land

MDPI

Article

The Embeddedness of Nature-Based Solutions in the Recovery and Resilience Plans as Multifunctional Approaches to Foster the Climate Transition: The Cases of Italy and Portugal

Elena Di Pirro [1,*,†], Rúben Mendes [2,†], Teresa Fidélis [2], Lorenzo Sallustio [1], Peter Roebeling [3,4], Marco Marchetti [1] and Bruno Lasserre [1]

[1] DiBT: Dipartimento di Bioscienze e Territorio, Università degli Studi del Molise, Contrada Fonte Lappone, 86090 Pesche, Italy
[2] GOVCOPP: Research Unit on Governance, Competitiveness and Public Policies, Department of Environment and Planning, Campus Universitario de Santiago, University of Aveiro, 3810-193 Aveiro, Portugal
[3] CESAM: Centre for Environmental and Marine Studies, Department of Environment and Planning, Campus Universitario de Santiago, University of Aveiro, 3810-193 Aveiro, Portugal
[4] Wageningen Economic Research, Wageningen University and Research, Droevendaalsesteeg 4, 6708 PB Wageningen, The Netherlands
* Correspondence: elena.dipirro@unimol.it
† These authors contributed equally to this work.

Abstract: European countries recently prepared recovery and resilience plans (RRPs) to recover from the pandemic crisis and reach climate neutrality. Nature-Based Solutions (NBS) are recognized as crucial drivers to fostering climate transition while addressing other challenges. Accordingly, RRPs offer the opportunity to promote the adoption of NBS. This article assesses the NBS embeddedness in the policy discourse of Italian and Portuguese RRPs and how they are considered to meet climate–and related environmental–targets. We conducted a discourse analysis based on two steps, (*i*) a quantitative analysis to classify different nature-related terms into four categories—biophysical elements, general environmental concepts, threats and challenges, and NBS—and estimate their frequency in the text; (*ii*) a qualitative analysis to understand the relationship between the categories of challenges and NBS as well as the dedicated investments. The results show that NBS are barely mentioned, with a frequency in the texts for the NBS category of 0.04% and 0.01%, respectively, in Italian and Portuguese RRPs. Narratives are mainly built around general concepts such as resilience and sustainability with nature scarcely considered as an ex novo solution to meet challenges. Notwithstanding, Italy invests 330 M in the implementation of urban forests, while in Portugal, no specific NBS interventions have been considered so far. To date, both countries are primarily orienting the climate transition toward reducing emissions instead of combining these measures with multifunctional NBS to address environmental and socio-economic challenges.

Keywords: discourse analysis; environmental policies; green deal; NextGenerationEU; bio-based economy; climate change; urban forests

Citation: Di Pirro, E.; Mendes, R.; Fidélis, T.; Sallustio, L.; Roebeling, P.; Marchetti, M.; Lasserre, B. The Embeddedness of Nature-Based Solutions in the Recovery and Resilience Plans as Multifunctional Approaches to Foster the Climate Transition: The Cases of Italy and Portugal. *Land* **2022**, *11*, 1254. https://doi.org/10.3390/land11081254

Academic Editor: Alexander Khoroshev

Received: 30 June 2022
Accepted: 3 August 2022
Published: 5 August 2022

1. Introduction

The European Union is addressing the recovery from the pandemic crisis by investing in a stimulus package worth EUR 2.018 trillion at current prices. It consists of a combination of the EU's long-term budget for 2021 to 2027 and the NextGenerationEU [1]. The latter is a temporary instrument to stimulate the recovery with scope and ambition without precedent, including investments and reforms to accelerate the ecological and digital transition, support education, and achieve greater gender, territorial and generational equality. To access NGEU funds, each member state had to prepare a national recovery and resilience plan (RRP) for the period 2021–2026, according to the criteria established by Article 18 of Regulation no. 2021/241/EU. One-third of the overall EU budget aims to

finance the European Green Deal, under which Europe aims to become the first climate-neutral continent by 2050, producing no more greenhouse gases than the ecosystems can naturally absorb. To reach this target, all the member states pledged to reduce net greenhouse gas emissions by at least 55% in 2030 as compared to their 1990 levels. Further ambitious environmental goals were set for all member states, such as zero soil sealing by 2050 [2] and a vast tree planting campaign (i.e., 3 billion trees by 2030; [3]). Achieving these goals relies on the transformation of all sectors of the EU's economy, requiring a paradigm shift for a transition to a circular, nature-positive, carbon-neutral, bio-based and equitable economy [4–7]. Therefore, the focus should not be only on the transformation of energy and transport systems, but also on measures across the economy to harness the potential of nature to contribute to both mitigating climate change and enhancing our resilience to its impacts [8]. As one of the main environmental challenges, climate change is already affecting Europe's ecosystems and human health, and it is expected to pose further threats to the ecosystem and socio-economic system shortly [9–11]. The RRP is thus an opportunity for all the member states to include and invest in a nature-based recovery, addressing the effects of climate change via adaptation and mitigation measures [4]. The latest IPCC report states that all scenarios that limit climate change to 1.5 °C rely on decreasing emissions, decarbonizing the economy as well as adopting land-use change mitigation strategies [12,13]. Accordingly, coupling the decrease in emission sources with the increase in carbon sinks through terrestrial ecosystems is one of the most reliable strategies to fight climate change [9,14,15]. Particularly, all nature-based approaches have emerged as a key instrument to face different challenges across sectors of society and business, also offering multiple cost-effective benefits to ecosystems and human wellbeing [12,16]. However, adopting a nature-based economic perspective means the explicit recognition of nature as both providing inputs and generating outputs for our economy [4,17]. Although it could be still difficult to assess the monetary value and the economic benefits of the outputs [18,19], it is recognized worldwide that there is a need to overcome the "business-as-usual" model based on resource exploitation, biodiversity loss, and carbon emission growth through investing in nature and fostering the transition to sustainable development [6,20].

In recent years, several nature-based approaches have become a key topic of contemporary research on sustainable development of urban and rural areas [21] such as ecological restoration, ecological engineering, green and blue infrastructure, ecosystem services, urban forestry, ecosystem-based management and adaptation, and eco-disaster risk reduction [22–24]. Since 2015 [25], the concept of Nature-Based Solutions (NBS) enclosed each of them under its 'umbrella' including all the approaches, with different terminology, that work with and enhance nature to help address multiple challenges [26]. Several studies have indeed shown how NBS are very efficient in facing extreme events related to climate change, by adaptation and mitigation actions (e.g., reducing flood risk, and storing CO_2) [10,27,28], contemporarily able to preserve human health [27,28], psychosocial well-being [29,30], improve air quality [31–33], and increase landscape connectivity [34,35].

Thanks to their capacity and multifunctionality, NBS are gaining momentum in the emerging policy discourse, and multiple initiatives raised to mainstream the NBS, encouraging their development for more sustainable and just communities [36]. Therefore, NBS are expected to further shape the policy narrative in global environmental decision-making [37]. Accordingly, at a global policy level, 66% of all signatories to the Paris Agreement included NBS for climate change mitigation and adaptation in their nationally determined contributions [38,39]. Furthermore, the EU claims to be a world leader in NBS through supporting numerous projects in the Research and Innovation Agenda [23,25]. These projects are proving to be a catalyst for research–practice partnerships [40], gathering insights regarding NBS performance, impacts assessments, and cost-effectiveness [8,41]. Consequently, NBS are tested in front-runner cities, demonstration sites, and urban living labs, and the EU is using their outcomes to upscale these initiatives to a broader public [10,23] and to facilitate their operationalization from experts to decision makers and stakeholders [42]. However,

the contexts of urban living labs, as well as frontrunner cities and regions, are designed to provide flexible governance conditions, supportive decision makers, and policy instruments [43], hence scarcely representing the complicated real-life contexts of practice [39]. Furthermore, working with limited and scattered case studies, and often only at the local and municipal level, increases the difficulties to spread the gained knowledge to other contexts and scales, rising the issues related to planning silos [44,45]. This overlaps with the fact that the policy instruments for NBS implementation are mainly restricted to the municipal level (i.e., focusing on urban planning [46]) and not to the landscape, country or higher levels [47]. So far, the processes to mainstream and institutionalize NBS into national policy are still not clear, and this concept, with its huge potential, is suffering multiple incorporation difficulties as already observed for other environmental concepts (e.g., ecosystem services) [45].

Given the planned investments to reach global and European targets (e.g., RRP) as well as the high NBS capacity to help in this path, there is still a need to enhance knowledge regarding the NBS inclusion at national and regional policy levels [16,48]. It is necessary to urgently strengthen policy frameworks at the national level [49] to enhance NBS multifunctionality in favor of climate mitigation and adaptation, biodiversity conservation and human well-being as a whole [12,44,48,50]. Therefore, as economic instruments are usually recognized as enablers for a successful NBS uptake [51], taking benefit from the investments related to the recovery from the pandemic crisis is probably the once-in-a-lifetime opportunity to systematically introduce NBS in the member states policy framework.

In this work, we explored if member states have seized this opportunity by analyzing how the role of nature is embedded in the narrative of RRP documents, and how NBS are framed as an investment to foster the climate transition. Narrative and discourse analysis have been applied to other environmental policies, processes, or plans [52] to assess the embeddedness of particular topics since different narrative approaches can influence decision making and knowledge production [37]. Particularly, we focused on two case studies, Italy and Portugal. Both countries are heavily impacted by climate change and are studied by several projects focusing on NBS and related approaches (e.g., H2020, LIFE). Firstly, we conducted a discourse analysis based on two stages. A quantitative analysis to collect different nature-related words included in both the RRPs, classifying them into four different categories of terms. After that, we conducted a qualitative analysis to understand the way NBS are included in the text and how they are translated into actions, interventions as well as investments. Finally, we presented a comparative analysis between the two member states, highlighting the current state, pros, cons, possible ways forward, and future challenges.

