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Displacement Induced by Climate Change Adaptation: The Case of 'Climate Buffer' Infrastructure

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Abstract: Climate buffer infrastructure is on the rise as a promising 'green' climate adaptation strategy. More often than not, such infrastructure building is legitimized as an urgent technical intervention—while less attention is paid to the distribution of costs and benefits among the affected population. However, as this article shows, adaptation interventions may directly or indirectly result in the relocation or even eviction of households or communities, thereby increasing vulnerabilities for some while intending to reduce long-term climate vulnerabilities for all. We argue that this raises serious, if underappreciated, ethical issues that need to be more explicitly addressed in adaptation policy making. We illustrate our conceptual argument with the help of three examples of infrastructural 'climate buffers': Space for the River projects in the Netherlands, the Diamer–Bhasha dam in Pakistan and the coastal protection plan in Jakarta, Indonesia.

Keywords: climate adaptation; displacement; relocation; The Netherlands; Pakistan; Indonesia; climate ethics

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1. Introduction

In response to increasing worries about global warming, 'green' solutions for climate adaptation have become 'hot'. A growing realisation that climate risks result from an interplay between nature and society has promoted systemic approaches that are inspired and supported by nature. For example, the Sendai Framework for Disaster Risk Reduction (2015–2030) explicitly made the environmental sustainability of interventions a priority. Recent years have seen a drive in many countries to 'green' and 'climatize' hydrologic (flood and drought) disaster risk reduction strategies under the banner of a lexical field of buzzwords like nature-based solutions (*Nbs*), ecosystem-based disaster risk reduction (Eco-DRR), the water–energy–food–climate nexus, climate proofing, climate resilience, building with nature and green infrastructure (*Green infrastructure* (GI) is 'a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services' [1]. Enthusiastically embraced by many in the policy and NGO communities [2], such approaches bring the promise of combining healthier, more sustainable living with climate adaptation and sustainable disaster risk reduction.

The scope of such interventions has steadily increased. Salt marshes, mangroves, sand dunes and coral reefs are customarily understood as natural climate buffers, and their function has come to be revived by the decommissioning of dams, embankments and polders—so-called 'depoldering' ('returning land to the sea') [3–7]—and the restoration of green landscape elements. Other nature-based solutions combine such 'soft' interventions with 'harder' engineering, as in 'building with nature' [8]. This has also involved the repurposing or relabelling of existing infrastructure as 'climate-smart' or 'climate-resilient', as well as the construction of new 'green' (ecological) infrastructure. After a period of

smaller 'living with floods' and wetland conservation projects, bigger infrastructural modernisation projects are now being built to cushion against flood and drought extremes expected to become more frequent with advancing climate change [9]. Their rationale, we argue, is often boosted by a powerful national or regional development drive to pay for or benefit from the investment. The present contribution primarily focuses on such new, engineered infrastructure or land-use interventions presented as climate buffering.

As Triyanti and Chu [10] have noted, these 'green' approaches to climate adaptation tend to be focused on 'scientific projections, engineering techniques, and their respective roles in shaping economic benefits' (p. 11) while negating the politics of their governance, often relying on 'idealised elaborations of accountability, legitimacy, and adaptability' (p. 18), which may be due to the (thus far) low involvement of social and political scientists in the domain. A common assumption of such initiatives is that enhanced environmental sustainability implies enhanced social sustainability (including health, wellbeing and 'liveability'). This assumption is certainly not bulletproof, as growing evidence that climate change adaptation interventions can increase the vulnerability of already marginalized groups [11–13].

Thus, while different forms of public and public–private adaptation interventions are commonly legitimized by highlighting their importance in flood protection, they can also bring considerable trade-offs [14]: while expected to reduce future environmental vulnerabilities for all over time, climate adaptation interventions can significantly increase existing vulnerabilities for some, shift or outsource these vulnerabilities or create new vulnerabilities [11]. Essentially, the imperative of climate interventions tends to call on some citizens to sacrifice the local for the greater good of 'urgent' and 'necessary' climate adaptation.

This raises the issue of fairness and (climate) ethics. Climate ethics often focus on the distribution of costs between present and future generations [15], but the present article calls attention to contemporaneous discrepancies across space. While Broome [16] has argued from economic theory that, theoretically, there is a conceivable sacrifice-free way of dealing with climate change, in reality, security or risk trade-offs can be anticipated between communities that are expected to sacrifice their wellbeing and those that stand to benefit. These bring glaring tensions between the security of some and the security of all, or short-term vs. long-term sacrifice, and can show up the limits to solidarity.

This article zooms in on cases where climate-driven interventions involve one such sacrifice: the short- and long-term displacement of some communities to accommodate climate interventions 'for the greater good'. As we will show, programs to make space for climate infrastructure may directly or indirectly induce the relocation evacuation and/or resettlement of households or communities. This focus gives a fresh twist to the ongoing debates on climate migration, which has received considerable attention over the last decade. Climate migration has both been hailed as a sign of resourceful human adaptability and decried as a human tragedy through the discourse of climate refugees [17–19]. Displacement and relocation induced by policy interventions for climate change adaptation, however, tend to be overlooked in these debates.

We illustrate this with three brief case studies of infrastructural 'climate buffers'. As the examples in this contribution illustrate, climate buffers can range from relatively small multifunctional detention basins to mega dams, presented by the World Bank as necessary tools for climate-proofing [20]. As our cases show, these buffers may incite different degrees of displacement for the local populations. After defining intervention-induced climate displacement, illustrated by three examples of climate buffers in the Netherlands, Pakistan and Indonesia, our contribution discusses the ethical implications of such displacement. We find that, despite their varying political economy contexts, displacement ethics are relevant in each of these.

2. Conceptual Framework

2.1. The 'Anti-Politics Machine' of Climate Change Adaptation

We are witnessing an unprecedented 'climatization' [21] of security and development issues, and many have come to refer to climate change only in terms of crisis or 'climate emergency' [22]. Climate change is 'securitised' [23], as an urgent life-and-death threat, lifting it above politics and legitimising extraordinary measures to save the planet. The crisis label incites a strong *affect* [24] of existential fear—it keeps people awake at night. This fear makes climate concerns override everything else; the consequences of climate-change intervention seem apolitical. As we shall illustrate, the framing and labelling of places and issues as threats, imbuing them urgency and danger [23], makes 'climate interventions' difficult to challenge; since the referent object to be protected is not a community or nation, but humanity itself, it is implied that everyone will have to show solidarity.

The normative aspect of the distribution of sacrifices to make climate interventions happen is further obscured by the way infrastructure tends to be decided upon. Writing in a development context, Li [25] has influentially called attention to the trap of knowledge-based institutions rendering knotty problems technical, reducing complex problems and framing solutions such that they are amenable to technical fixes and devoid of dissent. It implies that such interventions should be left to the experts [26,27]. This ostensibly takes the politics—the competition for who gets what, where, why, how and when—out of such planning, thereby 'depoliticizing' and bureaucratizing questions of resource allocation in a process Ferguson [11,28] has labelled the *anti-politics machine*.

Li's [25] 'rendering technical', observed in the development context, appears to be similarly applicable to climate solutions. While development projects are legitimised by the advancement of a population and lifting it out of poverty, climate and (re)greening infrastructure projects seek to protect a population from the expected negative impact of climate change. By framing green infrastructure interventions first and foremost as necessary adaptation to climatic threats (and attaching a deadline to add to the sense of urgency), these interventions are supposed to be apolitical.

