Post-Disaster Recovery. *Contemp. Sociol. J. Rev.* **2015**, *44*, 30–31. [CrossRef]
4. Heazle, M.; Tangney, P.; Burton, P.; Howes, M.; Grant-Smith, D.; Reis, K.; Bosomworth, K. Mainstreaming climate change adaptation: An incremental approach to disaster risk management in Australia. *Environ. Sci. Policy* **2013**, *33*, 162–170. [CrossRef]
5. Djalante, R.; Holley, C.; Thomalla, F. Adaptive governance and managing resilience to natural hazards. *Int. J. Disaster Risk Sci.* **2011**, *2*, 1–14. [CrossRef]
6. Kelly, L.T.; Giljohann, K.M.; Duane, A.; Aquilué, N.; Archibald, S.; Batllori, E.; Bennett, A.F.; Buckland, S.T.; Canelles, Q.; Clarke, M.F.; et al. Fire and biodiversity in the Anthropocene. *Science* **2020**, *370*, 653–663. [CrossRef]
7. Threatened Species Scientific Committee. Advice to the Minister for Sustainability, Environment, Water, Population & Communities from the Threatened Species Scientific Committee (the Committee) on Amendments to the List of Key Threatening Processes under the Environment Protection and Bi. Available online: https://www.awe.gov.au/publications (accessed on 15 April 2022).
8. Australian National Audit Office. Corporate Governance in Commonwealth Authorities and Companies. Available online: www.anao.gov.au (accessed on 15 April 2022).
9. Plumptre, T.; Graham, J. Governance and Good Governance: International and Aboriginal Perspectives. Institute on Governance. Available online: https://www.files.ethz.ch/isn/122184/govgoodgov.pdf (accessed on 20 April 2022).
10. Palmer, C.G.; Fry, A.; Libala, N.; Ralekhetla, M.; Mtati, N.; Weaver, M.; Mtintsilana, Z.; Scherman, P.-A. Engaging society and building participatory governance in a rural landscape restoration context. *Anthropocene* **2022**, *37*, 100320. [CrossRef]
11. Reid, A.; Nikel, J. Differentiating and evaluating conceptions and examples of participation in environment-related learning. In *Participation and Learning: Perspectives on Education and the Environment, Health and Sustainability*; Springer: Catalonia, The Netherlands, 2008; ISBN 9781402064159.
12. Llovet, J. A participatory assessment of post-fire management alternatives in eastern Spain. *Geophys. Res. Abstr. J.A. Alloza* **2015**, *17*.
13. Sitsika, L.; Ntshudu, M.; Hamer, N.; de Vos, A. *Ntabelanga (Laleni) Stakeholder Analysis Report. Prepared for the DEA: NRM—Ntabelanga Lalini Ecological Infrastructure Project*; 2016.
14. Ansell, C.; Gash, A. Collaborative Governance in Theory and Practice. *J. Public Adm. Res. Theory* **2007**, *18*, 543–571. [CrossRef]
15. Porter, J.J.; Birdi, K. 22 reasons why collaborations fail: Lessons from water innovation research. *Environ. Sci. Policy* **2018**, *89*, 100–108. [CrossRef]
16. Averchenkova, A.; Plyska, O.; Wahlgren, J. Addressing the climate and environmental crises through better governance: The environmental democracy approach in development co-operation. *Grantham Res. Inst. Clim. Chang. Environ.* **2022**.
17. Tierney, K. Disaster Governance: Social, Political, and Economic Dimensions. *Annu. Rev. Environ. Resour.* **2012**, *37*, 341–363. [CrossRef]
18. Mukherji, A.; Ganapati, N.E.; Manandhar, B. Panacea or problem: New governance structures for disaster recovery. *Int. J. Disaster Risk Reduct.* **2021**, *52*, 101960. [CrossRef]
19. Healey, P. Creativity and urban governance. *Policy Stud.* **2004**, *25*, 87–102. [CrossRef]
20. Parra, C.; Moulaert, F. The Governance of the Nature-Culture Nexus: Lessons Learned from the San Pedro de Atacama Case Study. *Nat. Cult.* **2016**, *11*, 239–258. [CrossRef]