2. Background

Description of the Recovery and Resilience Plans in Italy and Portugal

The recovery and resilience plans (RRPs) aim to mitigate the economic and social impact of the coronavirus pandemic and to enhance EU sustainability, resilience, as well as its ability to face climatic and digital transitions' challenges. The EU regulation sets six major areas of intervention (pillars) on which all RRPs have to focus: green transition; digital transformation; economic cohesion, productivity, and competitiveness; social and territorial cohesion; health, economic, social, and institutional resilience; and policies for the next generation. The green transition pillar derives directly from the Green Deal and thus shares the dual goal of achieving a reduction in greenhouse gas emissions of 55% compared to the 1990 scenario by 2030 and, in turn, to achieve climate neutrality by 2050. The regulation of the NGEU stipulates that (*i*) at least 37% of planned investment and reform should support climate goals, and (*ii*) all the investments and reforms must respect the principle of "do no significant harm" to the environment [1].

The RRP is, in each member state, a reform plan mainly based on fostering economic growth and increasing job opportunities. The guidelines for the development of RRP identify under the name of "Components" the areas where aggregate investments and the respective reforms to reach specific objectives. In accordance, the investment lines need to

be matched to a reform strategy aimed at improving the regulatory and legal conditions of the context and to steadily increase the country's equity, efficiency, and competitiveness. Each Component reflects reforms and investment priorities in the area of intervention to address specific challenges by building a coherent package of complementary measures.

The expected economic growth in terms of gross domestic product is similar between the two countries analyzed. Both countries start with a growth in the gross domestic product of 1.5%, expected to lift to 2.5% in Italy and to 2.4% in Portugal, by 2026, employing economic resources about 12 times higher in Italy than Portugal. The expected economic growth is up to 240,000 and 50,000 new jobs, respectively.

The Italian RRP is organized into 16 Components, in turn comprising 63 reforms and 163 investments, financing a total of EUR 191.5 billion. The Components and the respective reforms and investments are grouped into six missions: digitalization (40.3 billion) ecological transition (59.5 billion), sustainable mobility (25.4 billion), research and education (30.9 billion), social cohesion and inclusion (19.9 billion), and health (15.6 billion). The ecological transition takes the highest percentage of the total funding program with respect to the other missions [53].

The Portuguese RRP is organized into 20 Components that, in turn, comprise 37 reforms and 83 investments, financing a total of EUR 16.6 billion. The Components and the respective reforms and investments are grouped in three structuring dimensions: resilience (11.1 billion), climate transition (3 billion), and digital transition (2.5 billion). Both the transitions—climate and digital—represent 33% of the total funding program, while the remaining resources are dedicated to the resilience dimension, which encompasses the aspect of social vulnerabilities, economic and territorial resilience [54].

3. Materials and Methods

The methodology used in this work is based on a discourse analysis [52] conducted in both the original RRPs. In our understanding of discourse analysis, discourses are defined as "socio-cultural meaning structures identified through general characteristics of text, speech or the symbolic aspect of actions" [52]. Narratives are instead adopted by different stakeholders (e.g., policymakers, NGOs, and research institutes) to frame and legitimize their work associated with or adapted to a certain discourse [55]. In our work, we divided the discourse analysis into two different steps, quantitative and qualitative. Firstly, we conducted a content analysis of the RRPs considering different nature-related terms and we grouped them into four categories, Biophysical elements (I), General environmental concepts (II), Threats and challenges (III), and NBS (IV). Grouping the terms into categories was instrumental, as nature can be framed in the narrative of policies according to different aspects and functions, which is reinforced by the growing use of discourse analysis to study environmental challenges in policy topics [52]. As visible in Table 1, in category I, we considered the most common biophysical elements (e.g., tree). In category II, we considered the concepts that are usually included in the policy narratives (e.g., the environment in a broader meaning) but not associated with physical elements or established solutions. Particularly, some of the concepts that have become hegemonic in the policy discourse (e.g., resilience and sustainability) by functioning as a linguistic political mechanism, despite their frequent decoupling from objectives, indicators, and outcomes in policy achievement, from environmental conservation to social equity [56]. In category III, we considered threats and environmental challenges (e.g., climate change, biodiversity loss) that can be potentially addressed by NBS or related approaches (e.g., green infrastructure, urban forests), as already proposed in the literature [57]. Lastly, in category IV, we considered approaches and methods that conceptualize nature as a solution to face multiple challenges (e.g., urban forestry); thus, we considered them under the umbrella of NBS. In accordance with this classification, quantitative analysis is performed as an instrumental step to help understand the overall term frequency patterns shown in both documents and then employed to orientate the qualitative step by focusing on the relationship between specific groups of terms. Accordingly, in the qualitative step, we aim to investigate if nature is framed as a

solution to meet the socio-economic and environmental challenges mentioned in the text and if traditional approaches (e.g., brown infrastructure [58], grey interventions [59]) are envisaged to address the challenges. In line with the aim of this work, we thus focused the qualitative analysis only on the last two categories, i.e., threats and challenges, and NBS. Through a coding process, we investigated the relationship between terms included in the threats and challenges category with terms included in the NBS category, selected in the quantitative step. To perform both the steps of the analysis, we used the Atlas.Ti (version 8.3), a software used in social science research that assists in both the qualitative and quantitative steps of the research (for a detailed review of the software, please see [60]).

Table 1. Coded terms and associated words, aggregated into four categories, "biophysical elements"—category I, "general environmental concepts" related to environment and ecological transition (hereafter "general environmental concepts")—category II, "threats and challenges" potentially addressed by NBS (hereafter "threats and challenges")—category III, and "different ecosystem-based approaches" (hereafter "NBS")—category IV. The use of the "*" at the end of the word accounted for both the plural and all the related words.

	Terms
Category I Biophysical elements	Tree* Air Territor* | Land Water | Wetland* | Irrigation* Soil Ecosystem* Biodiversity | Habitat* | Specie* Riparia* Forest* Agroecologic* Sea | Marin* | Coastal
Category II General environmental concepts	Natural Capital Circular Economy Green* Climate Transition | Green transition Ecological Transition Unsustainab* Resilie* Sustain* Resist* Natur* Ecologi*
Category III Threats and challenges	Climate change* Land take | Soil sealing | Urbaniz* Pollut* Biodiversity loss | Ecosystem fragmentation | Habitat fragmentation Hydrological risk | Landslide risk | Floods Drought Heat Island | Thermic stress | Heat wave Desertifi* Energy efficiency
Category IV Nature-based solutions	Ecological Network* | Ecological Connect* Natural Park* | National Park* | Protected/Natural area* | Marine area* Nature/Ecosystems/Biodiversity/Landscape conservation Ecological/Natural/Environmental restoration Ecosystem based approach* Ecosystem service* Renatur* Nature based solution* Blue Infrastructure* Green/Ecological Corridor* | Green Infrastructure Natural engineering solution* | Bioclimatic architecture solution* Permeab* Urban Forest* Forestation* | Reforestation | Afforestation | Forestry Green area* | Green space* | Garden*

3.1. Quantitative Step

First, we conducted a preliminary analysis of both RRPs in the original languages (i.e., Italian and Portuguese) to identify and collect all nature-related terms enclosed in the documents (please see Table S1 in the Supplementary Materials; the terms are selected in both original languages). In addition, through a grey literature review, we identified challenges and threats related to climate change that can be addressed by NBS [41] and collected them along the texts. In total, we found 46 different nature-related terms and grouped them into four categories able to explain the different roles and relationships with nature, namely "biophysical elements", "general environmental concepts" related to environment and ecological transition (hereafter "general environmental concepts"), "threats and challenges" potentially addressed by NBS (hereafter "threats and challenges"), and "different ecosystem-based approaches" (hereafter "NBS"). Specifically, Table 1 shows the 46 entries derived from the content analysis and classified according to the four categories. When necessary, for some terms, we also considered other associated words, i.e., both plural and singular (expressed in the table with the *) as well as the synonymous or close meanings, e.g., Heat Island* | Thermal stress | Heatwave* (Table 1). All the words identified (i.e., singular, plural, synonymous) were associated and coded as a single term (i.e., each of the 46 entries in Table 1) through the Autocoding tool included in the software Atlas.Ti (version 8.3) [60]. The search was conducted using the same principles of searching as in the scientific databases; the use of the "*" at the end of the search accounted for all the related words, e.g., "ecologi*" accounted for "ecological", "ecologically", etc. Hence, all the words selected for each entry of the table were counted as references and assigned to the respective term. In this way, we built a database with the number of references per term shown throughout the document. During the Autocoding process, we excluded the words that were not related to the meaning in the search, e.g., when the word "nature" is presented as "the nature of the problem", the word "nature" was excluded from the counting as it is not relevant with the meaning of our interest. The number of references for each term was then (*i*) summed up under each category to analyze the relative percentage of the category out of the total words of the document and (*ii*) analyzed as the relative percentage out of the total references counted in the document. These metrics allow us to discuss and compare the different RRPs in both absolute and relative terms.

3.2. Qualitative Step

In the qualitative step, we focused our attention on the terms included in the category of threats and challenges (III) and NBS (IV) identified in the quantitative step. We considered NBS, according to Eggermont et al. [61], as follows: Type 1 NBS, no or minimal intervention in ecosystems for maintaining ecosystem services supply (e.g., protected areas and conservation measures); Type 2, management approaches for improving the ecosystem services supply compared to what would be obtained with a more conventional intervention (e.g., multifunctional agricultural and forests management); and Type 3, creating new ecosystems (e.g., green roofs). For each of the terms included in the threats and challenges category, we thus investigated when they are addressed by NBS (i.e., Type 1, 2, 3) or by a traditional or grey approach (i.e., absence of NBS). We used an open coding approach to assess how the categories of threats and challenges (III) and NBS (IV) were framed in the policy discourse and then used an axial coding approach to relate the two categories and understand if and how NBS are being considered to address the challenges (for the different coding approaches please see [62]). Exploring the relationship between the terms in these two categories we proposed a critical reflection, inspired by critical discourse analysis and eco-linguistic, regarding the capacity of the government to seize the opportunity to include NBS to foster the climate transition and meet the challenges presented in the two policy documents (for further applications of critical discourse analysis in environmental and policy discourse see [63,64]).

