



Citation: M. Schmidt di Friedberg, S. Malatesta, E. dell'Agnese (2020). Hazard, Resilience and Development: The Case of Two Maldivian Islands. *Bollettino della Società Geografica Italiana* serie 14, 3(2): 11-24. doi: 10.36253/bsgi-1087

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Data Availability Statement: All relevant data are within the paper and its Supporting Information files.

Competing Interests: The Author(s) declare(s) no conflict of interest.

Hazard, Resilience and Development: The Case of Two Maldivian Islands

Rischio, Resilienza e Sviluppo: il caso di due isole alle Maldive

MARCELLA SCHMIDT DI FRIEDBERG¹, STEFANO MALATESTA¹, ELENA DELL'AGNESE²

¹ "Riccardo Massa" Department of Human Sciences and Education, University of Milano-Bicocca, Italy / Marine Research and High Education Center (MaRHE), Republic of Maldives

² Department of Sociology and Social Research, University of Milano-Bicocca, Italy / Marine Research and High Education Center (MaRHE), Republic of Maldives

E-mail: marcella.schmidt@unimib.it; stefano.malatesta@unimib.it; elena.dellagnese@unimib.it

Abstract. Due to their geophysical structure, the Maldives face various natural hazards, such as coastal erosion, rising water levels, tsunamis and other climate-related disasters. In 2004, the country was affected by the Indian Ocean tsunami, with almost 12,000 displaced persons and a further 8,500 relocated inhabitants. In the context of the country's efforts to achieve sustainable development and face climate change, disaster risk reduction and resilience capacity are key issues. The Government is working hard to implement the *Sendai Framework for Disaster Risks Reduction 2015-2030*, linked to *Sustainable Development Goals* and the *Paris Agreement*. The paper considers the cases of two islands in Dhaalu Atoll – Meedhoo and Rin'budhoo – both affected by the tsunami, where social and economic resilience produced two different models of development. The tsunami hit Meedhoo hard. The island economy depends on fishing and the main threats are its small size and soil erosion. Thus, in 2006 a large area around the island was reclaimed and in 2014 larger reclamation projects were started. Rin'budhoo was also severely impacted by the tsunami; there were two victims and a lot of infrastructural damage, forcing many people to migrate. However, for years local government has promoted no land reclamation. The recovery of the island started from its historical and cultural heritage and the revival of traditional crafts and goldsmithery, involving young people. Two islands, two different resilience stories.

Keywords: hazard, resilience, trans-scalar perspective, Maldives, land reclamation.

Riassunto. Le Maldive sono esposte a un'ampia gamma di fattori di rischio, come l'erosione costiera, l'innalzamento del livello delle acque, gli tsunami e altri eventi. Nel 2004 il paese è stato colpito dallo tsunami, con quasi 12.000 sfollati e 8.500 abitanti rilocalizzati in isole diverse dai luoghi di residenza. In questo contesto storico-politico, la riduzione del rischio e la resilienza dei sistemi locali rappresentano delle questioni chiave per il paese. Implementare il *Sendai Framework for Disaster Risks Reduction 2015-2030*, in connessione i *Sustainable Development Goals* and il *Paris Agreement*, è una le priorità del governo. Questo lavoro prende in considerazione i casi di due isole

nell'atollo di Dhaalu, Meedhoo e Rin'budhoo, dove la resilienza sociale ed economica ha prodotto due diversi modelli di sviluppo. Lo tsunami ha colpito Meedhoo in modo molto violento. Immediatamente dopo l'evento, le principali sfide per l'isola, la cui economia dipende dalla pesca, erano rappresentate dalle ridotte dimensioni e dall'erosione della linea di costa. Così, nel 2006 e 2014, sono stati avviati due imponenti progetti di *land reclamation*. Anche l'isola di Rin'budhoo è stata duramente colpita dallo tsunami. Ci sono state vittime e diversi danni alle infrastrutture. Tuttavia, per anni, nessun progetto di *land reclamation* è stato avviato. Il processo di recupero dell'isola, è partito dalla valorizzazione del patrimonio storico e culturale e dalla rinascita dell'artigianato e dell'arte orafa. Due isole, due storie di resilienza.

Parole chiave: rischio, resilienza, prospettiva trans-scalare, Maldive, *Land Reclamation*

1. Introduction¹

This paper² aims to address the issue of hazard and resilience from a trans-scalar perspective. It combines the reading of global dynamics with an understanding of regional (the Indian Ocean region), national (the Maldives) and local processes (the two islands of Meedhoo and Rin'budhoo in Dhaalu atoll). The trans-scalar perspective is generally essential for any discussion of local community responses to environmental challenges: "Natural disasters cannot be understood at the global level alone, just as they cannot be understood at the local level alone. Community-based monitoring and indigenous observations are also significant because they fill the gaps of global science and provide insights regarding local impacts and adaptations" (Zhou 2010, 30). At the global level, following the Indian Ocean tsunami in 2004 and the Kobe Hyogo World Conference on Disaster Reduction in January 2005, the United Nations implemented the *International Strategy for Disaster Reduction (UNISDR)*. The next milestone (2030), which brings together the three important UN agreements (*Sendai Framework for DRR 2015-2030*, *SDG 2030* and *Paris Agreement 2015*),

¹ The authors have conducted this study with the support of the MaRHE Center of the University of Milan-Bicocca (www.marhe.unimib.it). MaRHE is hosted by the Island Council of Faafu-Magoodhoo, a few miles north of Dhaalu Atoll. The main purpose of MaRHE is to carry out research and teaching activities in the fields of environmental sciences, marine biology, the science of tourism and human geography. We thank the presidents of the Island Councils of Dhaalu Meedhoo and Dhaalu Rin'budhoo for their collaboration.

² An earlier version of this article was presented at the conference *Development Challenges in Rural and Urban Areas*, held by the IGU Commission on Local and Regional Development from June 25-28, 2019, at the Marine Campus of The University of the South Pacific, Fiji.

aims, among other things, to achieve the goal of international cooperation and resilience against disasters.

UNISDR defines resilience as "the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions" (UNISDR 2009, 24). The idea of resilience as a top priority is shared by all three UN landmark agreements: in Global Target (d) of the *Sendai Framework for DRR* it is proposed to "substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030". Sustainable Development Goal #9 addresses the challenge of "Build resilient infrastructure, promote sustainable industrialisation and foster innovation". Article 2 of the Paris Agreement "aims to strengthen the global response to the threat of climate change [...] Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development".

