

Adapting infrastructure to changing climatic conditions: The case of the Philippines

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Adapting infrastructure to changing climatic conditions: the case of the Philippines

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Executive Summary

Infrastructure has been essential in supporting the Philippines' rapidly growing economy. Yet, infrastructure assets and operations are significantly exposed to climate-related risks. Building climate resilience into infrastructure planning and financing is therefore an important strategic objective. The Philippine Development Plan (PDP), which places infrastructure enhancement at the core of the country's development agenda, recognises climate resilience as a key strategic priority. The "Build Better More" infrastructure investment programme aims to inject USD 243 billion for the development of critical infrastructure over the period 2023-2028 as part of its six-years Public Investment Programme. These initiatives represent a unique opportunity to weave climate resilience into the fabric of infrastructure networks and to securely shift the country onto a more resilient development pathway.

The number of policies that foster the integration of climate resilience in the development and operation of infrastructure are increasing. The risk assessment capacity of national and local governments has significantly improved with the proliferation of tools and platforms. The delineation of no-build zones, together with technical codes have facilitated the consideration of climate resilience in the design and construction of infrastructure. Specific criteria to foster the consideration of climate resilience in the selection of major infrastructure projects have also been developed. Certain economic sectors – such as the water sector – have made climate resilience a key strategic priority, setting a positive example for others to follow.

Nevertheless, the absence of a consensus and standards regarding what constitutes climate resilient infrastructure hinders its more systematic integration into infrastructure planning. The proliferation of various tools and approaches creates confusion about which methods to use for assessing climate risks and implementing adaptive measures. Furthermore, the lack of universal standards makes it challenging to evaluate the climate resilience features of infrastructure projects. Finally, a lack of technical capacity may also slow down the adoption of adaptation measures. For example, while stakeholders in water and social infrastructure have expressed interest in developing nature-based solutions to enhance the resilience of their infrastructure, many are unsure about the benefits, nature, and practical implementation of such solutions.

The level of awareness varies across infrastructure sectors. The water sector, for instance, is quite advanced in mainstreaming climate resilience and prioritises efforts to expand the adoption of nature-based solutions to bolster infrastructure resilience and improve access to funding. The energy sector prioritises the development of standards. In contrast, the information, communication, and technology (ICT) sector, primarily driven by private stakeholders, indicates a need to align sectoral goals with national objectives more effectively. The transport sector emphasises the importance of the strategic allocation of existing funds. Lastly, the social sector underscores the significance of project prioritisation based on risk assessment.

The National Economic and Development Authority (NEDA) plays a crucial role in advancing climate resilience in infrastructure planning and development. NEDA oversees the elaboration of the PDP, laying out the key infrastructure objectives for the next six years and hence guiding the design of infrastructure projects. In addition, NEDA reviews and approves the financing of the most strategic infrastructure projects

nationwide, thereby having an influential role in the integration of climate resilience criteria in the selection of these projects.

To support NEDA in its key role in guiding future infrastructure planning and development across all sectors, an action plan is suggested, which revolves around five pillars:

- **Development of common guidelines:** The formulation of guidelines and the design of a climate resilient infrastructure label can support both NEDA and infrastructure practitioners effectively.
- **Capacity building:** To operationalise such guidelines, it is important to focus on capacity building programmes for planners and practitioners throughout the infrastructure life cycle.
- **Streamlined infrastructure assessment processes:** The Infrastructure Committee, which is in charge of reviewing and approving the main investment programming, such as the major national infrastructure projects can integrate climate resilient criteria to appraise and approve projects.
- **Creation of a dedicated agency:** Creating an independent agency or a unit within NEDA to certify infrastructure projects approved by the Infrastructure Committee, responsible for reviewing and approving the main investment programming would be a useful vehicle to encourage climate resilience building across all infrastructure sectors.
- **Aligning financing with resilience building objectives:** Clear climate resilient indicators in the PDP can provide tangible arguments to facilitate budget allocation to climate resilient infrastructure. In addition, measures to further incentivise private stakeholders to consider climate resilience in their investments is essential to advance climate resilience within infrastructure development efforts.