4. Results

4.1. Quantitative Analysis

Of the 46 terms analyzed in both the RRPs, in the Italian RRP, we found 1410 references out of 111,178 total words of the whole document (1.27%), while in the Portuguese RRP, we found 1505 references out of the 127,171 words of the whole document (1.18%). All the categories show a frequency below 1% in both documents, with a similar pattern in both countries (Figure 1). Italy shows a higher relative frequency than Portugal in categories II, III, and IV (i.e., general environmental concepts, threats and challenges, and NBS, respectively) while only in category I (i.e., biophysical elements) was this ratio is reversed. The most frequent category is general environmental concepts (II), with, respectively, 0.67% and 0.58%, in Italy and Portugal, followed by the biophysical elements with, respectively, 0.45% and 0.49%, the threats and challenges with, respectively, 0.11% and 0.10%, and lastly, the NBS with values lower than, respectively, 0.04% and 0.01%.

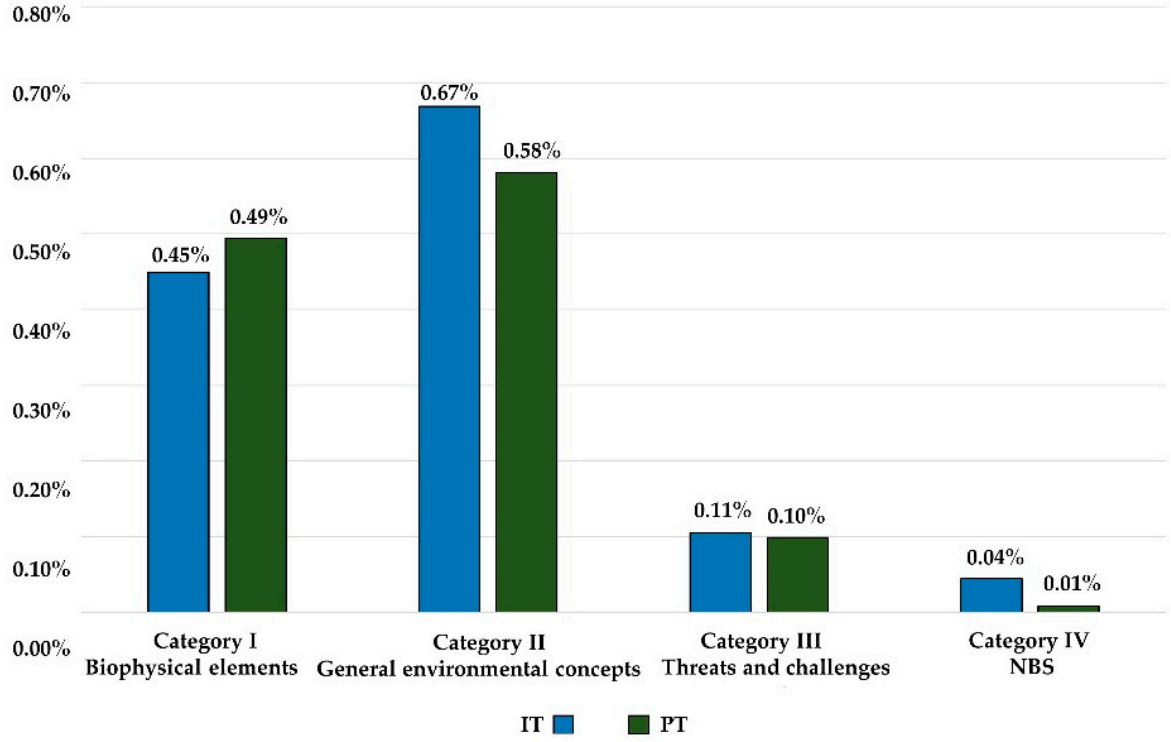

Figure 1. Frequency (%) of each category in the text of both resilience and recovery plans presented as the percentage of terms by the total amount of words in each document.

In Italy, the 46 coded terms show 1410 references throughout the document, with clear differences in their frequency among the four considered categories (Figure 2). Particularly, in category I (total 500 references), all the terms show at least one reference in the text. For ease of reading and exposure, we present the results referring to the first word for each entry (Table 1). The two most used terms are territory (i.e., 236 references) and water (i.e., 131), followed by biodiversity (i.e., 43) and ecosystem* (i.e., 34). In category II (total 733 references), the most frequent term is resilience (i.e., 337), followed by sustainability (i.e., 154) and green (i.e., 93), and ecology (i.e., 52). Climate transition, unsustainability, and resistance are terms completely absent in the Italian RRP. In category III (tot 117 references), all the terms show at least one reference, and the most frequent is energy efficiency (i.e., 46), followed by pollution (i.e., 25) and climate change (i.e., 23). In category IV, (total 50 references), the most frequent terms are gardens and green areas (i.e., 14), protected areas (i.e., 10), followed by restoration, nature conservation, renaturalization, reforestation, urban forest and ecosystem services. References to nature-based solutions, green infrastructure, blue infrastructure, naturalistic engineering, and permeability are absent.

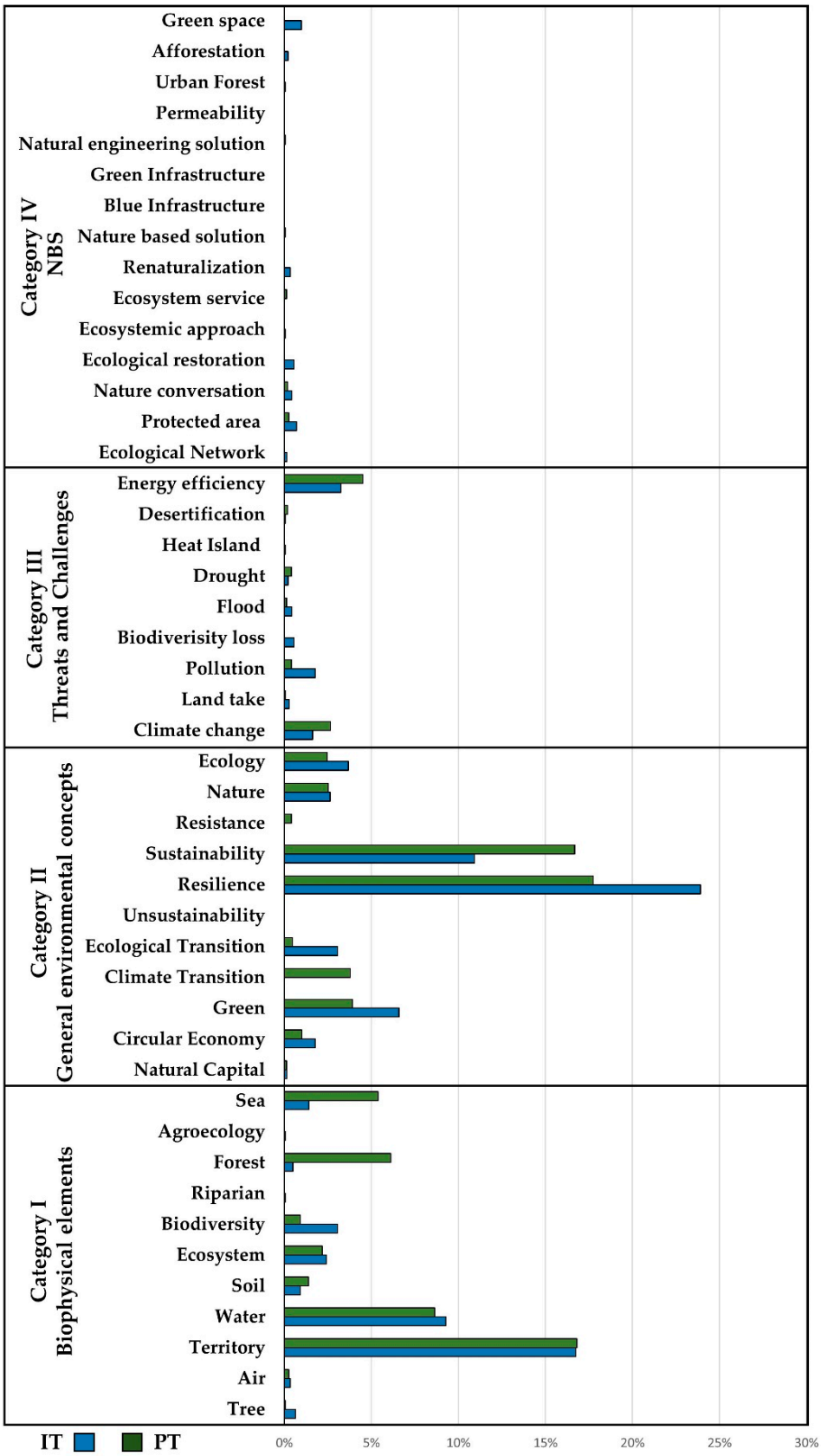

Figure 2. Relative frequency (%) of terms in the text of both national resilience and recovery plans, presented as the percentage of terms by the total amount of coded terms. We reported only the first word of the coded terms, for the complete list please refer to Table 1.

In Portugal, the 46 coded terms show 1505 references throughout the document, with a similar relative distribution frequency in four categories compared to the Italian results. In this country, particularly, in category I (total 629 references), territory and water are confirmed as the two most frequent terms (253 and 130, respectively), followed by forest (i.e., 92) and sea (i.e., 81), while riparian and agro-ecology are absent. In category II (total 739 references), resilience and sustainability are confirmed as the two most frequent of the category (267 and 251, respectively), followed by green and climate transition (59 and 57, respectively). Analogously to the Italian RRP, the concept of unsustainability is absent. Category III (total 126 references) is composed mainly of energy efficiency and climate change (68 and 40, respectively), while the other terms coded as challenges appear in the text less than six times, with habitat fragmentation and heatwaves absent. Considering category IV (total 11 references), the terms protected areas, natural conservation, ecosystem service, NBS, and ecological engineering appear less than five times.