However, the technical discourse is not monolithic; it can be punctured by critical counter discourse [25], and recent years have, indeed, seen increasingly critical engagement with this dynamic. Climate change adaptation interventions executed under the imperative of urgent action may 'have their own, even-less-understood, stratifying outcomes for vulnerable populations' [13]. As Marino and Ribot [13] and others have pointed out, climate change response measures and interventions may also be 'producing new injuries in the name of mitigation and adaptation' (*ibid.*). Rather than being apolitical, critical scholarship is increasingly emphasizing the highly political nature of any adaptation interventions, as these are shaped by and reinforce relational vulnerabilities that 'create a stratified human landscape in which the risks and opportunities presented by climatic change are unequally distributed and in which the vulnerability of the marginalized serves as a buttress to the security of others' [29,30]. In the flood domain, green infrastructure and other 'soft' flood measures can show a surprising disregard of such social and political impacts, as recent studies have highlighted [27,31].

If insecurities are redistributed disproportionally or offloaded elsewhere in time or space, '(c)limate-change interventions may be "maladaptive" (to some) and may further "injure" vulnerable communities' [14], p. 786. Maladaptation refers to an adaptation action 'taken ostensibly to avoid or reduce vulnerability to climate change', which impacts 'adversely on, or increases the vulnerability of other systems, sectors or social groups' [10,32]. Even if unintended, the external effects, or 'externalities', of such interventions may be evaluated as increasing the vulnerability of some actors. In summary, if 'one risk replaces another' [14], p. 786, the cure might be worse than the ailment; the climate change intervention might be perceived as more harmful than the risk of climate change effects for some stakeholders. Such cases risk creating a spurious win-sum that, in a wider perspective, becomes a zero-sum or even a negative-sum intervention. Eriksen et al. [11] refer

to three impact categories that mar flood-risk reduction interventions around the globe: strengthening existing vulnerabilities, offloading them and/or creating new ones.

This contribution presents an analysis of the redistribution of actual and perceived security positions as a result of climate interventions, policies or projects among stakeholder groups. Inevitably, certain actors stand to gain from an intervention, while others lose (materially and/or immaterially) from interventions. Iniquities may arise as a result of interventions in one place to obtain security for others. Interventions can be expected to redistribute the security positions of key stakeholders in a differential way.

This poses ethical questions that are strikingly similar to those asked in the development context several decades ago. This is unsurprising, as, frequently, climate change adaptation interventions are closely linked to development interventions: '(A)daptation is often co-opted to support existing development agendas rather than genuinely addressing climate change risks' [11], p. 8, and existing development programs might be rebranded and 'climatized' to fit the current global urgency (and the availability of funding) for climate change adaptation interventions. Such interventions, ostensibly aiming to kill two birds with one stone, risk sacrificing long-term adaptation for short- to mid-term development objectives, without addressing underlying socioeconomic inequalities that create and enhance climate vulnerabilities.

The promise of development was often used to justify the sacrifice of the local for the greater good of national development—today, the same self-effacing attitude for the greater good is asked based on the threat of impending climate doom. Impacts of such interventions can be 'classified as gains or losses accruing to different social groups—now and in the future' [33], p. 98. In the case of dam projects, for example, the challenge is that those areas that benefit and those that pay are different places and people.

2.2. Displacement Induced by Climate Change Adaptation Interventions

'Climate change is redistribution' [13], p. 323.

Just as was the case for development interventions in the 20th century, policies, initiatives and innovations for climate change adaptation can result in displacement of populations. For example, while it has become a truism that development projects such as hydroelectric dams tend to instigate involuntary displacement [34], e.g., through resettlement programs, over the past years there is increasing evidence that climate change adaptation and mitigation programs also have similar effects [13,14,35]. Some such displacements might be the result of large-scale infrastructural interventions, as the cases discussed in the following section will illustrate.

In other cases, displacement might be more indirect, not part of the plan, but still an outcome of large-scale interventions. This form of displacement occurs when the results of policies or actions render it irrational or intolerable for people to continue to live in a home environment [36,37], e.g., through increasing housing costs or the prohibition of land-use patterns local livelihoods depend on. For example, green infrastructure can bring a 'green gentrification' of previously neglected areas, which can drive up house prices making it impossible for the lower social strata to pay rent or buy property in such an area [38].

We would argue that in relation to climate adaptation interventions, the ethical issue of (direct or indirect) displacement as 'collateral damage' of climate adaptation has not been sufficiently explored. While the link between climate change and migration has been hotly debated in media, policy and scientific arenas since the 1990s [19,39,40] and is already used to justify climate interventions in many regions around the world vulnerable to climate change [17], the discussions have largely ignored the potential for relocation induced by such policy interventions for climate change adaptation. This, then, is the focus of the present contribution.

2.3. Labelling and Population Displacement

In making our argument, we call attention to labels. Labelling an area as 'climate vulnerable', thereby inscribing vulnerability, can lead to displacement: it contributes to

making those spaces into arenas of risk [41], overriding local needs and aspirations and imposing a 'securitised' narrative on people's sense of place. This makes, for example, flood mapping (as is now imperative under the 2007 European Floods Directive) an essentially political process. Designating flood zones tends to dramatically raise insurance premiums for the buildings in this area, such as the obligatory insurance premiums in newly designated flood risk areas in the USA after Hurricane Katrina. When the Federal Emergency Management Agency increased the area defined as flood-risk zones, this made for high insurance rates for those who had previously not been obliged to take out flooding insurance previously. With the end of federal subsidies for flood insurance in 2012 (the Biggert–Waters Flood Insurance Reform Act), many house owners suddenly faced barely affordable premium increases that left them at risk of losing their homes [42]. Such policy can thus indirectly increase outmigration from the area, as homeowners might have to sell their now-unaffordable houses and move away.

Labelling a place, a community, a geographical area of a city as 'risky' 'creates its own outcomes and can have the effect of a self-fulfilling prophecy' [13], p. 326. In so doing, the designations are performative. There are many examples of urban disaster sites being 'condemned' as a social clean-up, leading to the evacuation and relocation of poor people outside the city. Well-publicized cases of postdisaster 'land grabs' are Managua, Nicaragua, after the 1972 earthquake under President Somoza, and Istanbul, Turkey, after the 1999 earthquake. Lightman [43] inventoried the factors enabling postdisaster land grab). This inscription of vulnerability also applies to the infrastructure meant to buffer against urban flooding. Hatirjheel, for example, is a wetland connecting old and new Dhaka, the megacity capital of Bangladesh. It was scattered with illegal settlements and a dumping ground for waste, until a visionary urban architect developed a beautification and climate (flood) buffer project connecting lakes in uptown Dhaka. The ensuing land acquisition for the creation of an artificial lake, however, has led to the forced eviction of tens of thousands of people previously living informally or semi-informally in the area [44]. This illustrates how 'green infrastructure', developed with the best of intentions, can not only result in, but also legitimize, forced displacement.

The below examples illustrate these mechanisms in three specific cases, based on literature review: the Netherlands, Pakistan and Indonesia (see Table 1 for a comparison), with three Space for the River 'subcases' for the Netherlands.

Table 1. Comparison of climate buffer cases discussed in this article.