1. Mainstreaming climate resilience in infrastructure

1.1. Objectives of the study

The OECD's Sustainable Infrastructure Programme in Asia (SIPA) programme supports countries in Central and South-East Asia to improve the quality and sustainability of new and existing infrastructure. One of its pillars focuses on the mainstreaming of climate resilience in infrastructure development and financing. To this end, country-specific reviews are carried out to facilitate a policy dialogue on integrating climate resilience in infrastructure. This paper documents the findings of the work carried out in the Philippines, where the OECD partnered with the Philippines' National Economic Development Agency (NEDA) to facilitate a dialogue among national and subnational, governmental, and non-governmental stakeholders that play a key role in infrastructure development, planning, and investment. The project was structured around a national dialogue led by NEDA to inform the development of the Philippine Development Plan (PDP) 2023-2028, which included the development a roadmap of accompanying implementing measures and performance targets.

To support the national policy dialogue in the Philippines, the OECD carried out an in-depth assessment of the enabling environment for climate-resilient infrastructure in the country, identifying challenges and opportunities for improvement in the existing policy, regulatory, institutional, and financing frameworks to mainstream climate resilience in infrastructure planning and investment. The assessment was informed by desk research as well as by questionnaires, workshops (Annex B) and bilateral stakeholder interviews. This country-wide, cross-sector assessment was complemented by four sectoral deep dives focusing on energy, connectivity (i.e both transport and information, communication, and technology), water, and social infrastructure. The results of this state-of-play assessment then informed a series of multi-stakeholder workshops organised in the Philippines in June and July 2023. During these workshops, the relevance of the PDP, the level of ambition to be pursued in each of the sectors, and the measures needed to address existing bottlenecks were discussed. This paper summarises the main findings and recommendations of this work.

1.2. Making the case for climate-resilient infrastructure

Infrastructure plays a pivotal role in driving the development of the Philippines. With a rapidly growing population and economy across an extended archipelago, the country faces unique challenges that demand a modern and well-connected infrastructure network. However, the Philippines still struggles with the provision of infrastructure that are adequate in coverage and quality (Climate Change Commission, 2010^[1]). This challenge is particularly felt in urban areas, where the Philippines experiences one of the highest urban growth rates in the world (Global Facility for Disaster Reduction and Recovery, 2011^[2]).

One of the key challenges facing the infrastructure sector in the Philippines is the growing threat posed by climate change. With an average of twenty typhoons every year, the Philippines' territory is located in the

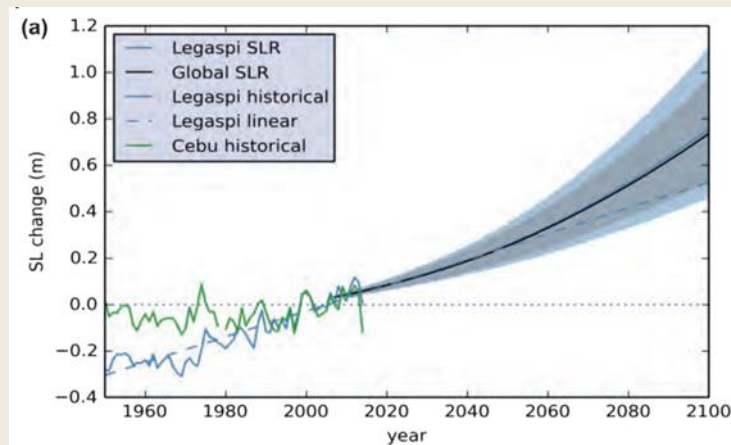
world's most active tropical cyclone area and is also exposed to a wide array of other climate hazards, including extreme precipitations, floods, landslides, droughts and sea-level rise (Climate Change Commission, 2010^[1]; Climate Change Commission, 2011^[3]) (Box 1.1). Average temperatures have increased by 0.65°C between 1951 and 2010, sea-level has increased by 0.15 metres between 1940 and 2017 (USAID, 2017^[4]). These trends are projected to keep increasing under climate change.