4.2. Qualitative Analysis: The Role of Nature in the Narratives and Investments Envisaged to Meet the Challenges

Following the quantitative analyses, and considering the previous results, we explored across the documents how the threats and challenges presented in both plans (117 references for Italy and 126 for Portugal) were envisaged to be addressed and the respective mitigation role of the NBS mentioned (50 references for Italy and 11 for Portugal). We found that the inclusion of nature takes different meanings and roles in the policy narrative (e.g., nature as a resource, as hazard, etc.) and in the investments to tackle the challenges. Particularly, both plans included conservation and protection approaches (NBS Type 1) as well as management action (NBS Type 2) to face threats and challenges, while only the Italian plan includes and invests in NBS Type 3 (i.e., building new ecosystems). However, we found that the policy responses to the threats and challenges considered in the work are still mainly oriented toward conventional approaches or grey infrastructures (i.e., the absence of specific references to NBS in the texts). This is also confirmed by the fact that the investments to foster the ecological and climate transitions (Mission 2 in Italy and Dimension 2 in Portugal) are largely dedicated to mitigation measures (i.e., decreasing the emissions of industries and transports, decarbonization strategies), while poor emphasis is paid to adaptation measures in both policy narratives. Indeed, in the area of climate reforms and investments, Italy's major challenges include strengthening the energy efficiency of buildings (about EUR 15 billion), improving the management of waste and water resources (about EUR 12 billion), as well sustainable mobility (about EUR 35 billion). Similarly, Portugal's challenges include strengthening the energy efficiency of buildings (EUR 610 million) and sustainable mobility (EUR 967 million), as well as diversifying energy sources, hydrogen and decarbonization of the industries (EUR 1 billion summing up the two investments).

Accordingly, energy efficiency stands in both plans as the most referenced challenge to be addressed to foster the ecological and climate transition and fight climate change. Italy planned to increase the energy efficiency of buildings and facilities, particularly on farms and agricultural enterprises (Mission 2 Component 1; investment 2.2; hereafter, all the Italian investments are reported in the following short form, M2C1; i2.2), school and judicial buildings, as well as private buildings (M2C3; i1.1, i1.2, i2.1), reaching a potential surface of intervention of about 40 million m^2, and investing in total about EUR 15.3 billion. There is no mention to NBS or related approaches, despite the document proposed specifically structural works (e.g., thermal insulation, solar or photovoltaic panels). Similarly, Portugal also proponed structural interventions aimed at reducing emissions and energy expenditure with an overall investment of EUR 610 million (Component 13; hereafter, all the Portuguese investments are reported in the following short form, C13), explicitly referring to the possibility of NBS inclusion such as green roofs or, more generally, bioclimatic architectural solutions without envisaging any investment.

Among the other challenges here considered, large investments were dedicated to water management. In both RRPs, they are articulated to both face flood vulnerability

(referenced six and two times, Italy and Portugal, respectively) and water scarcity, i.e., drought (three and six times, respectively). Nature takes the double meaning of hazard and biophysical resource to be preserved, being scarcely considered as a solution to actively address water management in an explicit manner. In the Italian document, the conservation, monitoring, and requalification of the territory are framed as possible strategies to mitigate the flood and hydrogeological vulnerability, providing investment up to EUR 2.5 billion (M2C4; i2.1). On the other hand, water scarcity is mainly addressed through investments in new grey infrastructure and traditional interventions, investing in Italy EUR 2 billion (M2C4; 4.1) and in Portugal EUR 390 million (C9).

Similarly, also in the investments dedicated to the sea and coastal areas, nature is conceptualized as a resource to be preserved and restored, but the narrative of the two RRPs shows different objectives. On one hand, the Italian plan recognizes the importance of the challenges related to sea-level rise as a cause of marine and biodiversity loss. Therefore, the protection and sustainable management of marine natural capital and restoration of coastal areas are mentioned in two different investments with a total of EUR 670 million (M2C4; i3.5 with EUR 400 million plus M3C2; i1.1 with EUR 270 million). On the other hand, in the Portuguese plan, the sea and coastal areas are mainly framed as an economic asset, and the narrative is embedded in terms such as "sea economy" or "sea potentialities", thus dedicating most of the investment to enhancing the sea and coastal-related economy (C10—EUR 252 million).

Both countries identified the integrated management of croplands and forests as crucial to preserve cultural and natural heritage and enhance job opportunities, but even in this case, the narrative of the documents is oriented to emphasize different objectives and aspects between countries. In the Italian RRP, the investment is oriented to foster the sustainable use of environmental resources (e.g., timber production), encourage "slow tourism" [65], and the energy autonomy of mountain and rural communities (Green Communities project, M2C1; i3.2 with EUR 140 million). Particularly, in Italy, these territories are referred as "inner areas" [66], and they are already subject to specific national policies and investments aiming to reduce the socio-economic gap with cities through enhancing a more sustainable and bio-based economy [67,68]. In the Portuguese RRP, an entire Component and related investments (C8—EUR 615 million) are dedicated to forests. However, the investment objective is mainly oriented to forests' management to increase the resistance and resilience to wildfire, framed as the main threat to Portuguese forests. Accordingly, the investments and reforms are mainly focused on the importance of the risk prevention for the population and biodiversity. Furthermore, the document refers to silviculture actions as a way to enlarge the portion of managed areas, increasing productivity and economic opportunities. Nonetheless, the Portuguese document explicitly recognizes the role of forest management to improve the potential of forests as a carbon sink, emphasizing their mitigation potential, also including the conservation and enhancement of biodiversity and natural capital to ensure the ecosystem services supply.

Analogously, the protection and enhancement of natural and cultural capital are identified in the Italian plan as an opportunity to foster culture and tourism without increasing threats related to land take and urbanization. In this regard, an intervention is planned to restore and requalify 5000 Italian historical parks and gardens in urban and peri-urban contexts (14 references) (M1C3; i2.3 with EUR 300 million allocated). The narrative related to this investment thus recognizes not only the cultural and social value of gardens, but also their importance in increasing ecosystem services supply can, in turn, improve human health and well-being.

The narrative of the Italian document builds an even more specific and explicit language, recognizing the value of restoring vulnerable ecosystems (e.g., riparian) and strengthening the ecological connectivity with new ecosystems to mitigate pollution, reducing hydrogeological risk, and fighting habitat fragmentation, pollution, and degradation. The investment of EUR 360 million (M2C4; i3.3) thus includes the ecological restoration of one of the most degraded, fragmented, and polluted areas in Italy (i.e., Po 'valley), providing for widespread renaturation

interventions along all the ecological corridor (i.e., 1500 ha). Similarly, the investment related to the enhancement of urban green areas (M2C4; i3.1) provides EUR 330 million for urban forestry interventions, specifically planting 6.6 million new trees in the 14 Italian metropolitan cities for mitigating pollution in densely inhabited areas.

As opposed to the Italian RRP, in the Portuguese one, we could not find any measures clearly referring to the construction of new ecosystems (i.e., Type 3). Therefore, any measure is comparable to the renaturation or to the implementation of urban forests, as envisaged in the Italian RRP. Except for the unique reference to the possible NBS implementation to promote energy efficiency in residential areas (i.e., green roofs), the inclusion of nature in urban contexts is absent from the Portuguese RRP. The absence of terms encountered in the quantitative step, e.g., green spaces, green and blue infrastructures, confirms that nature is conceptualized in the Portuguese policy narrative mainly as elements belonging to the rural areas and not framed as a solution to tackle the urban challenges. Accordingly, urbanization, habitat fragmentation, and heat islands, challenges usually related to urban contexts, are absent in the Portuguese RRP. Furthermore, the threat of pollution is scarcely mentioned (six references), focusing only on a reduction in sources of pollutants. Besides the unique reference to prevent pollution in the sea, we could not find any other relation between nature and pollution nor investments that use nature as a way to deal with pollution issues.

5. Discussion

The RRP aims to promote a robust recovery of the economies achieving climate neutrality by 2050 and reducing greenhouse gas emissions by 55% compared to the 1990 scenario by 2030. The regulation of the NextGenerationEU required at least 37% of planned investment and reform to reach climate goals. Hepburn et al. [69] analyzed 300 global rescue and recovery policies from COVID-19 highlighting that the packages seeking synergies between economic and climate goals have better prospects for increasing national wealth, by enhancing productive, social, physical, and natural capital [69]. Following this logic, the former statement suggests that all EU member states might be considered on the right track, regarding both the expected economic growth and climate goals the EU set.

The environmental threats considered in this paper are all directly or indirectly correlated with the challenges of climate change and could be faced with NBS. We thus excluded other challenges that may be addressed in the literature by NBS, such as public health and social cohesion [28,70,71], as they cannot be limitedly associated with the causes and effects of climate change. As a consequence of our analysis, which focused on both policy discourse and allocated investments, we can state that NBS do not represent the main policy narrative in RRPs to respond to the environmental threats and challenges associated with climate change. Indeed, both plans identified the improvement of energy efficiency and renewable energy, and the decarbonization of industry and transport as the most relevant levers for reaching the climate goals, mainly financing interventions for reducing greenhouse gas emissions. However, even if measures to limit the temperature increase to 1.5 °C will be successful, some impacts will continue to increase due to climate system feedback and inertia (e.g., sea-level rise) [13,38]. According to Hepburn et al. [69], "natural capital investments for ecosystem resilience and regeneration including restoration of carbon-rich habitats and climate-friendly agriculture" stands as one of five policies with the highest potential on both economic multiplier and climate impact metrics. Notwithstanding, the NBS implementation to foster climate adaptation remains a neglected measure in both documents as well as their use to foster mitigation is scarcely mentioned and funded, even though NBS proved highly efficient for both measures [25,72] in the context of different initiatives and projects [42]. Italy and Portugal currently stand among the countries showing more literature related to NBS [45]. Although this research effort, the scientific outcomes have probably struggled to be translated into the policy narrative of the RRP, especially in Portugal. However, within RRP framework, the Italian Government has funded two new research Centers specifically aiming to increase sustainability in urban contexts—even establishing and upscaling NBS—namely the Sustainable Mobility Center and the Na-

tional Biodiversity Future Center, with a total amount of about EUR 640 million [73]. This confirms the awareness of policymakers on the pivotal role of research in this sector.