The issue of resilience, addressed by a wide range of interdisciplinary literature, has recently experienced the transition "from a descriptive concept to a normative agenda" (Weichselgartner, Kelman 2015, 252). Resilience is a broad and sometimes ambiguous concept that may change depending on the regional context and opportunities for political, economic and social development: "Based on vulnerability and development geography, the ability to be resilient is never distributed homogeneously within and through social groups. Instead, this ability is largely determined by social, economic and cultural factors, and, because the minority of a society often holds control over the decision-making for the majority, these factors may often be beyond society's control" (Ibid.). The cross-sectoral and interdisciplinary nature of this concept has been influencing the most recent debate within *Island Studies*, the field of study this paper mainly refers to. Kelman (2018) pointed out how this paradigm contributes to shape contemporary small islands narratives. Chandler and Pugh (2020) recently proposed a theoretical discussion on islands resilience and the Anthropocene. Moreover, several studies referred to resilience as a key component in the understanding of small islands' socio-environmental momentum (Molina 2018, Scandurra et al. 2018, Trundle et al 2019, Bangwayo-Skeete and Skeete 2020). This debate brought back to the specific case of the Maldives, highlights three extremely relevant aspects: a) the need for the integration between the description of national environmental governance systems and the observation of spatial dynamics at local scale; b) the dis-

discussion of the dialectic between island vulnerability and island resilience as a driver to overcome the pervasive character of the Climate Change Adaptation (CCA) paradigm (Malatesta, Schmidt of Friedberg 2017); c) finally, the opportunity, through the study of resilience enhancement strategies, to have a look at the materialisation of the contemporary ideologies of development.

In the first paragraph the supra-regional context of the Indian Ocean will be analyzed, specifically considering Disaster Risk Reduction (DRR) policies activated by large supranational institutions. The second paragraph will consider the subject at national level, taking into account the situation in the Maldives, the impacts of the 2004 tsunami, the specific fragility of the coral islands, and the policies activated by the local government. In the third paragraph, we move on to the analysis of the two case studies, comparing the resilience strategies implemented locally. In the conclusion, an evaluation of the strategies adopted at local level is reconnected with the transcalar perspective.

The work was conducted by integrating different techniques and approaches to geographical inquiry (Flowerdew, Martin 2005): sessions of field observation, collection of visual material, informal meetings with local informants and unstructured interviews conducted during repeated visits to the islands; as well as analysis of secondary data made available by the government of the Maldives and local authorities.

- Field observations sessions were organized in January 2018, February 2019 and February 2020 involving small groups of MD students attending the Workshop “Place and local communities”. The team introduced each visit by lectures on methodology. Fieldwork aimed at collecting a visual repertoire documenting the evolution, in island landscapes, of land reclamation, fishery and food production infrastructures. Federica Adamoli (a professional photographer) and Luca Fallati (research fellow of MaRHE) collaborated with the research team and were in charge of collecting the visual material using cameras and drones.
- In February 2019 the team had three informal meetings with members of the Ministry of Environment. In January 2018, February 2019 and February 2020 the team conducted unstructured interviews with Dhaalu Rin’Budhoo Island Council President and in February 2019 with two Dhaalu Meedhoo Island Council Members. Meetings took place in Ministry office and interviews in several locations on the islands. Interviews took written notes and memos. Transcriptions of notes and memos have been analyzed through open coding approach.

- Secondary data sources used for the analysis are collected in the bibliography. The local documents (e.g. *Land Use Plans*) were collected (both printed and electronic versions) thanks to the collaboration with local authorities.

2. DRR and resilience in the Indian Ocean Region

In the Asia-Pacific region, natural disasters of climatological origin (droughts, tropical cyclones, storms), geological and tectonic origin (earthquakes, tsunamis, landslides) and hydrological origin (floods, tides) are recurrent phenomena. According to the United Nations Economic and Social Commission for Asia and the Pacific (UN-ESCAP): “Asia and the Pacific is the most disaster-prone region in the world. Geologically, the region is characterised by active tectonic plate movements [...] which have been the source of major earthquakes and tsunamis. The Indian and Pacific Oceans also regularly generate tropical cyclones and typhoons [...] economic losses increased by almost 15 from 1970 while the region’s GDP only grew five times, suggesting that building resilience to disasters is likely a necessary condition for protecting the region’s growth prospects” (UNESCAP 2015, 6-7). ISDR Asian Partnership on Disaster Reduction (IAP) and UN Economic and Social Commission for Asia and the Pacific (UNESCAP) cooperate to share progress made on DRR and the increase in resilience at a regional level.

Pervasive environmental risk is a crucial topic in the contemporary history of the Indian Ocean (Alpers 2014). The Indian Ocean Region (IOR) is particularly prone to disasters, both natural and caused by human action, which threatens social development and livelihoods in the region. Moreover, small island states are highly vulnerable to climate change and rising sea levels. Many of their key infrastructure and socio-economic activities are located along the coastline, in many cases close to the current sea level (Watson et al. 1997).

Rumley emphasises the centrality of this region for any “critical review of the ways in which the interrelationship between the politics and geopolitics of climate change and development have been portrayed” (Rumley 2010, 147). Rumley places “most Indian Ocean states in a complex conundrum since the overall causes of greenhouse gas emission vary both by the level of economic activity as well as economic development” (Idem 150). It follows, according to Rumley, that “considerations associated with maximising both development goals and energy security should override broader global climate change concerns for many Indian Ocean states” (Idem).

Although Rumley does not explicitly mention the Maldives, their central position in the “complex conundrum” is evident. The country’s contribution to the level of greenhouse gas emissions is minimal compared to the leading economies of the region, while its exposure to the consequences of climate change at the regional and global level is very high. By the 2030 milestone, there are also likely to be high impacts from floods – and high overall disaster losses as a proportion of GDP for the subregion’s smaller countries (UNESCAP 2018, 13).

Environmental security is a priority for the development of Small Island States (SIS), where the threat of disasters is particularly acute. In low-lying coastal settlements, with a high population density, the risk of rising sea levels, increasing water temperatures and their economic, geographical and social consequences are a cause for concern (IPCC 1990; Yohe 1991; Titus, Narayanan 1996; Mimura, Harasawa 2000). It is expected that entire low-lying archipelagic countries, such as the Maldives, will disappear if the continuous rise in sea level persists (Bruce et al., 1996). The “blue economy”, in particular as regards food security and sustainable fisheries policies, and the environmental and social consequences of climate change, are among the priorities on the political agenda of SIS: furthermore, we must remember that the islands that “hold the keys to the IOR” are, geographically speaking, coral atolls, whose physical characteristics include a high rate of erosion and are seriously threatened by major stresses on coral reefs (such as human impact caused by tourism practices, ocean acidification, or abnormal phenomena of large-scale bleaching) (Schmidt di Friedberg, Malatesta 2020).