The growing incidence of extreme weather events can damage physical assets, disrupt operations, and thereby increase economy-wide disruptions, underscoring the need to strengthen adaptation to climate change. This was most evident during Typhoon Rai (locally known as Odette) in 2021, which affected 11 million people and generated USD 557 million in infrastructure damages (National Disaster Risk Reduction and Management Council, 2022^[5]) as well as during Typhoon Ketsana (locally known as Ondoy) in 2009, when water pumping infrastructure in Metro Manila proved unable to manage the exceptional volumes of stormwater (Climate Change Commission, 2011^[3]). Overall, typhoons and other climate-induced extreme and slow-onset events such as sea-level rise that can threaten port facilities, take a significant toll on infrastructure assets every year, with trickle-down effects on power distribution, business continuity and supply chains, as well as on emergency response operations and on the very ability of whole communities to bounce back after each disaster.

Box 1.1. The growing challenges posed by climate change in the Philippines

The frequency and intensity of extreme events in the Philippines have increased over the past decades and are projected to keep increasing under climate change. By the end of the century, average temperatures are projected to increase by up to 2.9°C (under a high-emission scenario, with reference to the 1986-2005 period), while heatwave risk is projected to increase by 52–76% under both moderate- (RCP 6.0) and high-emission (RCP 8.5) scenarios. The region of Mindanao is projected to be particularly exposed to long-lasting heatwaves already by 2050. Precipitation patterns are projected to become more variable with increases in rainfall during the southwest monsoon season in Luzon and the Visayas and annual rainfall levels potentially doubling in Metro Manila. Conversely, rainfall is projected to decrease by up to 11% in Mindanao, the country’s food basket. High-intensity typhoons are likely to become more frequent, with their annual impacts potentially increasing by up to 35% by 2050, while sea-level rise is projected to increase by up to 0.65 metres by 2100, exposing about one million Filipino people to coastal flooding.

Figure 1.1. Observed and projected sea-level rise in the Philippines, 1960-2100



Note: The chart represents tide gauge observations and projections of the changes in sea levels.
Source: (Pagasa, 2018^[6]).

1. The growing risks posed by climate change underline the need to build infrastructure that is resilient to the risks and impacts posed by climate change. Climate-resilient infrastructure describes infrastructure assets and networks that are “planned, designed, built and operated in a way that anticipates, prepares for, and adapts to changing climate conditions” (OECD, 2018^[7]). By incorporating climate resilience in their design and operation, climate-resilient infrastructure can withstand, respond to, and recover rapidly from the disruptions caused by climate change, eventually reducing their severity and avoiding costly repairs and rehabilitation operations. In addition, investing in climate-resilient infrastructure can generate several benefits (OECD, 2018^[7]), including increased asset lifespan and returns and an increased reliability and efficiency in service provision. Hence, climate resilience is a critical strategic element to consider in the development and upgrading of infrastructure networks in the Philippines.

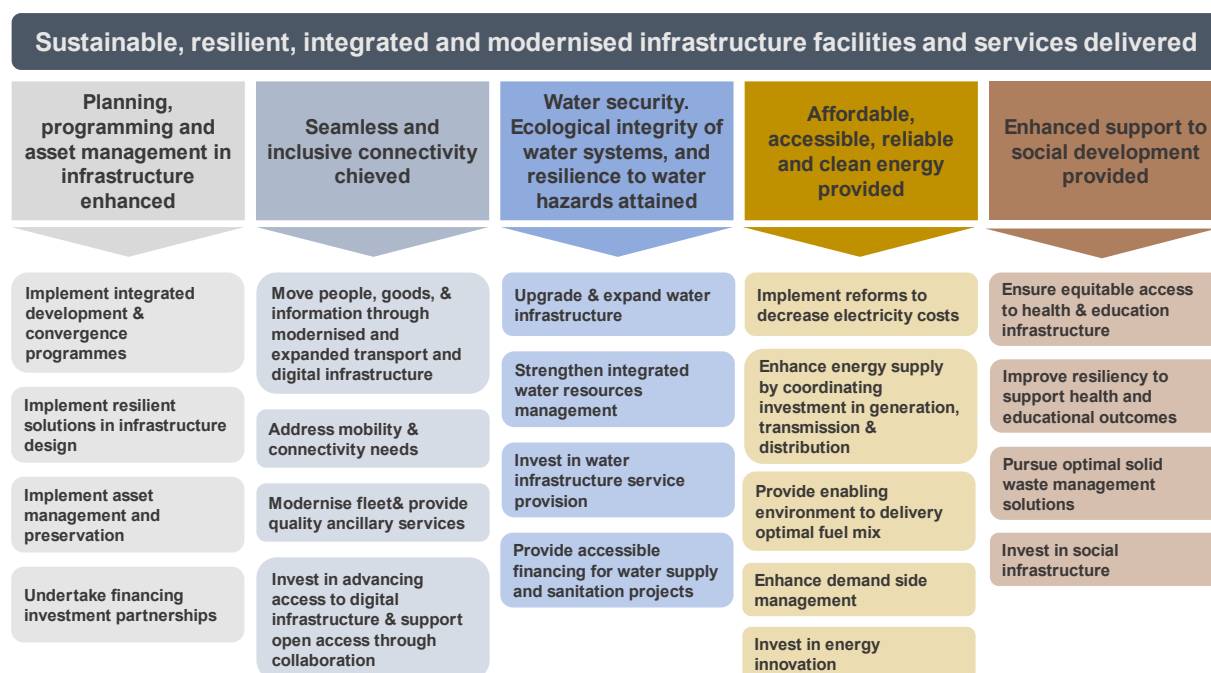
1.3. The new Philippine Development Plan: An opportunity to strengthen climate resilience.