5.1. Comparative Analysis of the Discourses

Both member states analyzed in this work show in their discourses a strong focus on ecological transition and green revolution (Italy) and climate transition (Portugal), with a dedicated section in the RRP (Mission 2 and Dimension 2, respectively). In the Italian RRP, the term climatic transition is excluded from the discourse. In the Portuguese RRP, three concepts of transitions appear related to environmental issues, namely climate transition, ecological transition, and green transition, which often appear linked, thus hindering the possibility to assert different meanings to each. As already shown in the literature, a variety of approaches to conceptualize transition appear in policy that often overlap, while being also distinct and divergent in their approaches and scopes [74]. We thus highlight how the absence of a clear definition of these concepts increases their mixed-use, and ambiguous meaning, complicating the policy discourse and the attribution of specific targets to foster the transition. Furthermore, these two missions alone do not reach the 37% of budget required by the EU for climate objectives (31% for Italy, 18% for Portugal). In both plans, other contributions are diffused and spread in other missions and dimensions to accomplish the climate targets, further increasing the confusion about terms, objectives and investments. Nevertheless, in the Italian document, Mission 2 (M2—ecological transition and green revolution) covers the largest portion of investments (59.5 billion euros out of 191.5 billion invested in the plan) which considers decarbonization, and nature protection and management as complementary aspects for fostering the ecologic transition and the green revolution. Portugal, on the other hand, adopts a different strategy differentiating the management of the territory into the resilience dimension (C8 and C9—Forests and Hydric management) from the dimension dedicated to climate transition (D2), which steers the investments exclusively to the reduction in greenhouse gases emissions, the increase in renewable energy sources, and the reduction in primary energy use. This division is probably due to the conceptualization of forest management mainly oriented to fight wildfires and, similarly, water management to fight water scarcity, thus neglecting the inclusion of NBS in fostering climate transition.

The lack of clarity and specific targets can be also confirmed by the results of the quantitative analysis. The narrative of both documents is framed around the terms included in general environmental concepts, showing the highest frequency (0.67%, 0.58%, in Italy and Portugal, respectively) with respect to the other categories, biophysical elements (0.45%, 0.49%), threats and challenges (0.11%, 0.10%), and lastly, NBS (0.04%, 0.01%). In addition to the concepts of climate and ecological transitions previously mentioned, among the general environmental concepts coded we found the terms with the highest relative frequency out of the coded terms, i.e., resilience, sustainability and green. These terms display their functions as a linguistic and ideological political mechanism often disconnected from specific objectives and outcomes. As illustrated by Tahvilzadeh et al. [56], "Sustainability discourse did not make any effective climate or environmental protection policies possible, nor did it have clout enough to combat rampant social inequalities". Analogously, the narrative of "green" can raise some contradictory interpretations [75]. In the PRRs, most of the references to the term "green" are not related to NBS, such as green infrastructure, green space or green area, but instead are referred to as an eco-friendly behavior or approach, e.g., "green economy", "green transition" "green communities" or "green islands". Given the heterogeneity and multiple interpretations, all these narratives, on the one hand, can serve multiple discourses (e.g., sustainable development and de-growth; [55]), but on the other hand, can overshadow ecological safeguarding and social equity concerns [56].

As shown in Figure 2, the terms classified in the NBS category are the least referenced in the text. Among these, both countries show higher references for NBS Type 1 and 2, i.e., nature conservation and management as well as different typologies of parks and protected areas. In Italy, these actions are mentioned within different investments across

the document, recognizing the value of nature as a resource to be protected or restored (further details in the results section). Portugal dedicates a Component to increasing the management of forests and in turn the resilience to wildfires. Despite biodiversity conservation and enhancement of natural capital are considered as an objective of this component, no mention to the maintenance of native forest is made. The absence of this reference can be significant given that the Portuguese's forests ecosystems are strongly threatened by alien species, e.g., eucalyptus [76], and appropriate silvicultural measures applied to native forest can help in improving their resistance to alien species invasions [77]. Furthermore, forests are mainly conceptualized in the document as an element of the rural areas, thus neglecting the urban dimension.

Considering NBS Type 3, Portugal fails in the allocation of specific investments and interventions, listing only green roofs and NBS among the possible approaches to improve the energy efficiency of buildings. Although there is no reference in the text regarding nature-based solutions, green and blue infrastructures, and ecologic engineering, Italy foresees two important forestry interventions such as the plantation of 6.6 million trees in the 14 metropolitan cities and the ecological restoration of riparian ecosystems of the Po' valley. In the Italian history up to the mid-1970s, numerous reforestation interventions in mountainous and rural areas have already been experimented, with laws, funding, and large-scale implementations aimed to regulate runoff, preventing soil erosion and landslides (for further information see [78]). The two investments envisaged in RRP together are close to EUR 700 million, representing one of the largest structural investments ever allocated in terms of NBS implementation in Italy in recent decades. However, we highlight that, despite the huge investment in absolute terms, this represents in relative terms approximately 0.36% of the total investments envisaged in the Italian RRP (EUR 191.5 billion), and that an extra budget dedicated to other Italian cities could have helped to mitigate other environmental challenges and extend their effects to critical areas out of the major cities [49]. The different approach to urban forests between the two countries might be explained by the differences in research interest between Mediterranean countries found and described by Krajter Ostoić et al. [79]. Accordingly, Italy stands as the leading scientific force in the thematic of urban forests implementation, especially for the air pollution mitigation [79]. In addition, Italy already experimented the inclusion of urban forests in the political context (i.e., Decree on Climate, 2019) allocating EUR 30 million for their implementation [49,80].

5.2. Missed and Potential Opportunities to Include Nature-Based Solutions

In both documents, we identified a series of investments that explicitly mention the value of nature as a resource to be preserved or restored, but do not yet include NBS. We believe that in these investments there may be room for possible implementations of NBS, referring to the currently available scientific literature. Among these, we certainly include water management (both flood and water scarcity) [19,59,81,82], soil restoration and water quality improvement [83,84], industrial land regeneration [2,85], wastewater management [86], coastal protection [87], biomass crops for sustainable biofuel production [88], and energy efficiency [89,90].

Under the Green Deal, the EU already invited all member states to reach specific environmental targets across different action plans (e.g., circular economy and zero pollution), strategies (e.g., Forestry and Biodiversity Strategy to 2030) and laws (e.g., European climate law), to improve the quality of ecosystems and human life in the next decade [2]. Considering the link between the Green Deal and the RRP, we found that these environmental targets were not fully included in the investments and reforms in the analyzed documents. It could be argued that the RRP is not the proper document to include considerations and actions related to the protection, management and/or implementation of nature, given that RRPs are reform plans primarily providing investments to recover and increase the economic growth of the member states. However, the term 'nature-positive economy' has recently emerged in the context of sustainable business and finance [55], and the vital

role of NBS in this economic shift has been presented in a recent EU report [4]. The latter profiles "some of the economic activities where nature-based enterprises are engaged in the delivery of NBS—generating new jobs, innovations, skills, and wider economic impacts, achieved through a nature-based approach respecting the needs of the environment and communities". As a consequence, we argue that the RRP could have been the ideal arena to bring NBS and nature-based enterprises [91] systematically and methodically into policy and reform, not binding them only to a strategic level or constraining them into an "eco-friendly" narrative.

6. Conclusions

This article assessed the embeddedness of NBS in the recovery and resilience plans of Italy and Portugal. In the narrative of both plans, we observed the dominance of generic concepts such as resilience, sustainability and green, supported by different typologies of "transitions" to reach the climate goals set out in the Green Deal. Ecological, green and climate transitions are used within the individual document and among the documents as synonymous. Furthermore, we observed that the category of NBS and related approaches is the least frequent in both plans, and we found indicative the total lack of specific terms such as, nature-based solutions, green and blue infrastructures that are instead well-established in literature as well as in EU reports and financing initiatives. This happens although the recent EU effort to become a leader in NBS, investing in practical projects and research, providing for assessments and evaluation of NBS as well as involvement of stakeholders. Despite the several existent best practices, their outcomes are still scarcely considered and included in both RRPs.

The central aim of the documents is reducing emissions stated as mitigation measures, while adaptation measures are not central in the RRP. Italy shows two large investments, planting 6.6 million trees in the 14 metropolitan cities and the restoration of riparian ecosystems in the Po' Valley. These two investments, besides helping to fight climate change, will help in the path to reach other two important EU goals, the pledge to plant 3 billion trees by 2030, and the zero net land take by 2050. The case of Portugal is instead emblematic because it does not consider any of the other EU goals and continues to mostly limit the role of nature to its "use value" (e.g., sea economy), instead of working with it or imitating it to tackle the national challenges, according to the NBS definition [25] and in line with a "people and nature" perspective [92].

We are aware that the selection of terms and the division into categories might be considered dubious regarding its robustness, due to the lack of a rigorous approach in their definition and classification. However, we tried to reduce possible software limitations and researchers' bias for the counting and coding of terms, (*i*) working in the original language texts, (*ii*) incorporating a wide number of terms, and (*iii*) promoting complete transparency to readers by reporting (Table S1) the selection of terms in the original languages and not limiting them to their translation in Table 1.

With the results of this article, we aimed to provide a critical reflection on the missed opportunities to use nature to address multiple global challenges, not only from a protection and conservation perspective but also by directly promoting the use of NBS through the construction of new ecosystems, new enterprises and new jobs and, in turn, the promotion of a more bio-based and sustainable economy. Accordingly, we identified multiple investments in both plans that use vague language in explaining the approach planned to address some of the threats and challenges considered (e.g., restoring contaminated sites in Italy and fighting water scarcity in Portugal). In these cases, we are confident that the future research centers and open calls will face the challenges in a more specific and unambiguous way, drawing on the scientific literature to implement NBS and develop a more nature-positive path. This is of utmost importance as the RRPs aim to be the main source of reforms and funding opportunities for the next decades, thus potentially playing a crucial role in positively contributing to a transformative society and economy towards real sustainability.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/land11081254/s1, Table S1: Coded terms and associated words in the original languages.