As a result, risk assessment and environmental protection policies have become key factors for “coral states” (such as the Maldives) likely to face the loss of part of the already scarce land territory. Investment in large infrastructure in maritime spaces and population relocation plans can become critical to their economic development. Within the IOR, the case of the Maldives, a SIS, characterised by a high rate of development and defined as “the most vulnerable” in terms of sea-level rise (Ghina 2003; Moore 2010) is especially significant.

3. Development and environmental policy in the Maldives

3.1 *The tsunami as an catalysis for change*

The Republic of Maldives is an archipelagic state in the Indian Ocean, south-west of Sri Lanka, stretching longitudinally for over 750 kilometers between the

islands of Lakshadweep to the north and Chagos to the south. The country has an area of about 298 square kilometers, an altitude above sea level of about 2 meters and an exclusive economic zone of 859.00 square kilometers (May, Riyaza 2017). The Maldives is the sixth smallest sovereign state in terms of territory and is divided into 1,192 islands (Shaig 2006). Only nine islands have, according to their original configuration, a size of more than 2 square kilometres (Ghina 2003), but many of them are undergoing reclamation projects to increase their surface area. One third of the resident population (344,023 inhabitants according to 2014 census, and 374,775 according to 2018 administrative data sources) lives in the capital Malé, on an area of about 5.8 square kilometers. Of the 1,192 coral islands, grouped into 20 administrative atolls, 192 are inhabited (counting both southern islands and the Greater Malé Region), others are dedicated to rural and productive activities, and 145 host tourist resorts (Ministry of Tourism 2019).

Meteorological records, field assessments and a Risk Assessment Report (UNDP 2006) identified the sea-induced natural hazards experienced in the Maldives as storm surges, monsoonal flooding, swell waves and wind waves, tsunamis, earthquakes and climate change: “Maldives faces moderate hazard risk except for the low probability and high consequential tsunami hazard in the near future, and high probability and high consequential sea-level rise hazard in the distant future” (UNDP 2006). With three-quarters of the land less than a meter above sea-level, the Maldives is one of the lowest countries in the world (Waheed, Shakoor 2014; UNDP 2007). In 2004 almost one-third of the country’s population was directly affected by the Indian Ocean tsunami, with nearly 12,000 people displaced and another 8,500 temporarily relocated within their islands (World Bank et al. 2005, 4): “The tsunami which reached the Maldives at 9:20 a.m. on 26 December 2004 was the worst natural disaster in Maldivian history” (Idem 3). More than 1,300 people suffered injuries, and 108 people were confirmed dead or missing. Despite the relatively small death toll, the Maldives experienced a disaster of national proportions with only eight of the 198 islands that were inhabited at that time unaffected by the tsunami. “56 islands sustained major physical damage, and fourteen were destroyed and had to be evacuated, some rendered permanently uninhabitable” (Fulu 2007, 848-849). In general, the more densely vegetated islands were less affected by the tsunami (Karan, Subbiah 2010). Overall, the tsunami caused severe coastal erosion, groundwater contamination and erosion of the upper soil. The total damage was estimated at almost \$460 million, representing about 62% of the country’s GDP at the time (Pardasani

2006). The tsunami triggered a series of measures aimed at disaster preparedness and resilience for the following years. On December 26th, 2004, the National Disaster Management Centre was created. In February 2006, the NDMC became a permanent institution.

Human settlement in the Maldives is very ancient. The islands, inhabited for over 2000 years, have always been a meeting point for international cultures and trade: “The coming and going of settlers, migrants, explorers, castaways, slaves, and merchants and merchandise, religions, supernatural beings, building structures, currencies, calendars, counting and measuring systems, and scripts, as well as of old and new concerns and hazards, indicates the location of the Maldives at a complex set of crossroads of major historic tidal currents of the Indian Ocean” (Knoll 2018, 15). Apart from two short periods of foreign occupation and the British protectorate, formalised in 1887, the country always basically maintained its independence, allowing the inhabitants (Dhivehi) to develop a strong sense of national identity. In 1965 the Maldives gained independence from Great Britain. A little later, with the referendum of 1968, the sultanate was abolished and the Second Republic was born, presided by Ibrahim Nasir. In 1978 Maumoon Abdul Gayoom was elected president of a country still extremely poor and, despite two attempts at a coup d’ état in 1980 and 1988, he remained in power for thirty years.

Gayoom was responsible for the country’s process of modernisation and economic development through the careful planning of luxury tourism. As early as the 1980s, he was concerned about the consequences of climate change and anticipated the risk of a potential rise in sea-level: “As for my own country, the Maldives, a mean sea-level rise of 2 meters would suffice to virtually submerge the entire country of 1,190 small islands, most of which barely rise over 2 meters above mean sea level. That would be the death of a nation.” Gayoom’s words were inspired by the results of the 1988 UNEP survey and the anticipation that “Assuming a mean global sea-level rise of 20 cm by the year 2025, those islands in the archipelago which have been structurally modified can expect increased rates of erosion and coastal alteration. The impacts of ‘high waves’ will be greater if the sea-level will be, on average, higher. Moreover, the ongoing land reclamation³ process will reduce the capacity of the reef system to absorb the wave energy” (Pernetta, Sestini 1989, 3). The report concludes that: “Sustainable develop-

ment in the Maldives can only be achieved by a careful and simultaneous consideration of all aspects of these islands’ fragile environment” (Idem 4).

Unrest and protests marked the Gayoom government’s last period until the declaration of a state of emergency. The opposition called for democratic reforms and, in 2005, the multi-party system, and the reform of the Constitution were introduced. The 2004 tsunami was one of the elements that played a fundamental role in the political change of the country. Fulu stated that: “the ongoing democratic reforms in the Maldives — including the lifting of the state media monopoly and wider spectrum of public debate on social issues — were in part catalysed by the tsunami and the resulting international attention on the country. [...] The need to rebuild livelihoods may also provide opportunities to offer training and sources of support to those who had previously been excluded from income-generating activities. The need for such opportunities is clearly reflected in the slogan of the Special Envoy for Tsunami Recovery: ‘Build Back Better’” (Fulu 2007, 844).