2. The Philippine Development Plan (PDP) is the national blueprint and strategic framework to guide the country’s economic development in the medium term. The plan defines a set of socio-economic targets such as economic growth or reduced poverty incidence, as well as strategies to expand the stock of infrastructure to enable the country’s economic and social transformation.

3. Climate resilience and its mainstreaming in infrastructure planning are an important objective of the new PDP 2023-2028. A chapter of the PDP is dedicated to strengthening climate and disaster resilience across the country’s territory, with a focus on increasing capacities in this field and improving governance to better promote policy co-ordination among sectors. The improvement of data management systems and other tools to support national and local decision-makers are also recognised as pivotal to support such objectives. In parallel, another chapter of the Plan is dedicated to the upgrade and expansion of the existing stock of infrastructure (Figure 1.2). This chapter highlights the objective to mainstream climate resilience in the infrastructure sector, with a view to better absorbing economic shocks, and thus reducing the resulting financial impacts. The infrastructure chapter of the plan specifically focuses on four economic sectors, setting specific objectives on infrastructure quality, development and resilience (Republic of the Philippines, 2023^[8]).

4. Overall, the PDP is an important entry point to facilitate climate resilience mainstreaming in infrastructure planning. The policy objectives outlined in the plan – and most notably those concerning infrastructure – establish a management framework for the country’s major infrastructure projects and guide local and national stakeholders in prioritising their investments. As NEDA is currently elaborating target indicators to monitor the implementation of the plan, there is a unique opportunity to translate the ambition laid out in the PDP into specific targets.

Figure 1.2. The strategic framework of the PDP 2023-2028



Source: Based on (Republic of the Philippines, 2023^[8]).

5. The centrality and cross-cutting references to infrastructure in the PDP demonstrate the government's willingness to place infrastructure enhancement at the core of the country's development agenda. Infrastructure has long been acknowledged as an important driver of economic development in the Philippines, with public spending on infrastructure assets growing from 2.6% of GDP in 2013-2016 to 4.6% in 2017-2019 (Republic of the Philippines, 2023^[8]). Infrastructure investments are set to remain stable around 5-6% of GDP in the period 2023 and 2028, with an average investment of USD 20-40 billion every year (Republic of the Philippines, 2023^[8]). Such investments reflect the "Build Better More" infrastructure programme¹ (Box 1.2), with a view to enhancing the Philippines' infrastructure stock, quality, and resilience.

Box 1.2. Infrastructure Flagship Projects (IFPs) under the "Build Better More" infrastructure programme

6. The "Build Better More" infrastructure programme is the infrastructure investment programme of the current government in the Philippines. The programme aims to deliver critical infrastructure projects, increasing quality of life and economic development through better connectivity, jobs and business opportunities for millions of Filipinos. As such, the programme places infrastructure at the core of the country's development agenda, framing infrastructure as a catalyst for social and economic transformation. The programme builds on the success of the "Build, Build, Build" infrastructure investment programme of the previous administration. As approved by the NEDA Board in February 2024, the updated IFPs list contains 185 flagship infrastructure projects spanning across different infrastructure sectors, with a total investment requirement of USD 148 billion. The government aims to develop these projects in co-operation with the private sector by crowding in private finance and developing public-private partnerships.