	Controlled Flooding Areas ('Climate Buffers')	**Dam**	**Urban Coastal Island and Sea Wall Project**
Example	'Room for the River' programme in the Netherlands, several locations	Diamer–Bhasha dam, Kashmir, Pakistan	Jakarta, Indonesia
Climate adaptation benefit/formal legitimization	Prevention of flooding of larger urban centres	Provision of hydropower, irrigation and work to region	Flood protection from Java Sea, creation of freshwater reservoirs, land reclamation
Mechanisms of displacement	Relocation, potential short-term evacuation from sacrificial flood areas, lock on land-use planning (economic immobility)	Government-led relocation of 32 affected villages to 'model villages'	Displacement of marginalized coastal *kampung* dwellers
Compensation	Financial compensations to house owners for buy-outs	Considered insufficient; delayed	Relocation to social housing only for residents with housing titles
Protest and result	Citizen mobilisations, project re-evaluations by experts and municipal/provincial governments leading to stop/redesign of several projects	Sit-ins and protests by Diamer–Bhasha Dam Affectees Action Committee; no modification in project	Citizen protest of affected residents; legal procedures against irregularities in intervention leading to reduction of project
Governance context	'Full democracy'	'Flawed democracy'	'Hybrid regime'

3. Contested Climate Buffers: Three Examples

In this section, we elaborate on three different case studies of 'climate buffers'—a dam, controlled flooding areas and an urban coastal island project—to exemplify the conceptual argument above. These cases were deliberately chosen from widely differing contexts (Pakistani, Dutch, and Indonesian) and illustrate different mechanisms of direct and indirect displacement. We first introduce the climate buffer projects and their rationale and continue exploring how they relate to displacement.

3.1. Example 1: Climate Buffers in The Netherlands

In the Netherlands, a 'climate buffer' is a concept for detaining water in a multifunctional water retention area with a view to future extreme flood events. It is a modality of 'building with nature', a green technology utilising the natural dynamics of accretion and erosion [45]. Climate buffering has its origins in the Dutch World Wildlife Fund chapter's 1992 *Living Rivers* vision document [46] to restore side channels and riverbank ecosystems. Such a climate buffer is a de facto zoning, space-making measure. A promotional text from the Dutch Natural climate buffers coalition [47,48] exults that green buffers can make the Netherlands 'more secure, more beautiful and more economically attractive' (p. 1) and claims that '(a)dministrators and local residents are invariably enthusiastic' (p. 2). As we shall see, 'economically attractive' and 'invariably enthusiastic' are not unanimously condoned designations.

Interventions such as displacing or removing levees and lowering groynes and floodplains to allow rivers to meander—if within bounds: on busy river arteries such as the Rhine, Waal and Ijssel, shipping interests are too important economically to be ignored. Any green intervention will, therefore, have to tolerate infrastructure such as groynes to keep the fairway in place and deep enough for big ships to navigate. Equally, within limits, the rivers are allowed to flood in carefully selected areas when peak discharges test their capacity. An alliance of river engineers and ecologists has been increasingly successful in mounting projects to improve the flood safety and aesthetic value of rivers, enhancing its 'spatial quality'. 'Green' river engineers have proposed massive 'riverscape gardening' interventions to bring controlled wilderness into regions they consider 'ecologically uninteresting'. Natural enhancement presupposes that the area to be enhanced is impoverished or neglected and needs developing, improving, upgrading. Often the establishment of a natural education centre to edify the population is part of the plan.

In the 1990s, the Dutch government reduced the Public Works department, the national flood manager, and partly devolved flood management to local and regional initiatives. This broadened the focus from flood defence, only, to 'integral, area-based economic development' [49]. 'Making Room for the River' is a combination of river rehabilitation, flood safety planning, regional economic development and urban regeneration along riversides. Widening the river, e.g., through dike displacement, gives it more discharge capacity without compromising economic value of shipping. More natural embankments also take space in what may be densely populated areas. These initiatives are enthusiastically backed by an economic growth coalition of municipal authorities and investors keen on developing premium locations, rediscovered as business opportunities. The cost of such exercises can largely be borne by the proceeds from the river itself, through the sale of gravel and sand from the riverbed excavated to deepen or widen the river, and by building attractive houses and businesses by the water. Given the attractiveness and convenience of living and working by the river, the 'spatial quality' of these developments often explicitly targeted the kind of purchasing power municipalities like to welcome [50].

Space for the River reintroduced time-honed 'soft' technologies such as controlled flooding and building on mounds (elevations), but in a top-down fashion. While participation was part of the programme design, this was often left late once the public authorities, landowners and umbrella interest organisations had conducted complex multistakeholder negotiations. As a consequence, those most affected by the programme quite belatedly became aware that the interventions could bring displacement in three senses:

a. Houses and farmsteads were to be *relocated* in both Lent on the Waal and in Overdiepse Polder on the Meuse [51], with different levels of participatory decision making.
b. People will have to temporarily *evacuate* in a flood event in controlled flooding areas to shave the peak discharge off flood waves. The Ooijpolder became a celebrated case when residents realised the diverted river flow would put their homes under water and successfully protested it [51].
c. Interventions on the Ijssel near the town of Kampen would put a 'lock' (or 'freeze') on land-use planning, meaning inability to move into the area, and for those living there to sell their houses (*economic immobility*).

a. Relocating houses

Controversy erupted at the start of the millennium over an inland dike relocation plan at Lent, Nijmegen, by 350 m, to widen a flood-prone bottleneck in the river Waal. The Spiegelwaal, a 10 m deep, 200 m wide canal was to be dug in the new flood plain liberated by the dike shift [52], creating a new buffer island, Veur-Lent, on which to develop a new suburban district. In all, 100 houses would need to be demolished to make space for the project. In the Netherlands, 'eminent domain' is very rarely invoked to force resident buyout, giving those displaced an advantageous bargaining position. Some former residents were reported to have 'made a killing' out of it, so they could afford a better house than before. However, many initially refused to budge until citizen protest ran up to a political barrier. The city of Nijmegen had already signed agreements with the national government, in which Nijmegen was to get compensation for its intended housing plan in the relocation area as well as funding (EUR 90 million) for a bridge across the River Waal to tackle congestion problems with the existing bridge [53]. Citizen pressure in the city council led to involvement in a multistakeholder advisory group. The project was eventually implemented in 2011–2015, but citizen discontent remains, this time against the upmarket high-rise development planned for Veur-Lent.

b Reinventing calamity polders as climate buffers

The ancient Dutch custom of assigning polders as 'calamity polders', that is, sacrificial flood areas to buffer against flood peaks (*calamity polders* are low-lying areas surrounded by dikes and situated along the rivers that can be used for emergency water storage), had fallen out of fashion in the Netherlands in the mid-20th century with the advent of hard river defences [51]. The Ooijpolder, a leafy polder area near the city of Nijmegen bordering Germany, used to be such a 'calamity polder'. In February 2000, the Public Works Department reintroduced the Ooijpolder as a controlled flooding area for flushing [51]. In case of a riverine flood peak, the polder would be first in line to be 'sacrificed', and the inhabitants of the polder would be expected to evacuate. In case of evacuation, however, it was projected it would take 6 months to clean out and restore homes after flood damage. However, in nonflood times, polder dwellers feared their houses would become unsaleable or that the program would put a 'freeze' on new housing developments, assuming that no one would invest in new or upgraded homes in an area designated as a sacrificial area. A media campaign targeting local, regional, national and international (German) policy arenas led to parliamentary questions and eventually to the shelving of the controlled flooding designation [51].