3.2 *The contemporary scenario*

In the first multi-party elections in 2008, the former political prisoner Mohamed Nasheed, leader of the Maldivian Democratic Party (MDP), won. With Nasheed, the “environmental issue” became central to the government’s agenda. Nasheed played a leading role in placing the Maldives at the centre of the debate on environmental policies and in making his country a symbol of the fragility of the islands in the face of climate change. As seen in the film dedicated to him, *The Island President*, the visibility of the Maldives was strengthened by his personality and communication skills during the UN Climate Change Conference COP 15, in Copenhagen. The four-year period was, in fact, characterised by three processes (Malatesta, Schmidt di Friedberg 2017): the increase of the international visibility of the Maldives as a symbol of the fight against climate change, a visibility strengthened during the Conference of the Parties in Copenhagen in 2009; an unprecedented articulation of state regulations aimed at environmental protection, local development,⁴ sustainable management

³ Land reclamation may be defined as the process aiming to gain (or create) new land from ocean, river, lake or maritime spaces. In the Maldives, they dredge sand from shallow lagoons. The sand fills “reclaimed” spaces along the shoreline.

⁴ In 2010 the Government released the *Act on Decentralization*. The Act “allow(s) the island communities to make their own decisions [...] to improve people’s living standards through social, economic and cultural development; to empower the people; to (increase the) scope (for) services closer to the people” (Department of National Planning 2010). The Act has recently been reformed, fostering the autonomy of local administrations.

of resources and environmental impact assessment of major economic activities; finally, the centrality of risk adaptation and mitigation as fundamental paradigms for environmental policy. These trends have contributed to transform the response to climate change into one of the main constituent forces of contemporary national identity (Idem). Nasheed received numerous awards for his commitment to the environment, and for bringing democracy to the islands. In October 2009, a cabinet meeting held underwater at a depth of six meters, complete with masks and cylinders, communicated the message of the environmental risk faced by the Maldives to all the international media. The environmental emergency thus also became an extraordinary flywheel that boosted the country further as a tourist attraction, linked to the unique experience of a fragile and transitory landscape to be enjoyed “before it is too late.” After Nasheed’s forced resignation, Abdulla Yameen Abdul Gayoom of the Progressive Party of the Maldives (PPM) was elected president. The last elections in 2018 were unexpectedly won by the opposition party candidate, Ibrahim Mohamed Solih, politically near to Nasheed.

The Maldives today “is a typical example of the ‘island paradox’, with multi-dimensional development issues” (UNDP 2015, 2). In the complex framework of the Indian Ocean Region economy, the relative prosperity of the country generated by tourism, and the ambitious infrastructure and urban development plans of the presidency of Abdulla Yameen, clash with the objectives of sustainability and the vulnerability of the Small Island State. Addressing climate change, disaster risk and environmental sustainability remains critical for the country. The Government of Maldives (GOM), in synergy with United Nations’ goal to strengthen resilience, is working hard to implement the ambitious agenda of the *Sendai Framework for Disaster Risk Reduction, Sustainable Development Goals* and the *Paris Agreement* on climate change. Adaptive measures to sea-level rise include retreating settlements to higher grounds, accommodating higher sea levels through building construction changes, and protecting settlements through coastal defensive strategies (IPCC 1990). Despite the UNDP statement that: “The root cause of increasing vulnerability to climate change has been found to be the lack of systematic adaptation planning and practice, combined with the still-fledgling institutional capacity” (UNDP 2015, 2), the recent body of legislation and the institutionalisation of environmental protection agencies should be taken into account. The *Environment Protection and Preservation Act of Maldives*, Law no. 4/93, published by the Ministry of Environment and Energy in 1993, continues to provide the main reference frame-

work for national policies. It remains particularly relevant with regard to protected area management, environmental impact assessment, and waste management. More recently, and after the tsunami emergency of 2004, a comprehensive set of laws has been enacted. In particular the *National Adaptation Plan of Action (NAPA)* in 2008: “The goal of the NAPA is to present a coherent framework to climate change adaptation that enhances the natural, human and social systems and ensures their sustainability face to predicted climate changes” (p. 3). The *Strategic National Action Plan for Disaster Risk Reduction and Climate Change Adaptation 2010-2020 (SNAP)*, adopted in 2009, considered four strategic areas: 1. environmental governance; 2. empowerment of communities’ resiliences; 3. islands’ access to technology, knowledge, and other resources; 4. risk-sensitive regional and local development: “The most interesting aspects of SNAP were the attempt to integrate these strategic areas with the overall framework provided by NAPA and, above all, the emphasis on promoting resilience strategies at the local scale” (Malatesta, Schmidt di Friedberg 2017, 60).

Maldives’ vulnerability to many types of hazards (storm surges, torrential monsoon rain, sea level rise, tidal waves) and the dramatic experience of the 2004 tsunami prompted the government to consider essential adaptive strategies in case of hazards and tsunami (Suppasri et al. 2015; Riyaz, Park 2010; Fritz et al. 2006). The ‘*Safe Islands’ Program*, which was first developed prior to the tsunami, proposes to resettle more vulnerable communities living on smaller and less inhabited islands on larger, safer islands, developing them as “growth centres”. The government Safe Island Development Programme dwells on the assumption that: “there are no safe islands in the Maldives. Each island has a maximum threshold level, especially for flood events, above which an event could flood the entire island regardless of its existing geophysical characteristics. All islands are generally exposed to natural hazards, but some islands are comparatively less exposed due to the geophysical setup of the island. It may be possible to control the impact of hazards for existing events using engineering solutions” (UNDP 2007, 7). Relocation, according to the GOM, would be “totally demand driven and voluntary”. To date, criteria for identifying “Safe Islands” have not been fully elaborated.

Additional informations regarding the administrative geography of the archipelago may give useful insights to understand the trans-scalar analysis proposed by this essay. Inter-institutional relationships shall be regulated by the ct on Decentralization of the Administrative Divisions of the Maldives (Department

of National Planning, 2010), integrated, in 2019, with amendments by President Ibrahim Mohamed Solih (Transparency Maldives 2019; Mohamed, 2021). The tensions between the centralisation of competences in the Capital and the decentralisation of strategic areas of the *res publica* has constantly been playing a pivotal role in the internal political debate after the promulgation of the Constitution in 2008. It would be misleading, and too long, to go over the stages of that debate. It would be more functional to indicate which competences and duties, according to the Act, pertain to local authorities. The intermediate level between the island councils and the Government is represented by two Regional Development Management Offices (RDMOs), seven province offices and the atolls councils. Each inhabited island (excluding cities) elects an island council. The Act norms the election of local councils: “these councils are empowered by law to develop five-year development plans in full consultation with their constituencies” (Transparency Maldives 2009, p. 18). The Act confers to island councils a broad spectrum of responsibilities: namely planning and implementing (after the revision by the Government) development projects; acquiring land reefs and lagoons; maintaining public spaces; managing waste disposal systems and piers and harbours operations. Specific duties refer to the adoption of measures and strategies to alleviate land erosion problems and the implementation of utilities such as sewage and water. Moreover, island councils are in charge of sports and playground promotion and maintenance.