Source: (Republic of the Philippines, 2023^[8])

7. The PDP also identifies resilience to climate change as a key enabler of socio-economic development. The government aims to scale up its efforts on strengthening climate and disaster resilience throughout the territory by developing the adaptive capacity of the country. Planned actions include

- Improving data and risk assessments to enable evidence- and scenario-based planning.
- Enhancing preparedness and response mechanisms, as well as early-warning systems and protocols to protect critical infrastructure.
- Enhancing support to local governments – and especially vulnerable or low-income municipalities – which are on the frontline in service provision, climate adaptation, and disaster risk reduction.
- Improving policy and regulatory capacity and co-ordination across sectors and levels of government, including by more clearly allocating roles and responsibilities and encouraging policy convergence and a comprehensive risk management approach (Republic of the Philippines, 2023^[8]).
- Raising public risk awareness, partnering with the private sector, and developing skills and capacity in the context of local disaster risk reduction plans and local climate change action plans.

8. Overall, climate change is recognised as a key threat to the country's infrastructure provision and operation. Hence, mainstreaming climate resilience in the country's infrastructure is deemed essential to reduce asset vulnerability to climate change and ensure service reliability and cost-effectiveness.

¹ <https://neda.gov.ph/build-better-more-infra-program-to-further-propel-ph-economy-neda/>

2. Strategic framework

2.1. Infrastructure resilience as a key priority in the national climate change policies

9. The Philippines has demonstrated an unwavering commitment to addressing the challenges posed by climate change through a whole-of-society approach thanks to coordinated actions and partnerships across government and non-government entities, including local communities.

10. At government-level, coordinating agencies, such as the Climate Change Commission (CCC), foster the integration of climate considerations and contribute to the elaboration of plans and strategies that lay the foundations for climate resilience mainstreaming. The Climate Change Commission is the lead policy-making body of the government, tasked to coordinate, monitor, and evaluate the programs and action plans of the government in order to ensure the mainstreaming of climate change into the national, sectoral, and local development plans and programmes. (Philippines' Congress, 2009^[9]) (World Bank Group & Asian Development Bank, 2021^[10]) (Climate Change Commission, 2011^[3]). Operating under the Office of the President and chaired by the President himself, the CCC plays a central role in shaping the country's climate agenda, ensuring that climate action permeates all aspects of governance and development and that the interventions of different agencies and institutions are aligned (Global Facility for Disaster Reduction and Recovery, 2011^[2]) (Republic of the Philippines, 2014^[11]).

11. The National Framework Strategy on Climate Change 2010-2022 elaborated by the CCC represents the cornerstone of all climate adaptation policies in the Philippines. It establishes the objective of enhancing the climate resilience of people, economies and ecosystems and of strengthening adaptive capacity through interventions that anticipate and minimise climate risks and impacts (Climate Change Commission, 2011^[3]). It defines a risk-based approach for climate change decisions and policies on potential climate impacts and focuses on adaptation as the anchor strategy, with mitigation being pursued as support to adaptation efforts. In addition, the National Climate Change Action Plan (NCCAP) for the period 2011-2028, outlines the country's long-term program and strategies for climate change adaptation and mitigation and promotes climate change policies across all sectors and levels of governments. It will soon be updated using iterative results and practical evidence from the implementation of the Nationally Determined Contribution (NDC) and National Adaptation Plan (NAP) (Climate Change Commission, 2011^[3]) (World Bank Group & Asian Development Bank, 2021^[10]). The NCCAP recognises that certain activities cut across strategic priorities and sectors. Thus, this plan prioritises implementation mechanisms and financing, which require convergence planning across national sectoral agencies to support vulnerable communities and de-risk investments (Climate Change Commission, 2011^[3]).

12. Climate resilient infrastructure has been clearly identified as a priority by existing national climate strategies and plans. The National Framework Strategy on Climate Change as well as the National Climate Change Action Plan provide objectives and key results indicators to integrate climate resilience in infrastructure planning and programming, as they acknowledge both the role of infrastructure to support the economic development of the country and their vulnerability. Referred as climate-proofing infrastructure, these strategy and plan underline the importance to consider climate information to plan energy and transport infrastructure, the replacement of specific material by resilient one, or construction to

strengthen the resilience of water and agriculture infrastructure faced with climate risks (Climate Change Commission, 2010^[11]).