Fast-forward to the late 2010s, history repeated itself in the Lob van Gennep area on the river Maas in the Southern province of Limburg. This area consists of five villages (Ven-Zelderheide, Ottersum, Plasmolen, Middelaar and Milsbeek) between the southern towns of Gennep and Mook and was appointed as a climate buffer detention basin: the area would be embanked by a lock dike to be opened in times of extreme high-water discharges, 20% higher than the maximum in recent history. In such an event, some 7000 people would need to evacuate within 48 h, leaving their livestock behind, before the lock in the dike would be opened and water would come rushing in at 300 m/s. A local protest group, *Nee tegen de vloedgolf* ('No to the floodwave') loudly resisted the plan, resenting sacrificing their homes to save downstream Den Bosch and Rotterdam, two important Dutch cities [54].

Like the Ooij polder, the Lob van Gennep case raised the issue: Is a life in the east Netherlands worth less than one in Rotterdam? Is a rural life worth less than a metropolitan one? This question touches on people's strong intuition that, in Orwellian terms, 'not all pigs are equal'. Mainport Rotterdam, a powerhouse of the Dutch economy, is located below sea level. If the port were to flood, the logic goes, investment would halt—which is why the national government makes sure Rotterdam is extra well protected. As a result, a Rotterdam citizen is potentially better protected than an inland citizen. Economic logic then dictates that the city will attract even more citizens and assets behind the dikes, so the logic is self-reinforcing [55]. In 2020, the Gennep plan—like the Ooijpolder 15 years earlier—was eventually shelved after a combination of loud protestations and model studies showing the planned intervention to be ineffective [56,57].

c Kampen: a climate hotspot

Another controversial Space for the River intervention, Ijsseldelta Zuid, made a direct climate change argument for setting aside an area as a 'climate buffer' as an ecological adaptation intervention in the Netherlands [58,59]. In 2008, a prestigious national advisory Delta Commission identified an apparently open-ended number of 'climate hotspots' for drought and flooding extremes. This climate vulnerability label put the 'main river' (Rhine, Meuse, IJssel) areas into the frame. One such 'climate set-aside' or 'climate buffer', a scenic area near the historic town of Kampen, was proposed in the gently sloping landscape of the Ijssel delta [60]. It is a flood-prone bottleneck in the river IJssel near Kampen, a picturesque town in the delta facing flood risk from two sides: from the river and from Lake IJssel.

Like the Ooijpolder example, such a 'set-aside' was feared to result in a freeze on housing development—fostering 'immobility' (cf. [19]) for homeowners whose houses were expected to become unsaleable. This time, however, it was the municipality of Kampen and the province of Overijssel who had set their sights on this area for housing development.

Given the prospect of (temporary) displacement looming over people's heads due to the Space for the River projects described above, it is unsurprising that local enthusiasms varied after all, and protests ensued. In the Kampen case, it was local authorities, themselves, siding with residents about a bypass serving as a climate buffer. It is notable that these successful protests were driven by well-connected middle-class citizens who could push back against what they saw as disenfranchisement over issues affecting their living environment and, often, livelihoods. In the other cases discussed below, many affected groups were significantly less successful.

3.2. Example 2: Reinventing Dams as Climate Buffers in Pakistan

In the 20th century, large-scale dams were emblematic of modernisation, bringing irrigation and electrification and driving food security. However, in the 1990s, these goals lost their lustre in a cloud of corruption and global protests over social and environmental impacts. Furthermore, the work of Scudder [34] and others showed that compensation plans for dam-displaced people rarely worked out well. For these reasons, the tripartite (public, private, NGO) World Commission on Dams report [33] made strong recommendations on large dams, i.e., those exceeding 15 m in height. Among these, it postulated dam-displaced people should be consulted prior to the intervention and properly compensated.

However, since then, dams have made their comeback around the globe, in no small measure legitimised as a green alternative to fossil fuels and as a 'climate buffer':

> *"(Dams are)... an adaptive measure regarding the impacts of climate change on water resources, because regulated basins with large reservoir capacities are more resilient to water resource changes, less vulnerable to climate change, and act as a storage buffer against climate change"* (emphasis in original) [61]

Climate awareness has increased the popularity of hydropower [62,63], hailed as a dependable source of green and renewable energy and eligible for Clean Development funding and carbon credits [64] Rather than multilateral financiers such as the World Bank and the Asia Development Bank, the new generation of dams is often backed by regional

and national players such as Chinese investors and development funds, as in the present case of Pakistan.

Pakistan, one of the world's most water-stressed countries, currently has some 150 large dams higher than 15 m. As Pakistan's economy is highly dependent on irrigation water for food production, river disputes easily become heated national security disputes. In Pakistan, 'dams are seen as the best adaptation strategy to meet the challenges of climate change' [65]. The Diamer–Bhasha dam, a concrete dam in the wider Kashmir region on the river Indus near the town of Chilas has been planned and repeatedly inaugurated as a hydropower-cum-irrigation project for almost 50 years [66,67] but is now presented by the Pakistan government as a climate buffer [65]. When a crowdfunding campaign for the biggest dam in Pakistan's history largely failed, China stepped in to build the 250 m Diamer–Bhasha dam, and the building contract was finally signed in 2020. Built on a geological fault line in an active seismic zone, this project is not without its risks.

The gravity dam is supposed to bring electricity, irrigation water and jobs to Diamer, and the government has promised to upgrade the local infrastructure. The dam project, located in the Diamer district of Gilgit province, is set in a tribal zone in the Himalaya valleys (and in nationally and internationally disputed territories, to boot [68]) where people are used to migrating to lower-lying areas during the extreme winter cold. The dam project is projected to flood 32 villages, displacing some 30,350 people, and to submerge important Buddhist cultural and archaeological heritage [69,70]. The Pakistani government plans to resettle the displacees into new 'model villages', one of which is 80 km away [71]. As a response, the Diamer–Bhasha Dam Affectees Action Committee has staged sit-ins over the meagre compensation arrangements on offer, leading to protesters being killed by riot police [72].

Despite the new 'climate change adaptation' label attached to the Diamer–Bhasha dam project, the controversies around the displacement of already marginal communities and the lack of participation and compensation, as well as the political repercussions, are evocative of earlier dam constructions as part of development projects. It shows that whether they are adaptative to climate change or developmental in their objectives does not alter the tendency of such projects to serve vested interests [63,73].

3.3. Example 3: Climate-Proofing Jakarta

Jakarta, the capital of Indonesia, is a megacity of some 10 million inhabitants, with an estimated 34 million in Greater Jakarta. Forty percent of the city is located below sea level, with some areas by over 4 m. With advancing climate change, Jakarta is predicted to be threatened by sea level rise and tidal floods, as well as by river floods due to increasing extreme weather events. This is aggravated by the rapid subsidence of 8–25 cm per year parts of the city experience due to groundwater overpumping [14]. Many poorer inhabitants live in informal settlements, so-called *kampung*, along the coastline and rivers. These areas tend to be affected by minor floods every rainy season, with major floods occurring on average every five years. The *kampungs* were hit especially hard in 2007, killing 76 and displacing some 600,000 Jakartans. This combination of event and trend has given rise to many doomsday deadlines in the headlines, indicating that 'by 2050 about 95% of North Jakarta will be submerged' and that there are only two years left 'to save Jakarta' [60,74].

As van Voorst and Hellmann [14], p. 805 argue, flood adaptation interventions can be considered as 'part of a long tradition of city renewal and slum eviction', which are now labelled 'greening the city'. Even before the destructive 2007 flood, the World Bank had insisted Jakarta get serious about its climate policy, and Jakarta's government had repeatedly vowed to make the capital city clean and slum-free. The 2007 flood, however, gave a push to various redevelopment projects seeking to improve flood safety and 'liveability' along the coastline.