4. Two islands, two different stories of resilience

The human geography of the Maldives is characterised by the spatial antithesis between concentration and dispersion, and by centre/periphery relations, underlying disparities and imbalances between the so-called Greater Malé Region and the atolls (Malatesta et al. 2021). Such spatial patterns interact with population distribution, capital accumulation, access to resources, accessibility to services and land management of the islands. “The main source of disparity between Malé and the atolls, meanwhile, has been found in income status and wealth, which determines the ability to seek quality services where they are available. Dispersed and small populations, economies of scale and high per capita cost of services challenge equitable service delivery to many islands.” (UNDAF 2015, 15).

At the local level, we consider here the cases of two islands of Dhaalu Atoll (Fig. 1), both affected by the 2004 tsunami. Starting from a brief description of the

post-disaster response and strategies, we deepen the analysis by proposing a comparison based on information that combines the official data and the evidence reported by the current island Councils. This comparison underlines the broad spectrum of local development models related to resilience policies. Through a spatial analysis of recent plans and strategies, we follow a perspective aimed at integrating the assessment of adaptation measures as a whole, such as that provided by the 2011 *Survey on Adaptation Measures to Climate Change*, with considerations on policies and local development.

Meedhoo is a rather small, densely inhabited island (Fig. 2). At the time of the tsunami had an area of about 11 hectares and a population of about 900 inhabitants (National Bureau of Statistics 2018).⁵ The distance between Meedhoo and the capital is about 140 km. The main economic activity is yellow-fin and skipjack fishing, while some people work in nearby tourist resorts (Sun Aqua Vilu Reef, Angsana Velavaru). The 2004 tsunami hit Meedhoo hard, and the entire island was flooded (Kan et al. 2007). Due to the lack of space for new buildings and economic activities, given the island’s small size and dense population, after the tsunami people started to build multi-storey houses, which gave a great boost to the construction sector. The rapid development of the sector has attracted many workers, so much so that the population registered in 2017 had risen to 1406 people (National Bureau of Statistics, 2018). The island was therefore likely to become yet more overcrowded. To support the continuation of this growth and to foster long-term economic development, the only solution seemed to be to enlarge the island.

A first land reclamation project was carried out in 2006, when a 50-foot-wide buffer zone was built all around the island. A new land reclamation project, funded by the government of the Maldives, was launched in 2014. At the inauguration ceremony, President Yameen said he had visited the island, bringing “a gift” for its inhabitants, as the people of Meedhoo had been waiting for such a development project for years. But the community was not consulted in the planning and implementation of the developmental plan (notably consultation is not mentioned as a manda-

⁵ The size of the island (after enlargement following land-reclamation projects) is in line with the average figure at regional level, while the resident population is significantly higher than elsewhere in the same region (Figure 2.).

⁶ The atolls of Faafu and Dhaalu (in the central-southern area of the country) are considered, mainly because of administrative and demographic features, as the reference region for a trans-scalar reading. The authors reported data that both include and exclude the two capital islands (Nilhandhoo and Kudahuvadhoo). The capital islands are of exceptional area and population size compared to the regional context.

Department of National Planning
Spatial Planning Section | GIS & Mapping Unit

Scale: 5,00 Km



Dh



Rev: 7.2, March 22, 2009

Figure 1. Dhaalu Atoll. Source: Official Atlas of Maldives Land and Survey Authority Ministry of Planning, Department of National Planning, 2009.

tory condition for plan design and implementation at island level).⁷ The plan, which includes the reclamation of 17.5 hectares of land and the construction of 485 meters of revetment, was assigned to the Dutch company Boskalis⁸ and completed in 2016. Even so, the

operation was not without undesirable consequences. According to local environmental associations, the techniques used by Boskalis were not appropriate. Therefore, “a large part of the island’s shoreline vegetation and many houses near the beach [were] covered in

⁷ www.transparency.mv

⁸ https://presidency.gov.mv/Press/Article/14145

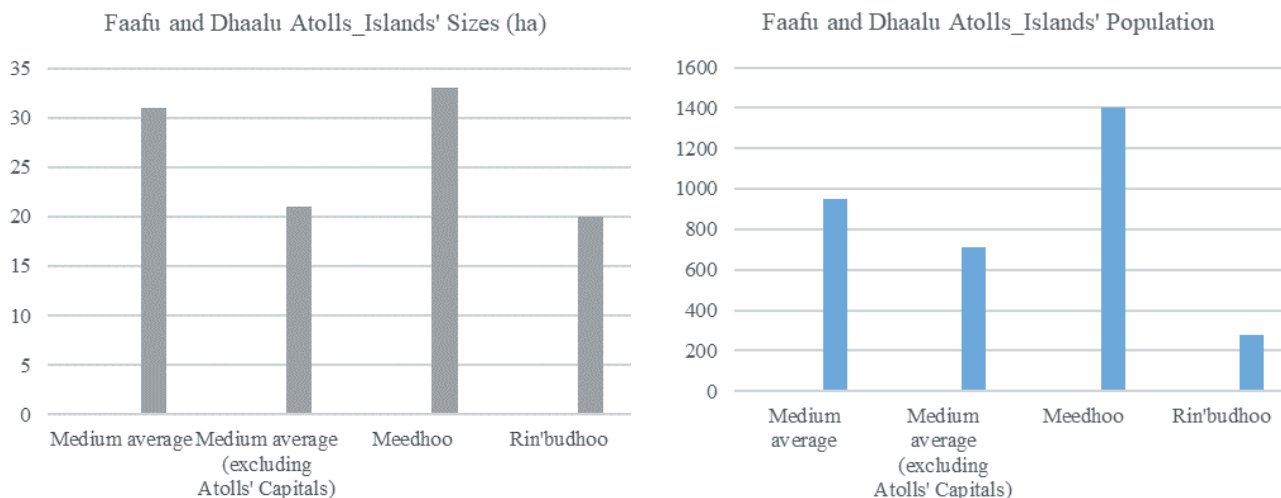


Figure 2. Faafu and Dhaalu Atolls: Islands’ sizes and population. Source: National Bureau of Statistics, 2018 and Ministry of Environment and Energy, 2018⁶.