21. UNDRR about UNDRR. Available online: https://www.undrr.org/ (accessed on 15 April 2022).
22. Srikandini, A.G.; Hilhorst, D.; Voorst, R. Van Disaster Risk Governance in Indonesia and Myanmar: The Practice of Co-Governance. *Polit. Gov.* **2018**, *6*, 180–189. [CrossRef]
23. Westgate, K.N. Reconstruction following disaster. *Futures* **1978**, *10*, 163–166. [CrossRef]
24. Fan, M.F. Disaster governance and community resilience: Reflections on Typhoon Morakot in Taiwan. *J. Environ. Plan. Manag.* **2015**, *58*, 24–38. [CrossRef]
25. Ng, S. Governance beyond the government: Responding to a reactionary flood governance regime in Ayutthaya, Thailand. *Habitat Int.* **2016**, *52*, 11–19. [CrossRef]

26. Fisher, D. International Disaster Relief: A Growing Regulatory Dilemma. *Proc. ASIL Annu. Meet.* **2007**, *101*, 114–118. [CrossRef]
27. Jones, S.; Aryal, K.; Collins, A. Local-level governance of risk and resilience in Nepal. *Disasters* **2013**, *37*, 442–467. [CrossRef] [PubMed]
28. De Lourdes Melo Zurita, M.; Cook, B.; Harms, L.; March, A. Towards New Disaster Governance: Subsidiarity as a Critical Tool. *Environ. Policy Gov.* **2015**, *25*, 386–398. [CrossRef]
29. Siddiqi, A. Disasters in conflict areas: Finding the politics. *Disasters* **2018**, *42*, S161–S172. [CrossRef] [PubMed]
30. Weiss, T.G. Principles, Politics, and Humanitarian Action. *Ethics Int. Aff.* **1999**, *13*, 1–22. [CrossRef]
31. Blanco, D.V. Disaster Governance in the Philippines: Issues, Lessons Learned, and Future Directions in the Post-Yolanda Super Typhoon Aftermath. *Int. J. Public Adm.* **2015**, *38*, 743–756. [CrossRef]
32. Sapat, A.; Esnard, A.-M. Displacement and Disaster Recovery: Transnational Governance and Socio-legal Issues Following the 2010 Haiti Earthquake. *Risk Hazards Cris. Public Policy* **2012**, *3*, 1–24. [CrossRef]
33. Kapucu, N. Public Administrators and Cross-Sector Governance in Response to and Recovery from Disasters. *Adm. Soc.* **2009**, *41*, 910–914. [CrossRef]
34. National Reconstruction Authority. *Post-Disaster Recovery Framework*; Nepal, G., Ed.; National Reconstruction Authority: Kathmandu, Nepal, 2016.
35. Agency, R. Efforts toward Reconstruction of Tohoku. Available online: https://www.reconstruction.go.jp/english/index.html (accessed on 15 April 2022).
36. Gentle, P.; Hunter, J. 3.11: Disaster and change in Japan. *Asia Pacific Bus. Rev.* **2014**, *20*, 619–621. [CrossRef]
37. Suzuki, I.; Kaneko, Y. *Japan's Disaster Governance*; Springer: New York, NY, USA, 2013; ISBN 978-1-4614-6150-0.
38. Cockburn, J.; Palmer, C.; Biggs, H.; Rosenberg, E. Navigating Multiple Tensions for Engaged Praxis in a Complex Social-Ecological System. *Land* **2018**, *7*, 129. [CrossRef]
39. Rogers, K.H.; Luton, R. Strategic Adaptive Management as a Framework for Implementing Integrated Water Resource Management in South Africa; WRC Report No. KV 245/10. 2011. Available online: https://www.wrc.org.za/wp-content/uploads/mdocs/KV%20245.pdf (accessed on 26 February 2023).
40. Caribbean Disaster Emergency Management Agency Annual Report 2019. 2020. Available online: https://cdema.org/images/2021/10/CDEMA_Annual_Report_2019-2020-compressed.pdf (accessed on 15 April 2022).
41. Department of the Prime Minister and Cabinet Disestablishment of CERA. Available online: https://dpmc.govt.nz/our-programmes/greater-christchurch-recovery-and-regeneration/greater-christchurch-group/roles-and-responsibilities/disestablishment-cera (accessed on 15 April 2022).
42. Schultz, C.A.; Moseley, C.; Mattor, K.; McIntyre, K.B.; Ellison, A. Key Findings and Recommendations Based on the USDA Forest Service Integrated Resource Restoration Pilot Third-Party Review. *J. For.* **2017**, *116*, 5–12. [CrossRef]
43. Schultz, C.; McIntyre, K.; Cyphers, L.; Kooistra, C.; Ellison, A.; Moseley, C. Policy Design to Support Forest Restoration: The Value of Focused Investment and Collaboration. *Forests* **2018**, *9*, 512. [CrossRef]
44. Babbie, E. *The Practice of Social Science Research*; Cengage Learning: Wadsworth, OH, USA, 2012.
45. McLafferty, S. Conducting Questionnaire Surveys. In *Key Methods in Geography*, 3rd ed.; Clifford, N., Cope, M., Gillespie, T., French, S., Valentine, G., Eds.; Sage Publishing: London, UK, 2016; pp. 129–143.
46. Djalante, R.; Garschagen, M. *A Review of Disaster Trend and Disaster Risk Governance in Indonesia: 1900–2015*; Springer: Berlin/Heidelberg, Germany, 2017; pp. 21–56. [CrossRef]
47. Bakema, M.M.; Parra, C.; McCann, P. Learning from the rubble: The case of Christchurch, New Zealand, after the 2010 and 2011 earthquakes. *Disasters* **2019**, *43*, 431–455. [CrossRef] [PubMed]
48. Chomeya, R. Quality of Psychology Test Between Likert Scale 5 and 6 Points. *J. Soc. Sci.* **2010**.
49. McGuirk, P.M.; O'Neill, P. Using Questionnaires in Qualitative Human Geography. In *Qualitative Research Methods in Human Geography*; Oxford University Press: Oxford, UK, 2016; pp. 246–273.
50. Fisher, M.J.; Marshall, A.P. Understanding descriptive statistics. *Aust. Crit. Care* **2009**, *22*, 93–97. [CrossRef] [PubMed]