Most iconic among these is the Great Garuda project, which combined a new sea wall closing the bay of Jakarta with the creation of a set of artificial islands/peninsulas planned,

in the shape of the mythical Garuda bird, a symbol of Indonesia [66,75]. While the main task of this intervention is to buffer Jakarta's north coast from the Java Sea [76], the redeveloped coastal zone would then become home to a new business district, luxury apartments and hotels. While keeping sea floods out, the sea wall is designed to create lagoons to serve as drainage reservoirs to buffer the outflow of the 13 rivers that flow through Jakarta, creating a freshwater reservoir—despite warnings that the heavily polluted river effluent would only create a cesspit. Massive pumps are to transfer water from the lagoons to the bay. The sea wall and artificial islands simultaneously create a huge new urban quarter on reclaimed land.

The Great Garuda island project was eventually significantly scaled down in 2018 by the incoming governor of Jakarta in light of its excessive 40 billion dollar estimated cost [77] and failures to adhere to procedural requirements; only the Giant Sea Wall project (now renamed as 'outer sea dike') and the construction of some smaller islets close to the coastline was continued [78–80].

Despite the later changes to the coastal development plan, many *kampung* dwellers were already displaced to make space for the flood infrastructure [25,60,81]. The Socially Inclusive Climate Adaptation for Urban Revitalization Project (2012–2017) aimed to 'relocate close to 400,000 squatters from riverbanks and nearby reservoirs' within, at the behest of the former governor, 'a humanized and participative process' [82]. Those in possession of legally recognized housing titles were moved to social housing facilities far away from the coast line [12]; many others without such documentation had to leave without compensation. This displacement deprived people of marginal and informal economic activities such as fishing, seafood harvesting and processing of their livelihoods and necessary social networks [78,80,83,84]. In 2016, for example, fishermen rallied in front of the district council building to protest their eviction and relocation to the Thousand Islands regency. As one female protester, who had gone through earlier forced relocation, said, 'I am not an animal that can be kicked out whenever they like' [85].

While this quote illustrates that the eviction of *kampung* dwellers is not unusual in Jakarta, in this case, it is the argument of climate risk, notably flood risk management, that was advanced to legitimize these actions, rather than urban development. Zero risk, however, is not necessarily a priority for everyone exposed to it, and people may have rather different understandings of (climate) risks (cf. [40]). '(F)or poor families living on river banks in the city center (and coastal areas) the floods also constitute a necessary condition to create a viable livelihood. (...) For the families living in these areas there is a constant 'trade-off' between safety and risk taking with the purpose to create a living' [83], p. 468. Many project-affected people consider evictions and displacement, rather than floods, as the main risk, as they separate them from necessary social networks offering informal work opportunities as well as social support [14,83,84]. As a consequence, the project has come in for harsh criticism [75,84] for falling short of both environmental and social procedural standards and for largely playing out on the backs of those already most disadvantaged.

4. Discussion

Climate buffers generate enthusiasm as green climate adaptation interventions but certainly also as green development projects. We have drawn attention to the direct and indirect displacement effects of climate interventions, ostensibly justified by a climate imperative, but with a strong development drive as its flywheel. These interventions aim at developing or upgrading a 'neglected area' for middle-class living and leisure in the Netherlands and Indonesia and boosting national agricultural and industrial development in Pakistan. The anticipated economic (and political) gains from land development can offset the steep cost of environmental projects such that it is not always entirely clear which drives which in 'climate buffer' projects. The construction of such buffer projects may not only reap adverse (and potentially self-defeating) environmental, economic and social impacts but also temporary or permanent displacement of some populations, as this article has highlighted.

We have seen how climate adaptation interventions can significantly enhance local vulnerabilities by impeding livelihoods or vital socioeconomic networks [13]. Adaptation project-induced movement can introduce new vulnerabilities, whether immediately uprooting people, expecting them to evacuate in the future, reducing the value of their assets by 'freezing' investment or pushing them out due to 'green gentrification'.

We may expect stakeholders to be willing to forego certain security aspects if they believe this is equitable, that is, proportional to the sacrifices made. Moreover, as in development projects, life is supposed to improve for many over time after the intervention, especially if their area is nicer and safer and compensation is well taken care of. Middle-class stakeholders in the Netherlands may be well aware that their livelihoods would temporarily worsen due to the intervention before getting better afterwards. However, even if they agree to the project, poorer stakeholders cannot 'buffer' economically for that long if compensation is uncertain or even absent [86].

Governments have claimed to look for more 'socially inclusive' infrastructural responses to climate change, but when, from the perspective of those most affected, such allegedly more inclusive interventions turn out to have similarly dire consequences as less inclusive interventions, officials can expect to encounter resistance from those expected to sacrifice for the greater good. We are not claiming that nobody should move anywhere. Some *kampung* dwellers in Jakarta may have expressed a strong desire for the government to take them to safer spaces rather than be flooded every two years. In some Space for the River cases the Netherlands, some will have welcomed the compensation 'deal' they were offered. Others living in areas, however, slated for controlled flooding resisted, and their mobilisation managed to get plans shelved or the terms of relocation modified to their advantage [87]. The protagonists in the other two case study sites were not as successful. Thousands of *kampung* dwellers in North Jakarta lacked official housing permits and were summarily evacuated and displaced without compensation in preparation for the sea wall construction, despite protests and critique of the project and its eventual downscaling. In Pakistan, displaced citizens in dam-affected areas (so far unsuccessfully) protested what they considered woefully inadequate compensation offered for their displacement.

The scope to influence climate buffer project decisions proved markedly different. In the Dutch cases, local resistance indeed eroded the legitimacy of the project's rationale and led to various degrees of retreat—from modification to shelving of the project. In Indonesia, while ostensibly participatory, the Garuda island project was, for all practical purposes, scaled down as a top-down budget decision by the new governor of Jakarta, and the remaining sea wall project has become a cautionary tale for similar endeavours that are already ongoing, such as the New Manila Land reclamation and port reconstruction project in the Philippines. The Pakistan dam will likely forge ahead despite protests and critique of its potential usefulness.

In *The Economist*'s ranking [88,89], the Netherlands is a 'full democracy' (#10 in 2020), Indonesia is a 'flawed democracy' (#65) and Pakistan is a 'hybrid regime' (#105); on Transparency International's Corruption Perception Index 2020 [90], the Netherlands ranked #8, Indonesia #103 and Pakistan #124. Despite its better ranking on indices such as *The Economist*'s democracy index and Transparency International's corruption perception index climate and development absolutes have, so far, not managed to cement a legitimising case of necessity (*nut en noodzaak*) in liberal democratic Netherlands, and middle-class resistance could carry the day, whereas in less liberal democratic systems, community resistance has, so far, often proved futile, missing out on the 'social justice ideal of equal and fair access to rights, resources, and opportunities that reduce people's vulnerability' [26], p. 4.

These tensions are by no means inevitable. The principles for fairness in project-induced displacement are well established [91]. For example, the World Commission on Dams guidelines [33] stipulate that consultation and compensation of affected communities are of the essence. The issue is that these long-established guidelines are often not well respected, and the urgency characterizing climate adaptation debates might be considered by some as a justification for flouting them. We do not necessarily need new rules; rather,

we recommend the proper implementation of the compensation and consultation principles that are already there but in too many cases seem to be a 'dead letter' in practice.