Figure 3. Dhaalu Meedhoo. Sources: Authors’ elaboration based on satellite images.



Figure 4. Land Reclamation in Meedhoo, February 2018. Photo: Federica Adamoli.

fine sand and sea water”⁹ Across tropical atoll regions like the Maldives archipelago, land reclamation has been reported as a potential generator of negative feedback regarding coral and intertidal ecosystems like reefs and seagrass meadows.

Currently, the total area of Meedhoo is 33 hectares. This size is the result of additional enlargements to the reclaimed area (now almost 20 hectares). In November 2019, the Secretariat of Dhaalu Atoll (Secretariat of South Nilandhee Atoll Council, 2019b) released a draft of the *Proposed Land Use Plan* for Meedhoo. The *Plan* is based on a multi-functional use of the reclaimed area,



Figure 5. Cycling and motorbike path in Meedhoo, February 2020. Photo: Federica Adamoli.

⁹ <https://archive.mv/en/articles/vr3Er>

combining public and private uses (Fig. 4 and Fig. 5). A total of 21 public housing units will cover a large part of the eastern and southern sides of the island, in line with the large-scale social housing development already completed in other islands of the archipelago. The *Plan* foresees recreational areas (local and tourist beaches, parks and cycling paths), public utilities and municipal services (powerhouse and sewage facilities). Socially and economically, the most relevant intervention, however, is taking place around the harbour and dock district. As has been mentioned, the island’s economy depends largely on yellow-fin tuna and skipjack fishing. The harbour will be enlarged by a set of additional infrastructures and facilities between the existing quays and the sand islet on the south-western side of the island (Fig. 3): a ferry terminal, a 0.15 hectares pavement running along the new quay wall, and a system of barriers sheltering the north-western side of the harbour.

Rin’budhoo is located on the north-west rim of Dhaalu Atoll, 158 kilometres from the capital. Its overall population is 278 inhabitants (National Bureau of Statistics 2018) and its surface area is approximately 20 hectares. The area of Meedhoo, on the other hand, is in line with the regional average, though its resident population is significantly lower (Fig. 2). Rin’budhoo too was severely affected by the tsunami in 2004, and suffered two casualties. Many houses and infrastructures were damaged, forcing a large section of the local population to migrate to other islands. The small island population declined rapidly as a result of the emigration. Following the 2004 tsunami, the island experienced a significant negative demographic trend: it had 420 inhabitants in 2000 and only 207 in 2006 (National Bureau of Statistics 2018). Rin’budhoo was famous as the “Jewellers’ Island”, since its people were traditionally among the most skilled silversmiths and goldsmiths in the Maldives, but a large proportion of the jewellers had migrated to Malé where there are more commercial opportunities. The emigrants, however, maintained links with the community through remittances for their nuclear or extended family members, and when the first tsunami warning was sounded, they immediately prepared a boat to take assistance to Rin’budhoo, before any government initiative. The post-tsunami recovery was founded on island’s historical and cultural heritage, and the revival of traditional handicrafts and jewellery. In close collaboration with the neighbouring resorts, the production of jewellery was restarted a few years ago, involving young people. Moreover, Rin’budhoo pioneered the second phase of the tourist development of the Maldives, opening one of the country’s first guesthouses, launching small-scale tourism projects and



Figure 6. Rin’budhoo (drone image), February 2018. Photo: Luca Fallati, DISAT and MaRHE Center, University of Milano-Bicocca.

promoting relationships between the nearby resorts and the island’s commercial initiatives (dell’Agnese 2018). A few years ago, these relationships drew attention to the need to enlarge the harbour to allow the island to manage a higher volume of goods and people. However, in almost 15 years, the local government has not promoted any land reclamation.

In September 2019, the Secretariat of Dhaalu Atoll (South Nilandhee) released a draft of the *Land Use Plan* for Rin’budhoo. The project includes both the construction of a new harbour area and the re-definition of the island’s land usage. The new harbour area (built through land reclamation) on the south side of Rin’budhoo covers about 0.32 hectares. The re-definition of land usage includes new housing and residential plots (approx. 0.50 hectares), municipal utility services (a ferry terminal, fuel facilities and a fish market) and a recreational area (Fig. 6).

As a key step in its development, in December 2019 Rin’budhoo Island Council launched the *Wall Mural Project*. An open-air art gallery was set up along a street that connects the Council Office to the north side of the island. During the first months of 2020, Rin’budhoo hosted artists from different islands of the archipelago, who painted murals on house walls (Fig. 7 and Fig. 8). The *Wall Mural Project* turned the street into a “visual” promenade and a landmark. The works are part of a marketing plan “to make the whole island an art hub”, as reported by Ibrahim Hathim (president of the Island Council). The aim is to show visitors the practices, landscapes and artefacts of Maldivian culture. Moreover, the *Wall Mural Project* promotes the island as a pioneer in the region’s cultural tourism.



Figure 7. The *Wall Mural Project*. Main Arcade, February 2020. Photo: Federica Adamoli.



Figure 8. The *Wall Mural Project*. Detail from a wall, February 2020. Photo: Federica Adamoli.

5. Conclusion. Island resilience or island development?

Despite the common trauma experienced after December 2004 and the relatively short spatial distance separating Meedhoo from Rin'budhoo, the two islands have been telling two different “stories of resilience”. The key to understanding these tales is the focus on the different political strategies implemented.

As mentioned, in Meedhoo the Government promoted a “defensive” land reclamation plan after the post-disaster period, and, subsequently, this emergency measure was acted on with the launching of an extensive land reclamation project. As noted, the restricted size of the settled area was the primary factor for its vulnerability to rising sea-levels and massive events like a tsunami, but there are additional reasons for the development: namely, to reduce the risk of overpopulation by creat-

ing lots for future settlement, and to provide safe shelter for the local fleet of fishing vessels, one of the largest in the region. The harbour, protected by areas of reclaimed land, serves as both a shipyard and a storage area. Furthermore, the fact of being a fishing hub at supra-local level ensures that Meedhoo plays a central role, which is of fundamental importance to diminishing a major threat to the local islands’ economies and societies: slipping into a dynamic of isolation or, even worse, being considered a subordinate periphery. Maintaining a strategic function regionally may weaken this risk and, at the same time, may act as a resilience strategy. However, it must be emphasised that the process has been initiated without involving inhabitants or the Island Council. For this reason, and for the negative impact it has on the environment and public health, the plan has been criticised as a development project “gone wrong”.¹⁰

In contrast, before the drawing up of the 2019 *Land Use Plan*, in Rin'budhoo local and regional authorities had promoted no massive land reclamation projects. The local Council has implemented a development strategy based on the promotion of small-scale tourism and the valorisation of local heritage, both natural and cultural. In recent years, they have invested in boosting the attractions of this small island as an alternative to the luxury offers that still prevail in the Maldives’ tourist industry, even shaping the image of this “paradisiacal” archipelago. The strategy entails a spectrum of related actions: the opening of a guesthouse during the pioneer phase of local tourism on inhabited islands (around 2010); the promotion of economic synergies and joint ventures with the company that runs the Aavee Nature Paradise eco-resort; investment in art (by inviting painters to participate in the *Wall Mural Project*); and the preservation of the traditional production of jewellery (by supporting training courses and selling Rin'budhoo’s handcrafts to nearby resorts). Unusually in the Maldives, Rin'budhoo is proposed nationally as a tourist destination based on cultural heritage.