13. A National Climate Risk Management Framework was also adopted to address intensifying adverse impacts of climate change. The objective is to provide a guidance to “harmonise and integrate various efforts of sectors and stakeholders on climate risk management, and to strengthen the country’s early warning system” (Climate Change Commission, 2019^[12]). For instance, this framework will provide guidance on climate risk assessment with the generation of localised baseline scenarios. Among the activities identified in the Framework, the CCC launched an initial stock-take survey in 2022 of available climate risk information, tools and methodologies to assess the gaps and needs and elaborate a set of minimum acceptable standards for climate risk data and climate risk assessment methodologies.

14. Finally, the CCC contributes actively to ensuring that climate change is integrated into infrastructure planning through various activities such as capacity building and training sessions for local government units to support them in the elaboration of local climate change action plans (Global Facility for Disaster Reduction and Recovery, 2011^[2]). The CCC contributes to the submission of priority programmes and projects for inclusion in investment programming documents such as the Public Investment Programme, and the Infrastructure Flagship Projects under the Build Better More Investment Programme. In addition, the CCC launched the People Survival Fund in 2012, i.e. a dedicated fund to support climate change adaptation by allocating a share of the national budget to the adaptation needs of local governments (World Bank Group & Asian Development Bank, 2021^[10]).

2.2. Aligning disaster risk management and climate resilience policies for infrastructure.

15. Due to its exposure to extreme and recurrent extreme events, the Philippines has also a well-established framework for managing natural hazards through Disaster Risk Reduction Management (DRRM). This tradition dates back to the Civil Defense Act of 1954 and the creation of the National Disaster Coordinating Council in 1978. In 2010, the Disaster Risk Reduction and Management Act shifted the focus from disaster response to prevention, which thereby increases linkages with climate change adaptation. The National Disaster Risk Reduction and Management Council (hereafter “the Council”) represents a national body in charge of guiding, supervising, and co-ordinating disaster management across in the country. The Council comprises governmental, non-governmental, civil society, and private sector entities operating in the Philippines. The Council formulates strategies and oversees disaster communication, disaster preparedness (e.g. alert systems), emergency response (e.g. evacuation and rescue operations), and post-disaster rehabilitation. Besides, the Council is also tasked to provide advice, proposals, and recommendations to the President on existing government efforts falling in its sphere of competence, including on the allocation of calamity funds. It can also provide advice concerning the declaration of the state of emergency (Department of Budget and Management, 2023^[13]).

16. In recent years, there has been a growing focus on aligning climate change adaptation and disaster risk reduction (DRR) instruments and interventions. Most notably, the core policy frameworks and plans in the field – including the Climate Change Act and the National Climate Change Action Plan for Climate Change Adaptation and the Disaster Risk Reduction and Management Act and National Disaster Risk Reduction and Management Plan – have been developed with a view to reinforcing their convergence, with aligned objectives, mutual recognition, and converging timeframes for implementation (International Federation of Red Cross and Red Crescent, 2021^[14]) (UNDRR, 2021^[15]). The Council has approved a National Disaster Risk Reduction and Management Plan for 2020-2030, which acknowledges the links between disaster risk reduction management and climate change adaptation, with the aim of strengthening the resilience of the country to all disasters, including extreme weather events (National Disaster Risk

Reduction and Management Council, 2019^[16]). Mainstreaming disaster resilience in infrastructure planning is one of the objectives of this plan.