Particularly regarding the latter, many scholars have long argued that in climate change issues, 'any thoughtful answer must weigh conflicting interests among different people' [16]. It seems imperative to take heed when the key target audience of (climate) security speech resists such framing. As we have shown in this article, this often happens with climate adaptation interventions 'set in a top-down manner by relatively privileged groups rather than being framed by the intended beneficiaries' [11], p. 3. This is particularly relevant where those most affected are already among the most marginalized groups, for their lack of housing titles, their minority status or other long-established sociocultural, economic or political factors.

We have considered from a climate justice perspective to what extent it can be considered 'fair' for a certain group of people to be asked, told or implied to make sacrifices, temporarily or permanently, for the sake of stakeholders in other locations or, indeed, future generations. Ethics, to be sure, are contextual and never black and white [92], but a clearer focus on the risk perceptions of project-impacted groups and the distribution between stakeholders of power to influence the potential distributive effects of climate adaptation projects in terms of displacement should inform future infrastructural 'climate buffer' projects to avoid steamrolled infrastructure (process) and human suffering (outcome).

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References

1. European Commission. *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions*; Green Infrastructure (GI)—Enhancing Europe's Natural Capital; European Commission: Brussels, Belgium, 2013.
2. Sebesvari, Z.; Woelki, J.; Walz, Y.; Sudmeier-Rieux, K.; Sandholz, S.; Tol, S.; Renaud, F.G. Opportunities for considering green infrastructure and ecosystems in the Sendai Framework Monitor. *Prog. Disaster Sci.* **2019**, *2*, 100021. [CrossRef]
3. Crow-Miller, B.; Webber, M.; Molle, F. The (re)turn to infrastructure for water management? *Water Altern.* **2017**, *10*, 195–207.
4. Dekker, I.; Fantini, E. Nature based solution for flood control in The Netherlands. Socialising water or naturifying society? *Rass. Ital. Sociol.* **2020**, *61*, 253–278.
5. Del Bene, D.; Scheidel, A.; Temper, L. More dams, more violence? A global analysis on resistances and repression around conflictive dams through co-produced knowledge. *Sustain. Sci.* **2018**, *13*, 617–633. [CrossRef]
6. Dolšak, N.; Prakash, A. The Politics of Climate Change Adaptation. *Annu. Rev. Environ. Resour.* **2018**, *43*, 317–341. [CrossRef]
7. Van Staveren, M.F.; Warner, J.F.; van Tatenhove, J.P.; Wester, P. Let's bring in the floods: De-poldering in the Netherlands as a strategy for long-term delta survival? *Water Int.* **2014**, *39*, 686–700. [CrossRef]
8. Sinnett, D.; Jerome, G.; Burgess, S.; Smith, N.; Mortlock, R. Building with nature—A new benchmark for green infrastructure. *Town Ctry. Plan.* **2017**, *86*, 427–431.
9. Leitner, H.; Colven, E.; Sheppard, E.; Heise, U.K.; Christensen, J.; Niemann, M. Ecological security for whom? The politics of flood alleviation and urban environmental justice in Jakarta, Indonesia. In *The Routledge Companion to the Environmental Humanities*; Christensen, J., Heise, U., Niemann, M., Eds.; Routledge: London, UK, 2017; pp. 194–205.
10. Triyanti, A.; Chu, E. A survey of governance approaches to ecosystem-based disaster risk reduction: Current gaps and future directions. *Int. J. Disaster Risk Reduct.* **2018**, *32*, 11–21. [CrossRef]
11. Eriksen, S.; Schipper, E.L.F.; Scoville-Simonds, M.; Vincent, K.; Adam, H.N.; Brooks, N.; West, J.J. Adaptation interventions and their effect on vulnerability in developing countries: Help, hindrance or irrelevance? *World Dev.* **2021**, *141*, 105383. [CrossRef]

12. Klepp, S.; Chavez-Rodriguez, L. Governing climate change—The power of adaptation discourses, policies, and practices. In *A Critical Approach to Climate Change Adaptation: Discourses, Policies, and Practices*; Klepp, S., Chavez-Rodriguez, L., Eds.; Routledge: London, UK; New York, NY, USA, 2018.
13. Marino, E.; Ribot, J. Adding insult to injury: Climate change, social stratification, and the inequities of intervention. *Glob. Environ. Chang.* **2012**, *22*, 323–398. [CrossRef]
14. Van Voorst, R.; Hellman, J. One Risk Replaces Another. *Asian J. Soc. Sci.* **2015**, *43*, 786–810. [CrossRef]
15. Gardiner, S.M. A perfect moral storm: Climate change, intergenerational ethics and the problem of moral corruption. *Environ. Values* **2006**, *15*, 397–413. [CrossRef]
16. Broome, J. The ethics of climate change. *Sci. Am.* **2008**, *298*, 96–102. [CrossRef]
17. Bettini, G.; Andersson, E. Sand waves and human tides: Exploring environmental myths on desertification and climate-induced migration. *J. Environ. Dev.* **2014**, *23*, 160–185. [CrossRef]
18. Boas, I.; Wiegel, H. Climate migration between conflictive discourses and empirical realities. In *Handbook on the Governance and Politics of Migration*; Carmel, E., Lenner, K., Paul, R., Eds.; Edward Elgar: Cheltenham, UK, 2021.
19. Wiegel, H.; Boas, I.; Warner, J. A mobilities perspective on migration in the context of environmental change. *Wiley Interdiscip. Rev. Clim. Chang.* **2019**, *10*, 1–9. [CrossRef]
20. World Bank. High and Dry. In *Climate Change, Water, and the Economy*; The World Bank: Washington, DC, USA, 2016.
21. Oels, A. From 'securitization' of climate change to 'climatization 'of the security field: Comparing three theoretical perspectives. In *Climate Change, Human Security and Violent Conflict*; Scheffran, J., Brzoska, M., Brauch, H.G., Link, P.M., Schilling, J., Eds.; Springer: Berlin/Heidelberg, Germany, 2012; pp. 185–205.
22. Sobczyk, N. How Climate Change Got Labeled a 'Crisis'. *E+E News*. 10 July 2019. Available online: https://www.eenews.net/stories/1060718493 (accessed on 9 August 2021).
23. Buzan, B.; Wæver, O.; De Wilde, J. *Security: A New Framework for Analysis*; Lynne Rienner: Boulder, CO, USA, 1998.
24. Figlerowicz, M. Affect theory dossier: An introduction. *Qui Parle Crit. Humanit. Soc. Sci.* **2012**, *20*, 3–18.
25. Li, T.M. *The Will to Improve: Governmentality, Development, and the Practice of Politics*; Duke University Press: Duke, NC, USA, 2007; p. 43.
26. Mason, L.R.; Rigg, J. Climate change, social justice: Making the case for community inclusion. In *People and Climate Change*; Oxford University Press: Oxford, UK, 2019; pp. 3–19.
27. Meissner, R. *eThekwini's Green and Ecological Infrastructure Policy Landscape: Towards a Deeper Understanding*; Springer: Cham, Switzerland, 2021.
28. Ferguson, J. *The Anti-Politics Machine: 'Development', Depoliticization and Bureaucratic Power in Lesotho*; Cambridge University Press Archive: Cambridge, UK, 1990.
29. Taylor, M. Climate change, relational vulnerability and human security: Rethinking sustainable adaptation in agrarian environments. *Clim. Dev.* **2013**, *5*, 318–327. [CrossRef]
30. Zoomers, A. Globalisation and the foreignisation of space: Seven processes driving the current global land grab. *J. Peasant. Stud.* **2010**, *37*, 429–447. [CrossRef]
31. Anguelovski, I.; Shi, L.; Chu, E.; Gallagher, D.; Goh, K.; Lamb, Z.; Teicher, H. Equity impacts of urban land use planning for climate adaptation: Critical perspectives from the global north and south. *J. Plan. Educ. Res.* **2016**, *36*, 333–348. [CrossRef]
32. Barnett, J.; O'Neill, S.J. Islands, Resettlement and Adaptation. *Nat. Clim. Chang.* **2012**, *2*, 8–10. [CrossRef]
33. World Commission on Dams. *Dams and Development: A New Framework for Decision-Making: The Report of the World Commission on Dams*; Earthscan: London, UK, 2000.
34. Scudder, T. *Impacts of Large Dams: A Global Assessment*; Springer: Berlin/Heidelberg, Germany, 2012.
35. Sovacool, B.K.; Linnér, B.-O.; Goodsite, M.E. The Political Economy of Climate Adaptation. *Nat. Clim. Chang.* **2015**, *5*, 616–618. [CrossRef]
36. Oliver-Smith, A. (Ed.) *Defying Displacement: Grassroots Resistance and the Critique of Development*; University of Texas Press: Austin, TX, USA, 2010.
37. Penz, P.; Drydyk, J.; Bose, P.S. *Displacement by Development: Ethics, Rights and Responsibilities*; Cambridge University Press: Cambridge, UK, 2011.
38. Gould, K.A.; Lewis, T.L. *Green Gentrification: Urban Sustainability and the Struggle for Environmental Justice*; Routledge: London, UK, 2016.
39. Boas, I.; Farbotko, C.; Adams, H.; Sterly, H.; Bush, S.; van der Geest, K.; Hulme, M. Climate migration myths. *Nat. Clim. Chang.* **2019**, *9*, 901–903. [CrossRef]
40. Wiegel, H.; Warner, J.; Boas, I.; Lamers, M. Safe from what? Understanding environmental non-migration in Chilean Patagonia through ontological security and risk perceptions. *Reg. Environ. Chang.* **2021**, *21*, 1–13.
41. Rebotier, J. Vulnerability conditions and risk representations in Latin-America: Framing the territorializing urban risk. *Glob. Environ. Chang.* **2012**, *22*, 391–398. [CrossRef]
42. Checker, M. Stop FEMA Now: Social media, activism and the sacrificed citizen. *Geoforum* **2017**, *79*, 124–133. [CrossRef]
43. Lightman, T.M. Dispossessed: Exploring the Factors That Enable Post-Disaster Land Grabs. Master's Thesis, Linköping University, Linköping, Sweden, 2020.