The two islands acted very differently in their development choices in response to the tsunami emergency. This article has shown the variety and complexity of factors that, on different scales, can trigger resilience practices. The two “stories of resilience” show that even in neighbouring islands of similar size, it is difficult to imagine a unique model of response to a hazard. The islands’ choices¹¹ were influenced on a regional scale by the strategic alliance policy of the Maldives in the IOR

¹⁰ www.transparency.mv

¹¹ Currently the Maldivian Democratic Party (MDP) runs both islands’ Council. President Ibraheem Solih belongs to MDP.

and the growth of international tourism. On a national scale, the factors that have informed the choices made by the two islands included the political orientation of the islands often contesting the ruling government party, the dialectics between the policies of decentralization during the presidencies of Nasheed and Solih¹² and centralization during the presidency of Yameen (Mohamed 2021), and the location of the new resorts in Dhaalu Atoll. Both Meedhoo and Rin'budhoo rebooted their existence after the disaster by implementing a development policy that would guarantee their future, a policy based on their specific vocations and demographic. In the choices they made, a key role was played by the visions of each island's chief and council, and by the islands' traditions – respectively tuna fishing and the production of jewelry.

References

- Alpers, E.A. (2014). *The Indian Ocean in World History*. New York, Oxford University Press.
- Bangwayo-Skeete, P. F., & Skeete, R. W. (2020). Modeling tourism resilience in small island states: a tale of two countries. *Tourism Geographies*. <https://doi.org/10.1080/14616688.2020.1750684>
- Bruce, J.P., Lee, H., Haites, E.F. (1996). *Climate Change 1995: Economic and Social Dimension of Climate Change*. Cambridge, Cambridge University Press.
- Chandler, D., & Pugh, J. (2020). Islands of relationality and resilience: The shifting stakes of the Anthropocene. *Area*, 52(1), 65-72. <https://doi.org/10.1111/area.12459>
- dell'Agnese, E. (2018). "One island, one resort". Il turismo enclave alle Maldive come eterotopia pianificata. *Bollettino della Società Geografica Italiana*, serie 14, 1 (1), 27-39.
- Department of National Planning. (2010). *The Act on Decentralization of the Administrative Divisions of the Maldives*. <http://www.planning.gov.mv/en/>.
- Flowerdew, R., Martin, D. (2005). *Methods in Human Geography*. Harlow, Pearson.
- Fritz, H. M., Synolakis, C.E., Mcadoo, B.G. (2006). Maldives field survey after the December 2004 Indian Ocean tsunami. *Earthquake Spectra*, 22 (3), 137-154.
- Fulu, E. (2007). Gender, vulnerability, and the experts: responding to the Maldives Tsunami, *Development and Change*, 38 (5), 843-864
- Ghina, F. (2003). Sustainable development in small island developing states. The case of the Maldives, *Environment. Development and Sustainability*, 5 (1), 39-165.
- Intergovernmental Panel on Climate Change [IPCC] (1990). *Strategies for Adaptation to Sea Level Rise. Report of the Coastal Zone Management Subgroup*, The Hague. IPCC Response Strategies Working Group. Ministry of Transport and Public Works.
- Kan, H., Ali, M., Riyaz, M. (2007). *The 2004 Indian Ocean tsunami in the Maldives: scale of the disaster and topographic effects on atoll reefs and islands*. Washington, National Museum of Natural History, Smithsonian Institution.
- Karan, P.P., Subbiah, S.P. (eds.). (2010). *The Indian Ocean tsunami: The global response to a natural disaster*. Lexington, University Press of Kentucky.
- Kelman, I. (2018). Islandness within climate change narratives of small island developing states (SIDS). *Island Studies Journal*, 13(1), 149-166. <https://doi.org/10.24043/isj.52>
- Knoll, E-M. (2018). *The Maldives as an Indian Ocean Crossroads*. Oxford, Oxford University Press. <http://www.oxfordre.com/asianhistory>
- Li, P., Qian, H., Zhou, W. (2017). Finding harmony between the environment and humanity: an introduction to the thematic issue of the Silk Road. *Environmental Earth Sciences*, 76, article n. 105.
- Malatesta S., Schmidt di Friedberg, M. (2017). Environmental policy and climate change vulnerability in the Maldives: from the 'lexicon of risk' to social response to change. *Island Studies Journal*, 12 (1), 53-70.
- Malatesta S., Schmidt di Friedberg, M., Mohamed, M., Zubair, S., Bowen, D. (eds). (2021). *Atolls of the Maldives. Nissology and Geography*. London, Rowman & Littlefield ("Rethinking the Island").
- May, J.F., Riyaza, F. (2017). *Maldives' Population Dynamics*. Washington, Population Reference Bureau, viewed 7 February 2019, <https://www.prb.org/maldives-population-dynamics/>
- Mimura, N., Harasawa, H. (2000). *Data Book of Sea-Level Rise. Center for Global Environmental Research*. Tokyo, National Institute for Environmental Studies, Environment Agency of Japan.
- Ministry of Environment and Energy (2018). *Island Electricity Databook 2018*. <http://www.environment.gov.mv>
- Ministry of Home Affairs, Housing and Environment (2001). *First National Communication of the Republic of*

¹² Readers may refer to note n. 5.