17. To further harness the links between climate change adaptation, mitigation and disaster risk reduction a joint body reduction, a joint body called the Cabinet Cluster on Climate Change Adaptation, Mitigation, and Disaster Risk Reduction (CCAM-DRR) was established in 2011. The CCAM-DRR, chaired by the Department of Environment and Natural Resources (DENR), brings together 24 key government agencies and departments to collaborate on policies, strategies, and actions that enhance the country's resilience to climate-related hazards and natural disasters². The line ministries responsible for infrastructure planning, the elaboration of sectoral masterplans and policies or even the construction of infrastructure are all represented in this Cluster. This Cluster works to enhance the capacity of government agencies, local governments, and communities to prepare for and respond to climate-related disasters. This may involve training programs, knowledge sharing, and the dissemination of best practices. The cluster also helps allocate resources and funding for climate change and disaster risk reduction initiatives. For instance, the Cluster undertook the elaboration of resilience roadmaps for 12 vulnerable areas, covering several items such as the supply of natural resources, knowledge of climate and disaster risks but also the increased resilience of critical infrastructure (Cabinet Cluster on Climate Change Adaptation, Mitigation and Disaster Risk Reduction, 2018^[17]). Such structure emphasises the importance given to a comprehensive approach for climate policies in the Philippines.

18. However, the Climate Change Commission, the Office of Civil Defense and the CCAM-DRR entities function primarily in an advisory and monitoring capacity. Consequently, while they can offer valuable frameworks, strategies, and support to government agencies, they are not directly tasked with implementation. The responsibility for implementation rests with the respective line ministries, including the Departments of Energy, Transportation, Agriculture, Environment and Natural Resources and Public Works and Highways (DPWH), among others. These ministries are charged with spearheading the development of their respective sectors and delineating key priorities.

2.3. Consideration of climate resilience in infrastructure across sectors

19. All national agencies and ministries are guided by the objectives of the PDP, which lays out the nation's overarching development goals (Republic of the Philippines, 2023^[8]). This plan is developed through a collaborative effort overseen by NEDA, the lead agency responsible for socio-economic planning within the Philippine government. In its capacity as the co-ordinating entity, NEDA also plays a pivotal role in fostering the mainstreaming of climate resilience by incorporating specifically related objectives in the plan.

20. Beyond elaborating the PDP, NEDA is responsible for policy and planning, investment programming, and project evaluation and monitoring. The NEDA Board, which is chaired by the President of the Philippines, has identified and approved the updated list of Infrastructure Flagship Projects, which are game-changing, transformative, and urgently needed infrastructure projects of national significance that aim to showcase the government's ongoing efforts in pushing the infrastructure agenda of the Administration. The Build-Better-More programme aims at investing up to USD 148 billion for infrastructure development over the next decade. It encompasses projects, from various sectors, such as airports, railways, roads, bridges, water resources, irrigation systems for agricultural enhancement, and flood control facilities (National Economic and Development Authority, 2023^[18]).

² <https://climate.gov.ph/our-story/secretariat/cabinet-cluster-on-climate-change-adaptation-mitigation-disaster-risk-reduction>

21. Although NEDA can promote climate resilience directly for the projects it approves as part of the Build-Better-More programme, the considerable sectoral infrastructure investments remain outside of NEDA's direct control. Different lead agencies in each sector, or their private counterparts are in charge of identifying, prioritising, and preparing their infrastructure projects. These projects' volume are equivalent to 28.6% of the proposed total national budget dedicated to capital outlays in 2024 (Department of Budget, 2024^[19]) (National Economic and Development Authority, 2023^[18]), making a large share of the infrastructure projects be in the hands of these lead agencies. It is therefore important that sectoral plans and policy directives highlight climate resilience in infrastructure.

22. The strategic consideration of climate resilience varies significantly across sectors (Table 2.1). For instance, the water sector has made climate resilience as one of its key objectives whereas the information and communications technologies (ICT) sector does not address climate risks at all in its masterplans. Such heterogeneity could result from the emphasis put in the National Climate Change Action Plan on the risks induced by climate change on water infrastructure or energy infrastructure.