44. Nijhum, F.Q.; Rahaman, S.T.; Hossain, M.J.; Islam, I. Participatory Democracy or State-Induced Violence? Resettling the Displaced People of Hatirjheel in Dhaka. *South Asia Res.* **2019**, *39*, 202–217.
45. Bal, F.; Vleugel, J.M. Climate change adaptation: Use and value of a climate buffer area. *Int. J. Saf. Secur. Eng.* **2014**, *4*, 193–206. [CrossRef]
46. Ruimte voor Levende Rivieren. Visie Ruimte voor Levende Rivieren. N.d. Available online: https://www.levenderivieren.nl/visie-ruimte-voor-levende-rivieren (accessed on 9 August 2021).
47. Klimaatbuffers. Natural Climate Buffers Make the Netherlands Climate Proof and More Beautiful. N.d. Available online: https://www.klimaatbuffers.nl/uploads/klimaatbuffers-algemeen-eng.582ee8.pdf (accessed on 9 August 2021).
48. McFadgen, B.K. Connecting Policy Change, Experimentation, and Entrepreneurs. *Ecol. Soc.* **2019**, *24*, 30. Available online: https://www.ecologyandsociety.org/vol24/iss1/art30/ (accessed on 9 August 2021). [CrossRef]
49. Room for the River. Safety for Four Million in the Dutch Delta. *Brochure*. Available online: https://dredging.org/media/ceda/org/documents/events/ceda/room%20for%20the%20river.pdf (accessed on 9 August 2021).
50. Warner, J.F. *Space for the River, Space for Diversity? Contest over Multifunctional Flood Planning*; Proceedings, British Hydrological Society's Annual National Symposium: Newcastle, UK, 2010. Available online: https://www.researchgate.net/publication/280102168_Space_for_the_river_space_for_diversity_Contest_over_multifunctional_flood_planning (accessed on 22 July 2021).
51. Roth, D.; Warner, J.; Winnubst, M. *Een Noodverband Tegen Hoog Water. Waterkennis, Beleid en Politiek Rond Noodoverloopgebieden*; Boundaries of Space Series; Wageningen University: Wageningen, The Netherlands, 2006.
52. Klimaatbuffers. Projected: Spiegelwaal. 2021. Available online: https://www.klimaatbuffers.nl/projecten/spiegelwaal (accessed on 9 August 2021).
53. Edelenbos, J.; Van Buuren, A.; Roth, D.; Winnubst, M. Stakeholder initiatives in flood risk management: Exploring the role and impact of bottom-up initiatives in three 'Room for the River' projects in the Netherlands. *J. Environ. Plan. Manag.* **2017**, *60*, 47–66. [CrossRef]
54. Elmers, D. Een Tweede Groningen? Groene Amsterdammer. No. 17–18. 2020. Available online: https://www.groene.nl/artikel/een-tweede-groningen (accessed on 9 August 2021).
55. Remmelzwaal, A.; Vroon, J. *Werken Met Water, Veerkracht als Strategie*; Report nr. 2000.021; RIZA: Lelystad, The Netherlands, 2000.
56. Van Hoof, J. Lob van Gennep: Onder Water Zetten Dorpen Blijft Mogelijk. *1Limburg*. 4 February 2020. Available online: https://www.1limburg.nl/lob-van-gennep-onder-water-zetten-dorpen-blijft-mogelijk (accessed on 9 August 2021).
57. Houtappels, F. Doorbraak Lob: Vaarwel Gevreesde Schuif, Hallo Hogere Dijk. *De Gelderlander*. 2 October 2020. Available online: https://www.gelderlander.nl/gennep/doorbraak-lob-van-gennep-vaarwel-gevreesde-schuif-hallo-hogere-dijk~{}a5f3b529/ (accessed on 9 August 2021).
58. Bulthuis, J. *De IJsselvallei als Klimaatbuffer? Scenariostudie Naar Mogelijk Ruimtelijke Consequenties van Klimaatadaptatie*; Rapport 500127002; Planbureau voor de Leefomgeving: Bilthoven, The Netherlands, 2008.
59. Warner, J.; Van Buuren, A. Implementing room for the river: Narratives of success and failure in Kampen, the Netherlands. *Int. Rev. Adm. Sci.* **2011**, *77*, 779–801. [CrossRef]
60. Van Buuren, A.; Vink, M.; Warner, J. Constructing authoritative answers to a latent crisis? Strategies of puzzling, powering and framing in Dutch climate adaptation practices compared. *J. Comp. Policy Anal. Res. Pract.* **2016**, *18*, 70–87.
61. Berga, L. The role of hydropower in climate change mitigation and adaptation: A review. *Engineering* **2016**, *2*, 313–318. [CrossRef]
62. Watts, R.J.; Richter, B.D.; Opperman, J.J.; Bowmer, K.H. Dam reoperation in an era of climate change. *Mar. Freshw. Res.* **2011**, *62*, 321–327. [CrossRef]
63. Shah, E.; Vos, J.; Veldwisch, G.J.; Boelens, R.; Duarte-Abadía, B. Environmental justice movements in globalising networks: A critical discussion on social resistance against large dams. *J. Peasant. Stud.* **2019**, *48*, 1–25. [CrossRef]
64. Ahlers, R.; Budds, J.; Joshi, D.; Merme, V.; Zwarteveen, M. Framing hydropower as green energy: Assessing drivers, risks and tensions in the Eastern Himalayas. *Earth Syst. Dyn.* **2015**, *6*, 195–204. [CrossRef]
65. Akhter, M. Dams as a climate change adaptation strategy: Geopolitical implications for Pakistan. *Strateg. Anal.* **2015**, *39*, 744–748. [CrossRef]
66. Colven, E. Understanding the Allure of Big Infrastructure: Jakarta's Great Garuda Sea Wall Project. *Water Altern.* **2017**, *10*, 250–264.
67. Construction Review Online. Construction Diamer Bhasha Dam Begins. 18 July 2020. Available online: https://constructionreviewonline.com/news/construction-diamer-bhasha-dam-construction-begins/ (accessed on 9 August 2021).
68. Philip, S.A. Pakistan's 40-Yr-Old Gilgit-Baltistan Dam Project Could Finally Be a Reality, with China Help. *The Print*. 15 May 2020. Available online: https://theprint.in/world/pakistans-40-yr-old-gilgit-baltistan-dam-project-could-finally-be-a-reality-with-china-help/422614/ (accessed on 9 August 2021).
69. Sabir, M.; Torre, A.; Magsi, H. Land-Use Conflicts and Socio-Economic Impacts of Infrastructure Projects: The Case of Diamer Bhasha Dam in Pakistan Area Development and Policy. *Area Dev. Policy* **2017**, *2*, 1–15. [CrossRef]
70. Sabir, M.; Torre, A. Different proximities and conflicts related to the setting of big infrastructures. The case of Diamer Bashan Dam in Pakistan. In *Regional Cooperation in South Asia. Socio-Economic, Spatial, Ecological and Institutional Aspects*; Bandyopadhyay, S., Torre, A., Casaca, P., Dentinho, T., Eds.; Springer: Berlin/Heidelberg, Germany, 2017.
71. Hasnain, K. Diamer-Basha Dam: Over 14,000 Acre Land Transferred to Wapda. *Dawn*. 2 April 2018. Available online: https://www.dawn.com/news/1398945 (accessed on 9 August 2021).