Author Contributions: Conceptualization, E.D.P. and R.M.; methodology, R.M. and T.F.; software, R.M.; formal analysis, E.D.P. and R.M.; investigation and data curation, E.D.P.; validation, E.D.P., R.M. and T.F.; writing—original draft preparation, E.D.P. and R.M.; writing—review and editing, E.D.P., R.M., T.F., L.S., P.R., M.M. and B.L.; visualization, T.F., L.S. and P.R.; supervision, T.F. and L.S.; project administration, resources, M.M. and B.L.; funding acquisition, B.L. All authors have read and agreed to the published version of the manuscript.

Funding: This work has received funding from the research project "Establishing Urban FORest based solutions In Changing Cities" (EUFORICC), cod 20173RRN2S, funded by the PRIN 2017 program of the Italian Ministry of University and Research (project coordinator: C. Calfapietra).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Acknowledgments: Thanks for the financial support through the Research Unit on Governance, Competitiveness and Public Policies (GOVCOPP) (POCI-01-0145-FEDER-008540), funded by European Regional Development fund (FEDER) through COMPETE 2020, and the Foundation for Science and Technology (FCT)—Research Centre for Risks and Sustainability in Construction (RISCO), University of Aveiro, Portugal [FCT/UIDB/ECI/04450/2020]. Thanks are also due to FCT/MCTES for the financial support to CESAM (UIDP/50017/2020 + UIDB/50017/2020), through national funds and co-funding by European funds when applicable. R. Mendes also acknowledges the support from FCT through grant SFRH/BD/147883/2019.

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

References

1. European Union. *The EU's 2021–2027 Long-Term Budget and NextGenerationEU. Facts and Figures*; Publication office of the Europian Union: Luxembourg, 2021.
2. Sessa, M.R.; Russo, A.; Sica, F. Opinion Paper on Green Deal for the Urban Regeneration of Industrial Brownfield Land in Europe. *Land Use Policy* **2022**, *119*, 106198. [CrossRef]
3. European Commission. The 3 Billion Tree Planting Pledge For 2030. Available online: https://knowledge4policy.ec.europa.eu/publication/commission-staff-working-document-swd2021651-3-billion-tree-planting-pledge-2030_en (accessed on 10 May 2022).
4. European Union. *The Vital Role of Nature-Based Solutions in a Nature Positive Economy*; Publication office of the Uropian Union: Luxembourg, 2022.
5. Palahí, M.; Pantsar, M.; Costanza, R.; Kubiszewski, I.; Potočnik, J.; Stuchtey, M.; Nasi, R.; Lovins, H.; Giovannini, E.; Fioramonti, L.; et al. Investing in Nature as the True Engine of Our Economy: A 10-Point Action Plan for a Circular Bioeconomy of Wellbeing; 2020; ISBN 978-952-5980-92-9. Available online: https://efi.int/sites/default/files/files/publication-bank/2020/EFI_K2A_02_2020.pdf (accessed on 10 May 2022).
6. European Union. *Carbon Economy—Studies on Support to Research and Innovation Policy in the Area of Bio-Based Products and Services*; Publications Office of the European Union: Luxembourg, 2021.
7. Hetemäki, L.; Palahí, M.; Nasi, R. Seeing the Wood in the Forests. *Knowlege Action* **2020**, 1–18. [CrossRef]
8. Wild, T.; Bulkeley, H.; Naumann, S.; Vojinovic, Z.; Calfapietra, C.; Whiteoak, K. Nature-Based Solutions: State of the Art in EU-Funded Projects. *Luxemb. Publ. Off. Eur. Union* **2020**, 308. [CrossRef]
9. Kabisch, N.; Korn, H.; Stadler, J.; Bonn, A. *Nature-Based Solutions to Climate Change Adaptation in Urban Areas*; Kabisch, N., Korn, H., Stadler, J., Bonn, A., Eds.; Theory and Practice of Urban Sustainability Transitions; Springer International Publishing: Cham, Switzerland, 2017; ISBN 978-3-319-53750-4.
10. Veerkamp, C.; Ramieri, E.; Romanovska, L.; Zandersen, M.; Förster, J.; Rogger, M.; Martinsen, L. *Assessment Frameworks of Nature-Based Solutions for Climate Change Adaptation and Disaster Risk Reduction*; European Topic Centre on Climate Change impacts, Vulnerability and Adaptation (ETC/CCA) Technical Paper 2021/3; European Environmental Agency: København, Denmark, 2021. [CrossRef]
11. Fischer, E.M.; Schär, C. Consistent Geographical Patterns of Changes in High-Impact European Heatwaves. *Nat. Geosci.* **2010**, *3*, 398–403. [CrossRef]
12. Seddon, N.; Chausson, A.; Berry, P.; Girardin, C.A.J.; Smith, A.; Turner, B. Understanding the Value and Limits of Nature-Based Solutions to Climate Change and Other Global Challenges. *Philos. Trans. R. Soc. B Biol. Sci.* **2020**, *375*, 20190120. [CrossRef]

13. Allen, M.R.; Dube, O.P.; Solecki, W.; Aragón-Durand, F.; Cramer, W.; Humphreys, S.; Kainuma, M.; Kala, J.; Mahowald, N.; Mulugetta, Y.; et al. Framing and Context. In *Global Warming of 1.5 °C*; An IPCC Special Report on the Impacts of Global Warming of 1.5 °C above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Intergovernmental Panel on Climate Change (IPCC); Masson-Delmotte, V., Zhai, P., Pörtner, H.-O., Roberts, D., Skea, J., Shukla, P.R., Pirani, A., Moufouma-Okia, W., Péan, C., Pidcock, R., et al., Eds.; Cambridge University Press: Geneva, Switzerland, 2022; pp. 49–92. ISBN 9781009157940.
14. Marchetti, M.; Vizzarri, M.; Lasserre, B.; Sallustio, L.; Tavone, A. Natural Capital and Bioeconomy: Challenges and Opportunities for Forestry. *Ann. Silvic. Res.* **2015**, *38*, 62–73. [CrossRef]
15. Burrascano, S.; Chytrý, M.; Kuemmerle, T.; Giarrizzo, E.; Luyssaert, S.; Sabatini, F.M.; Blasi, C. Current European Policies Are Unlikely to Jointly Foster Carbon Sequestration and Protect Biodiversity. *Biol. Conserv.* **2016**, *201*, 370–376. [CrossRef]
16. Naumann, S.; Anzaldua, G.; Gerdes, H.; Frelih-Larsen, A.; Davis, M.; Berry, P.; Burch, S.; Sanders, M. Assessment of the Potential of Ecosystem-Based Approaches to Climate Change Adaptation and Mitigation in Europe. 2011. Available online: https://climate-adapt.eea.europa.eu/metadata/publications/assessment-of-the-potential-of-ecosystem-based-approaches-to-climate-change-adaptation-and-mitigation-in-europe (accessed on 10 May 2022).
17. McDonald, R.; Aljabar, L.; Aubuchon, C.; Birnbaum, H.; Chandler, C.; Toomey, B.; Daley, J.; Jimenez, W.; Trieschman, E.; Paque, J.; et al. *Funding Trees for Health. An Analysis of Finance and Policy Actions to Enable Tree Planting for Public Health*; The Nature Conservancy: Arlington County, VA, USA, 2017; Volume 36.
18. Vallecillo, S.; La Notte, A.; Zulian, G.; Ferrini, S.; Maes, J. Ecosystem Services Accounts: Valuing the Actual Flow of Nature-Based Recreation from Ecosystems to People. *Ecol. Modell.* **2019**, *392*, 196–211. [CrossRef]
19. Wild, T.C.; Henneberry, J.; Gill, L. Comprehending the Multiple 'Values' of Green Infrastructure – Valuing Nature-Based Solutions for Urban Water Management from Multiple Perspectives. *Environ. Res.* **2017**, *158*, 179–187. [CrossRef]
20. Sangha, K.K.; Gordon, I.J.; Costanza, R. Ecosystem Services and Human Wellbeing-Based Approaches Can Help Transform Our Economies. *Front. Ecol. Evol.* **2022**, *10*, 14. [CrossRef]
21. Albert, C.; Schröter, B.; Haase, D.; Brillinger, M.; Henze, J.; Herrmann, S.; Gottwald, S.; Guerrero, P.; Nicolas, C.; Matzdorf, B. Addressing Societal Challenges through Nature-Based Solutions: How Can Landscape Planning and Governance Research Contribute? *Landsc. Urban Plan.* **2019**, *182*, 12–21. [CrossRef]
22. Escobedo, F.J.; Giannico, V.; Jim, C.Y.; Sanesi, G.; Lafortezza, R. Urban Forests, Ecosystem Services, Green Infrastructure and Nature-Based Solutions: Nexus or Evolving Metaphors? *Urban For. Urban Green.* **2019**, *37*, 3–12. [CrossRef]
23. Faivre, N.; Fritz, M.; Freitas, T.; de Boissezon, B.; Vandewoestijne, S. Nature-Based Solutions in the EU: Innovating with Nature to Address Social, Economic and Environmental Challenges. *Environ. Res.* **2017**, *159*, 509–518. [CrossRef]
24. Cohen-Shacham, E.; Andrade, A.; Dalton, J.; Dudley, N.; Jones, M.; Kumar, C.; Maginnis, S.; Maynard, S.; Nelson, C.R.; Renaud, F.G.; et al. Core Principles for Successfully Implementing and Upscaling Nature-Based Solutions. *Environ. Sci. Policy* **2019**, *98*, 20–29. [CrossRef]
25. European Commission. *Towards an EU Research and Innovation Policy Agenda for Nature-Based Solutions & Re-Naturing Cities. Final Report of the Horizon 2020 Expert Group on "Nature-Based Solutions and Re-Naturing Cities" (Full Version)*; European Commission: Brussels, Belgium, 2015; ISBN 978-92-79-46051-7.
26. Castellar, J.A.C.; Popartan, L.A.; Pueyo-Ros, J.; Atanasova, N.; Langergraber, G.; Säumel, I.; Corominas, L.; Comas, J.; Acuña, V. Nature-Based Solutions in the Urban Context: Terminology, Classification and Scoring for Urban Challenges and Ecosystem Services. *Sci. Total Environ.* **2021**, *779*, 146237. [CrossRef] [PubMed]
27. Barboza, E.P.; Cirach, M.; Khomenko, S.; Iungman, T.; Mueller, N.; Barrera-Gómez, J.; Rojas-Rueda, D.; Kondo, M.; Nieuwenhuijsen, M. Green Space and Mortality in European Cities: A Health Impact Assessment Study. *Lancet Planet. Heal.* **2021**, *5*, e718–e730. [CrossRef]
28. van den Bosch, M.; Ode Sang, Å. Urban Natural Environments as Nature-Based Solutions for Improved Public Health—A Systematic Review of Reviews. *Environ. Res.* **2017**, *158*, 373–384. [CrossRef]
29. Spano, G.; D'este, M.; Giannico, V.; Carrus, G.; Elia, M.; Lafortezza, R.; Panno, A.; Sanesi, G. Are Community Gardening and Horticultural Interventions Beneficial for Psychosocial Well-Being? A Meta-Analysis. *Int. J. Environ. Res. Public Health* **2020**, *17*, 3584. [CrossRef]
30. Bratman, G.N.; Anderson, C.B.; Berman, M.G.; Cochran, B.; de Vries, S.; Flanders, J.; Folke, C.; Frumkin, H.; Gross, J.J.; Hartig, T.; et al. Nature and Mental Health: An Ecosystem Service Perspective. *Sci. Adv.* **2019**, *5*, eaax0903. [CrossRef]
31. Tallis, M.; Taylor, G.; Sinnett, D.; Freer-Smith, P. Estimating the Removal of Atmospheric Particulate Pollution by the Urban Tree Canopy of London, under Current and Future Environments. *Landsc. Urban Plan.* **2011**, *103*, 129–138. [CrossRef]
32. Sgrigna, G.; Baldacchini, C.; Dreveck, S.; Cheng, Z.; Calfapietra, C. Relationships between Air Particulate Matter Capture Efficiency and Leaf Traits in Twelve Tree Species from an Italian Urban-Industrial Environment. *Sci. Total Environ.* **2020**, *718*, 137310. [CrossRef] [PubMed]
33. Fusaro, L.; Marando, F.; Sebastiani, A.; Capotorti, G.; Blasi, C.; Copiz, R.; Congedo, L.; Munafò, M.; Ciancarella, L.; Manes, F. Mapping and Assessment of PM10 and O3 Removal by Woody Vegetation at Urban and Regional Level. *Remote Sens.* **2017**, *9*, 791. [CrossRef]
34. Valeri, S.; Zavattero, L.; Capotorti, G. Ecological Connectivity in Agricultural Green Infrastructure: Suggested Criteria for Fine Scale Assessment and Planning. *Land* **2021**, *10*, 807. [CrossRef]