- Maldives. <http://unfccc.int/resource/docs/natc/maldnc1.pdf>
- Ministry of Housing and Environment (2011). *Survey of Climate Change Adaptation Measures in the Maldives*, Malé, Ministry of Housing and Environment.
- Ministry of Tourism (2019). *Tourism Yearbook 2019*. <https://www.tourism.gov.mv/statistics/annual-publications>
- Mohamed, M. (2021). The centralization of governance and economy in Maldives: a reading of the contemporary demographic transition between domestic migration and forced displacement. In Malatesta, S. et al. (eds). *Atolls of the Maldives. Nissology and Geography*. London, Rowman & Littlefield (“Rethinking the Island”), 89-105
- Molina, J. G. (2018). Advancing small island resilience and inclusive development through a convergence strategy in Carles, Philippines. *Disaster Prevention and Management: An International Journal*. <https://doi.org/10.1108/DPM-06-2018-0190>
- Moore, A. (2010). Climate Changing Small Islands. Considering Social Science and the Production of Island Vulnerability and Opportunity. *Environment and Society: Advances in Research*, 1, 116-131.
- National Bureau of Statistics (2014). *Population and Housing Census 2014. Preliminary Results*. Malé, Ministry of Finance & Treasury.
- National Bureau of Statistics (2018). *Statistical Yearbook of Maldives 2018*. viewed 26 May 2019, <http://statistic-smaldives.gov.mv/yearbook/2018/>
- Pardasani, M. (2006). Tsunami reconstruction and redevelopment in the Maldives: A case study of community participation and social action. *Disaster Prevention and Management: An International Journal*, 15 (1), 79-91.
- Pernetta, J., Sestini, G. (1989). *The Maldives and the impact of expected climatic changes*. UNEP Regional Seas Reports and Studies, 104
- Riyaz, M., Park, K.H. (2010). ‘Safer Island Concept’ developed after the 2004 Indian Ocean tsunami: A case study of Maldives. *Journal of Earthquake and Tsunami*. 4 (2), 135–143.
- Rumley, D. (2010). Ideology, carbon emissions and climate change discourses in the Indian Ocean Region. *Journal of the Indian Ocean Region*, 6 (2), 147-154.
- Scandurra, G., Romano, A. A., Ronghi, M., & Carfora, A. (2018). On the vulnerability of Small Island Developing States: A dynamic analysis. *Ecological Indicators*, 84, 382–392. <https://doi.org/10.1016/j.ecolind.2017.09.016>
- Schmidt di Friedberg, M., Malatesta, S. (2020). Indian Ocean Small Islands along the Postcolonial Trajectory: Chagos and the Maldives, in Schelhaas, B., et al. (Eds), *Decolonising and Internationalising Geography – Essay in the History of Contested Sciences*. Berlin, Springer, 1-10.
- Secretariat of South Nilandhee Atoll Council (2019a). *Land Use Plan. Dh. Rin'boodhoo*, Dh. Kudahuvadhoo, Secretariat of South Nilandhee Atoll Council.
- Secretariat of South Nilandhee Atoll Council (2019b). *Proposed Land Use Plan. Dh. Meedhoo*, Dh. Kudahuvadhoo, Secretariat of South Nilandhee Atoll Council.
- Shaig, A. (2006). *Climate Change Vulnerability and Adaptation Assessment of the Maldives Land and Beaches*. Townsville, James Cook University, Centre for Disaster Studies.
- Suppasri, A., Goto, K., Muhari, A., Ranasinghe, P., Riyaz, M., Affan, M., Mas, E., Yasuda, M., Imamura, F., (2015). A Decade after the 2004 Indian Ocean Tsunami: The Progress in Disaster Preparedness and Future Challenges in Indonesia, Sri Lanka, Thailand and the Maldives. *Pure and Applied Geophysics*, 172 (12), 3313-3341.
- Transparency Maldives (2019). *Review of the decentralization framework in the Maldives*. http://transparency.mv/v16/wp-content/uploads/2019/08/RDFM_ENG_FINAL-for-Website.pdf
- Titus, J.G. and Narayanan, V. (1996). The risk of sea level rise. *Climatic Change*, 33 (2), 151-212.
- Trundle, A., Barth, B., & Mcevoy, D. (2019). Leveraging endogenous climate resilience: urban adaptation in Pacific Small Island Developing States. *Environment and Urbanization*, 31(1), 53–74. <https://doi.org/10.1177/0956247818816654>
- United Nations Development Programme [UNDP] (2006). *Developing a Disaster Risk Profile for Maldives*. <http://www.undp.org/maldives>
- UNDP (2007). *Detailed Island Risk Assessment in Maldives. Executive Summary*, DIRAM team Disaster Risk Management Programme UNDP Maldives. <http://ndmc.gov.mv>
- UNDP (2015). *Country programme document for Maldives (2016-2020)*. New York, Executive Board of the United Nations Development Programme, the United Nations Population Fund and the United Nations Office for Project Services.
- United Nations Economic and Social Commission for Asia and the Pacific [UNESCAP] (2015). *Overview of Natural Disasters and their Impacts in Asia and the Pacific, 1970 – 2014*. <https://www.unescap.org/resources/>

overview-natural-disasters-and-their-impacts-asia-and-pacific-1970-2014

UNESCAP (2018). *Leave no one behind. Disaster Resilience for Sustainable Development. Asia-Pacific Disaster Report 2017*. Bangkok, UN.

United Nations International Strategy for Disaster Reduction [UNISDR] (2009). *Terminology on Disaster Risk Reduction*. Geneva, UNISDR.

Waheed, M., Shakoor, H. A. (2014). The impact of the Indian Ocean Tsunami on Maldives. In: Brassard, C., Giles, D. W., Howitt, A. M. (eds.). *Natural Disaster Management in the AsiaPacific. Policy and Governance*. Singapore, Springer.

Watson, R.T., Zinyowera, M.C., Moss, R.H. (eds.) (1997). *The Regional Impacts of Climate Change: An Assessment of Vulnerability. Report*. Cambridge, Cambridge University Press.

Weichselgartner, J., Kelman, I. (2015). Geographies of resilience: Challenges and opportunities of a descriptive concept. *Progress in Human Geography*, 39 (3), 249–267.

World Bank, Asian Development Bank and UN System (2005). *Maldives Tsunami: Impact and Recovery, Joint Needs Assessment*. Malé, Maldives, World Bank, ADB and United Nations.

Yohe, G. (1991). Uncertainty, Climate Change and the Economic Value of Information: An Economic Methodology for Evaluating the Timing and Relative Efficacy of Alternative Responses to Climate Change with Application to Protecting Developed Property from Greenhouse Induced Sea Level Rise. *Policy Sciences*, 24, 245-269

Zhou, H., Wang, J., Wan, J., Jia, H. (2010). Resilience to natural hazards: a geographic perspective. *Natural Hazards*, 53, 21–41. <https://doi.org/10.1007/s11069-009-9407-y>