72. Israr, A. Diamer Bhasha Dam Affectees Protest for Rights. *The Nation*. 30 January 2019. Available online: https://nation.com.pk/30-Jan-2019/diamer-bhasha-dam-affectees-protest-for-rights (accessed on 9 August 2021).
73. Mirumachi, N.; Sawas, A.; Workman, M. Unveiling the security concerns of low carbon development: Climate security analysis of the undesirable and unintended effects of mitigation and adaptation. *Clim. Dev.* **2020**, *12*, 97–109. [CrossRef]
74. BBC. Jakarta, the Fastest-Sinking City in the World. 13 August 2018. Available online: https://www.bbc.com/news/world-asia-44636934 (accessed on 9 August 2021).
75. Bakker, M.; Kishimoto, S.; Nooy, C. Social Justice at Bay—The Dutch Role in Jakarta's Coastal Defence and Land Reclamation Project. 2017. Available online: https://www.bothends.org/en/Whats-new/Publicaties/Social-justice-at-bay-The-Dutch-role-in-Jakartas-coastal-defence-and-land-reclamation/ (accessed on 26 May 2021).
76. Doman, M. Sinking Towards Disaster. *ABC*. 24 June 2019. Available online: https://www.abc.net.au/news/2019-06-24/jakarta-is-running-out-of-time-to-stop-itself-sinking/11190928?nw=0 (accessed on 9 August 2021).
77. Sherwell, P. $40bn to Save Jakarta: The Story of the Great Garuda. *The Guardian*. 22 November 2016. Available online: https://www.theguardian.com/cities/2016/nov/22/jakarta-great-garuda-seawall-sinking (accessed on 27 May 2021).
78. Ibnu Aqil, A.M. Blue Economy Not as Sustainable as Previously Promoted: Researchers. 2020. Available online: https://www.thejakartapost.com/news/2020/11/05/blue-economy-not-as-sustainable-as-previously-promoted-researchers.html (accessed on 27 May 2021).
79. Oktavianti, T.I. Anis Wins Legal Battle against Jakarta Islet Developer. 24 June 2020. Available online: https://www.thejakartapost.com/news/2020/06/24/anies-wins-legal-battle-against-jakarta-islet-developer.html (accessed on 27 May 2021).
80. Padawangi, R. Climate Change and the North Coast of Jakarta: Environmental Justice and the Social Construction of Space in Urban Poor Communities. In *Urban Areas and Global Climate Change (Research in Urban Sociology, Vol. 12)*; Hutchison, R., Ed.; Emerald Group Publishing Limited: Bingley, UK, 2012; pp. 321–339.
81. Leitner, H.; Sheppard, E. From kampungs to condos? Contested accumulations through displacement in Jakarta. *Environ. Plan. A Econ. Space* **2018**, *50*, 437–456. [CrossRef]
82. C40 Good Practice Guides. Jakarta—Socially Inclusive Climate Adaptation for Urban Revitalization Projec16. Available online: https://www.c40.org/case_studies/c40-good-practice-guides-jakarta-socially-inclusive-climate-adaptation-for-urban-revitalization-project (accessed on 25 July 2021).
83. Hellman, J. Living with floods and coping with vulnerability. *Disaster Prev. Manag.* **2015**, *22*, 468–483. [CrossRef]
84. Yarina, L. Your Sea Wall Won't Save You. Negotiating rhetorics and imaginaries of climate resilience. *Places J.* **2018**. [CrossRef]
85. Batu, S.L. Fishermen Stage Protest Against Eviction to Thousand Islands. *Jakarta Post*. 29 January 2016. Available online: https://www.thejakartapost.com/news/2016/01/29/fishermen-stage-protest-against-eviction-thousand-islands.html (accessed on 9 August 2021).
86. Warner, J.F.; van Staveren, M.F.; van Tatenhove, J. Cutting dikes, cutting ties? Reintroducing flood dynamics in coastal polders in Bangladesh and the Netherlands. *Int. J. Disaster Risk Reduct.* **2018**, *32*, 106–112. [CrossRef]
87. Roth, D.; Winnubst, M. Moving out or living on a mound? Jointly planning a Dutch flood adaptation project. *Land Use Policy* **2014**, *41*, 233–245. [CrossRef]
88. Drydyk, J. Development Ethics and the 'Climate Migrants'. *Ethicspolicy Environ.* **2013**, *16*, 43–55. [CrossRef]
89. Economist. Global Democracy Has a Very Bad Year. 2021. Available online: https://www.economist.com/graphic-detail/2021/02/02/global-democracy-has-a-very-bad-year (accessed on 9 August 2021).
90. Transparency International. Corruption Perception Index 2020. 2021. Available online: https://www.transparency.org/en/cpi/2020/index/nzl# (accessed on 9 August 2021).
91. Cernea, M. The Risks and Reconstruction Model for Resettling Displaced Populations. *World Dev.* **1997**, *25*, 1569–1587. [CrossRef]
92. Groenfeldt, D. *Water Ethics: A Values Approach to Solving the Water Crisis*; Routledge: London, UK, 2019.