35. Staccione, A.; Candiago, S.; Mysiak, J. Mapping a Green Infrastructure Network: A Framework for Spatial Connectivity Applied in Northern Italy. *Environ. Sci. Policy* **2022**, *131*, 57–67. [CrossRef]
36. van der Jagt, A.P.N.; Kiss, B.; Hirose, S.; Takahashi, W. Nature-Based Solutions or Debacles? The Politics of Reflexive Governance for Sustainable and Just Cities. *Front. Sustain. Cities* **2021**, *2*, 1–19. [CrossRef]
37. Melanidis, M.S.; Hagerman, S. Competing Narratives of Nature-Based Solutions: Leveraging the Power of Nature or Dangerous Distraction? *Environ. Sci. Policy* **2022**, *132*, 273–281. [CrossRef]
38. Chausson, A.; Turner, B.; Seddon, D.; Chabaneix, N.; Girardin, C.A.J.; Kapos, V.; Key, I.; Roe, D.; Smith, A.; Woroniecki, S.; et al. Mapping the Effectiveness of Nature-based Solutions for Climate Change Adaptation. *Glob. Chang. Biol.* **2020**, *26*, 6134–6155. [CrossRef]
39. Schröter, B.; Hack, J.; Hüesker, F.; Kuhlicke, C.; Albert, C. Beyond Demonstrators—Tackling Fundamental Problems in Amplifying Nature-Based Solutions for the Post-COVID-19 World. *Npj Urban Sustain.* **2022**, *2*, 4. [CrossRef]
40. Frantzeskaki, N.; McPhearson, T.; Collier, M.J.; Kendal, D.; Bulkeley, H.; Dumitru, A.; Walsh, C.; Noble, K.; Van Wyk, E.; Ordóñez, C.; et al. Nature-Based Solutions for Urban Climate Change Adaptation: Linking Science, Policy, and Practice Communities for Evidence-Based Decision-Making. *Bioscience* **2019**, *69*, 455–466. [CrossRef]
41. Raymond, C.M.; Pam, B.; Breil, M.; Nita, M.R.; Kabisch, N.; de Bel, M.; Enzi, V.; Frantzeskaki, N.; Geneletti, D.; Cardinaletti, M.; et al. *An Impact Evaluation Framework to Support Planning and Evaluation of Nature-Based Solutions Projects*; Centre for Ecology & Hydrology: Wallingford, UK, 2017.
42. Dumitru, A.; Wendling, L. *Evaluating the Impact of Nature-Based Solutions—A Handbook for Practitioners*; Publication office of the Uropian Union: Luxembourg, 2021; pp. 1–373. [CrossRef]
43. Sarabi, S.; Han, Q.; Romme, A.G.L.; de Vries, B.; Valkenburg, R.; Den Ouden, E.; Zalokar, S.; Wendling, L. Barriers to the Adoption of Urban Living Labs for Nbs Implementation: A Systemic Perspective. *Sustainability* **2021**, *13*, 13276. [CrossRef]
44. Di Pirro, E.; Sallustio, L.; Castellar, J.A.C.; Sgrigna, G.; Marchetti, M.; Lasserre, B. Facing Multiple Environmental Challenges through Maximizing the Co-Benefits of Nature-Based Solutions at a National Scale in Italy. *Forests* **2022**, *13*, 548. [CrossRef]
45. Mendes, R.; Fidélis, T.; Roebeling, P.; Teles, F. The Institutionalization of Nature-Based Solutions-a Discourse Analysis of Emergent Literature. *Resources* **2020**, *9*, 6. [CrossRef]
46. Cortinovis, C.; Olsson, P.; Boke-Olén, N.; Hedlund, K. Scaling up Nature-Based Solutions for Climate-Change Adaptation: Potential and Benefits in Three European Cities. *Urban For. Urban Green.* **2022**, *67*, 127450. [CrossRef]
47. Mendonça, R.; Roebeling, P.; Fidélis, T.; Saraiva, M. Policy Instruments to Encourage the Adoption of Nature-Based Solutions in Urban Landscapes. *Resources* **2021**, *10*, 81. [CrossRef]
48. UNEP Smart, Sustainable and Resilient Cities: The Power of Nature-Based Solutions. Available online: https://www.unep.org/resources/report/smart-sustainable-and-resilient-cities-power-nature-based-solutions (accessed on 10 May 2022).
49. Di Pirro, E.; Sallustio, L.; Sgrigna, G.; Marchetti, M.; Lasserre, B. Strengthening the Implementation of National Policy Agenda in Urban Areas to Face Multiple Environmental Stressors: Italy as a Case Study. *Environ. Sci. Policy* **2022**, *129*, 1–11. [CrossRef]
50. Davis, M.; Abhold, K.; Mederake, L.; Knoblauch, D. NBS in European and National Policy Framework. *Naturvation* **2018**, *50*, 1–52.
51. Sarabi, S.E.; Han, Q.; Romme, A.G.L.; de Vries, B.; Wendling, L. Key Enablers of and Barriers to the Uptake and Implementation of Nature-Based Solutions in Urban Settings: A Review. *Resources* **2019**, *8*, 121. [CrossRef]
52. Leipold, S.; Feindt, P.H.; Winkel, G.; Keller, R. Discourse Analysis of Environmental Policy Revisited: Traditions, Trends, Perspectives. *J. Environ. Policy Plan.* **2019**, *21*, 445–463. [CrossRef]
53. Presidenza del Consiglio dei Ministri Piano Nazionale Di Ripresa e Resilienza. Available online: https://italiadomani.gov.it/it/home.html (accessed on 10 May 2022).
54. MINISTÉRIO DO PLANEAMENTO PRR—Recuperar Portugal Construindo O Futuro. Available online: https://recuperarportugal.gov.pt/ (accessed on 10 May 2022).
55. D'Amato, D. Sustainability Narratives as Transformative Solution Pathways: Zooming in on the Circular Economy. *Circ. Econ. Sustain.* **2021**, *1*, 231–242. [CrossRef]
56. Tahvilzadeh, N.; Montin, S.; Cullberg, M. Functions of Sustainability: Exploring What Urban Sustainability Policy Discourse "Does" in the Gothenburg Metropolitan Area. *Local Environ.* **2017**, *22*, 66–85. [CrossRef]
57. Raymond, C.M.; Frantzeskaki, N.; Kabisch, N.; Berry, P.; Breil, M.; Nita, M.R.; Geneletti, D.; Calfapietra, C. A Framework for Assessing and Implementing the Co-Benefits of Nature-Based Solutions in Urban Areas. *Environ. Sci. Policy* **2017**, *77*, 15–24. [CrossRef]
58. Mander, Ü.; Kull, A.; Uuemaa, E.; Mõisja, K.; Külvik, M.; Kikas, T.; Raet, J.; Tournebize, J.; Sepp, K. Green and Brown Infrastructures Support a Landscape-Level Implementation of Ecological Engineering. *Ecol. Eng.* **2018**, *120*, 23–35. [CrossRef]
59. Vörösmarty, C.J.; Rodríguez Osuna, V.; Cak, A.D.; Bhaduri, A.; Bunn, S.E.; Corsi, F.; Gastelumendi, J.; Green, P.; Harrison, I.; Lawford, R.; et al. Ecosystem-Based Water Security and the Sustainable Development Goals (SDGs). *Ecohydrol. Hydrobiol.* **2018**, *18*, 317–333. [CrossRef]
60. Hwang, S. Utilizing Qualitative Data Analysis Software: A Review of Atlas.Ti. *Soc. Sci. Comput. Rev.* **2008**, *26*, 519–527. [CrossRef]
61. Eggermont, H.; Balian, E.; Azevedo, J.M.N.; Beumer, V.; Brodin, T.; Claudet, J.; Fady, B.; Grube, M.; Keune, H.; Lamarque, P.; et al. Nature-Based Solutions: New Influence for Environmental Management and Research in Europe. *Gaia* **2015**, *24*, 243–248. [CrossRef]

62. Corbin, J.; Strauss, A. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*; IV; SAGE Publication, Inc.: Thousand Oaks, CA, USA, 2015; ISBN 9781412997461.
63. Sumares, D.; Fidélis, T. Natura 2000 and the Narrative Nature of Nature: A Case for Critical Discourse Analysis. *J. Integr. Environ. Sci.* **2011**, *8*, 53–68. [CrossRef]
64. Yrjänä, L.; Rashidfarokhi, A.; Toivonen, S.; Viitanen, K. Looking at Retail Planning Policy through a Sustainability Lens: Evidence from Policy Discourse in Finland. *Land Use Policy* **2018**, *79*, 190–198. [CrossRef]
65. Lowry, L.L.; Lee, M. CittaSlow, Slow Cities, Slow Food: Searching for a Model for the Development of Slow Tourism. *Travel Tour. Res. Assoc. Adv. Tour. Res. Glob.* **2016**, *40*. Available online: https://www.semanticscholar.org/paper/CittaSlow%2C-Slow-Cities%2C-Slow-Food%3A-Searching-for-a-Lowry-Lee/fa6d9d7bfdc4f58207d3ae4dc7681f68c6409c3e (accessed on 10 May 2022).
66. Lucatelli, S.; Carlucci, C.; Guerrizio, M.A. A Strategy for "Inner Areas" in Italy. In *Education, Local Economy and Job Opportunities in Rural Area, Proceedings of the 2nd EURUFU Scientific Conference, Milan, Italy, 14–16 October 2015*; Gather, M., Luttmerding, A., Berding, J., Eds.; Transport and Spatial Planning Institute, University of Applied Sciences Erfurt: Erfurt, Germany, 2013; pp. 69–127.
67. De Toni, A.; Vizzarri, M.; Di Febbraro, M.; Lasserre, B.; Noguera, J.; Di Martino, P. Aligning Inner Peripheries with Rural Development in Italy: Territorial Evidence to Support Policy Contextualization. *Land Use Policy* **2021**, *100*, 104899. [CrossRef]
68. Marchetti, M.; Palahí, M. Perspectives in Bioeconomy: Strategies, Green Deal and Covid19. *For. Riv. di Selvic. ed Ecol. For.* **2020**, *17*, 52–55. [CrossRef]
69. Hepburn, C.; O'Callaghan, B.; Stern, N.; Stiglitz, J.; Zenghelis, D. Will COVID-19 Fiscal Recovery Packages Accelerate or Retard Progress on Climate Change? *Oxford Rev. Econ. Policy* **2020**, *36*, S359–S381. [CrossRef]
70. Liu, Y.; Wang, R.; Lu, Y.; Li, Z.; Chen, H.; Cao, M.; Zhang, Y.; Song, Y. Natural Outdoor Environment, Neighbourhood Social Cohesion and Mental Health: Using Multilevel Structural Equation Modelling, Streetscape and Remote-Sensing Metrics. *Urban For. Urban Green.* **2020**, *48*, 126576. [CrossRef]
71. Wolch, J.R.; Byrne, J.; Newell, J.P. Urban Green Space, Public Health, and Environmental Justice: The Challenge of Making Cities "Just Green Enough". *Landsc. Urban Plan.* **2014**, *125*, 234–244. [CrossRef]
72. IUCN. *IUCN Global Standard for Nature-Based Solutions: A User-Friendly Framework for the Verification, Design and Scaling up of NbS: First Edition*; IUCN, International Union for Conservation of Nature: Gland, Switzerland, 2020.
73. MUR PNRR: Nascono i 5 Centri Nazionali Di Ricerca. Available online: https://www.mur.gov.it/it/news/mercoledi-15062022/pnrr-nascono-i-5-centri-nazionali-la-ricerca (accessed on 29 June 2022).
74. Patterson, J.; Schulz, K.; Vervoort, J.; van der Hel, S.; Widerberg, O.; Adler, C.; Hurlbert, M.; Anderton, K.; Sethi, M.; Barau, A. Exploring the Governance and Politics of Transformations towards Sustainability. *Environ. Innov. Soc. Transitions* **2017**, *24*, 1–16. [CrossRef]
75. Scoones, I.; Leach, M.; Newell, P. *The Politics of Green Transformations*; Scoones, I., Leach, M., Newell, P., Eds.; Routledge: London, UK, 2015; ISBN 9781317601128.
76. Nunes, L.J.R.; Meireles, C.I.R.; Pinto Gomes, C.J.; Almeida Ribeiro, N.M.C. Historical Development of the Portuguese Forest: The Introduction of Invasive Species. *Forests* **2019**, *10*, 974. [CrossRef]
77. Sitzia, T.; Campagnaro, T.; Kowarik, I.; Trentanovi, G. Using Forest Management to Control Invasive Alien Species: Helping Implement the New European Regulation on Invasive Alien Species. *Biol. Invasions* **2016**, *18*, 1–7. [CrossRef]
78. Cantiani, P.; Di Salvatore, U.; Romano, R. Silvicultural Aspects of Artificial Black Pine Plantations: Analysis of Italian Regional Laws. *For. Riv. di Selvic. ed Ecol. For.* **2018**, *15*, 99–111. [CrossRef]
79. Krajter Ostoić, S.; Salbitano, F.; Borelli, S.; Verlič, A. Urban Forest Research in the Mediterranean: A Systematic Review. *Urban For. Urban Green.* **2018**, *31*, 185–196. [CrossRef]
80. Salbitano, F.; Sanesi, G. Decree on Climate 2019. What Resources Support Forests and Silviculture in Our Cities? *For. Riv. di Selvic. ed Ecol. For.* **2019**, *16*, 74–76. [CrossRef]
81. Lallemant, D.; Hamel, P.; Balbi, M.; Lim, T.N.; Schmitt, R.; Win, S. Nature-Based Solutions for Flood Risk Reduction: A Probabilistic Modeling Framework. *One Earth* **2021**, *4*, 1310–1321. [CrossRef]
82. World Bank. *Implementing Nature-Based Flood Protection: Principles and Implementation Guidance*; World Bank: Washington, DC, USA, 2017.
83. Keesstra, S.; Nunes, J.; Novara, A.; Finger, D.; Avelar, D.; Kalantari, Z.; Cerdà, A. The Superior Effect of Nature Based Solutions in Land Management for Enhancing Ecosystem Services. *Sci. Total Environ.* **2018**, *610–611*, 997–1009. [CrossRef] [PubMed]
84. Roebeling, P.C.; Van Grieken, M.E.; Webster, A.J.; Biggs, J.; Thorburn, P. Cost-Effective Water Quality Improvement in Linked Terrestrial and Marine Ecosystems: A Spatial Environmentaleconomic Modelling Approach. *Mar. Freshw. Res.* **2009**, *60*, 1150–1158. [CrossRef]
85. Cortinovis, C.; Geneletti, D. Mapping and Assessing Ecosystem Services to Support Urban Planning: A Case Study on Brownfield Regeneration in Trento, Italy. *One Ecosyst.* **2018**, *3*, e25477. [CrossRef]
86. Langergraber, G.; Castellar, J.A.C.; Pucher, B.; Baganz, G.F.M.; Milosevic, D.; Andreucci, M.B.; Kearney, K.; Pineda-Martos, R.; Atanasova, N. A Framework for Addressing Circularity Challenges in Cities with Nature-Based Solutions. *Water* **2021**, *13*, 2355. [CrossRef]

87. Kumar, P.; Debele, S.E.; Sahani, J.; Rawat, N.; Marti-Cardona, B.; Alfieri, S.M.; Basu, B.; Basu, A.S.; Bowyer, P.; Charizopoulos, N.; et al. Nature-Based Solutions Efficiency Evaluation against Natural Hazards: Modelling Methods, Advantages and Limitations. *Sci. Total Environ.* **2021**, *784*, 147058. [CrossRef] [PubMed]
88. Sallustio, L.; Harfouche, A.L.; Salvati, L.; Marchetti, M.; Corona, P. Evaluating the Potential of Marginal Lands Available for Sustainable Cellulosic Biofuel Production in Italy. *Socioecon. Plann. Sci.* **2022**, *82*, 101309. [CrossRef]
89. Kolokotsa, D.; Santamouris, M.; Zerefos, S.C. Green and Cool Roofs' Urban Heat Island Mitigation Potential in European Climates for Office Buildings under Free Floating Conditions. *Sol. Energy* **2013**, *95*, 118–130. [CrossRef]
90. Blanco, I.; Schettini, E.; Vox, G. Effects of Vertical Green Technology on Building Surface Temperature. *Int. J. Des. Nat. Ecodyn.* **2018**, *13*, 384–394. [CrossRef]
91. Kooijman, E.D.; McQuaid, S.; Rhodes, M.L.; Collier, M.J.; Pilla, F. Innovating with Nature: From Nature-Based Solutions to Nature-Based Enterprises. *Sustainability* **2021**, *13*, 1263. [CrossRef]
92. Mace, G.M. Whose Conservation? *Science* **2014**, *345*, 1558–1560. [CrossRef]