Table 2.1. Consideration of climate resilience in sectoral plans

Sector	Plans and Policies	Climate resilience considerations
Transport	National Transport Policy: Provision of transport infrastructure, facilities and services Forthcoming Master plan: Guidance to develop an intermodal transport infrastructure network.	Climate risks must be considered in the development of transport infrastructure
Information, Communication and Technology	National Broadband Plan for the deployment of fiber optic cables and wireless technologies Launch of the National Emergency Communications Plan and the Early Warning Broadcast System	No mention of climate resilience.
Energy	Philippine Energy Plan Power Development Programme 2020-2040	Specific references to resiliency in transmission and distribution (e.g., provisions for typhoons, restoration of power supply following catastrophic incidents, contingency plans...).
Water	The Philippine Water Supply and Sanitation Master Plan 2019-2030: the national action plan for universal access to safe, sufficient, affordable, and sustainable water supply, hygiene, and sanitation The National Water Security Roadmap : national action plan to ensure water security in the short to long term. Key actions related to resilient water infrastructure, drainage and flood control Integrated Water Resources Management Plans: main planning document to manage water resources. Climate resilience mainstr	Multiple references to climate resilience, including quantitative objectives and dedicated funding. Provisions for NEDA to check the integration of climate considerations in water supply and sanitation projects
Social infrastructure	The Basic Education Development Plan 2030 The Philippine Health Facilities Development Plan 2020-2040 The National Urban Development and Housing Framework and the 2040 National Housing and Urban Development Sector Plan	87% of the local government units in charge of urban and land use planning, have climate adaptation plans, suggesting that climate considerations are included in infrastructure projects led by the LGUs. Climate considerations in DPWH policies

23. Where sectoral plans include climate resilience, this often lacks clear and concrete objectives. This assessment was confirmed by answers to the OECD survey, which revealed that most agencies did not know of specific climate resilience goals in sectoral plans. For instance, 85% of the respondents from the transport's sector were not aware of any policy or directive on climate resilience although it exists (Table 2.1) to require climate resilience.

24. Finally, the Department of Public Works and Highways (DPWH) also plays an indispensable role in mainstreaming climate resilience into infrastructure planning. As the primary engineering and construction arm of the government, DPWH is entrusted with planning, designing, constructing, and maintaining critical infrastructure such as flood control measures, roads but also some social infrastructure. In 2023, 77.83% of climate adaptation finance tagged (see Section 3.) was allocated to DPWH for flood control infrastructure projects, making it a major contributor of climate-resilient infrastructure (Climate Change Commission, 2023^[20]).

2.4. The crucial role of the local governments in fostering climate-resilient infrastructure

25. Local governments have been a cornerstone of the Philippines' whole-of-government approach to mainstream climate policies. The Local Government Code of 1991 provided significant political and fiscal autonomy to local government units (LGUs), which are recognised as the frontline service providers and as the managers of local economic development within their respective jurisdictions. LGUs are responsible for infrastructure providing access to basic services such as health care, or social welfare, such as school buildings, health centres, drainage and sewerage but also infrastructure to service the needs of residents such as roads and bridges, waterworks, flood control or irrigation systems.

26. The NCCAP and the National Disaster Risk Reduction and Management Plan also recognise the key role of LGUs in strengthening resilience to climate change (OECD, 2020^[21]). LGUs are responsible for planning, implementing, and responding to climate impacts. They can formulate climate risk assessment building on data provided by the Department of Science and Technology. They can then disseminate information at local level, raise public awareness, assess vulnerability, and develop and implement their own local climate change action and disaster risk reduction and management plans (Climate Change Commission, 2010^[1]) (Climate Change Commission, 2011^[3]). Besides, the Local Government Code also mandates that all cities and municipalities develop a comprehensive development plan (i.e., a socio-economic plan) as well as a comprehensive land-use plan. Both should theoretically integrate climate considerations. According to the CCC, in 2024, 87.2% of the 1715 local government units had elaborated a local climate change action plan.

27. LGUs are supported by national line agencies, and most notably by the Department of Interior and Local Government (DILG). The DILG provides technical assistance and capacity building on climate adaptation and disaster risk reduction through guidelines, awareness-raising campaigns, and trainings to inform the development of risk-informed planning documents. For example, in 2015, the Local Government Academy, an attached agency to DILG, issued guidelines on mainstreaming climate change adaptation and disaster risk reduction in local development planning, with the objective of informing and guiding LGU action on DRR, climate change and policy planning. Most recently, DILG released the “Operation LISTO” (or “OPLAN Listo”) manual, which aims to guide provinces, cities and municipalities in their disaster risk preparedness and response efforts, with a view to strengthening and standardising local activities and protocols³ (DILG & NDRRMC, 2018^[22]). DILG also plays a role in designing national and local preparedness and response policies and in reinforcing co-ordination across levels of government and contributes to facilitate LGUs' access to funding.

28. LGUs also benefit from the support of other national institutions who provide numerous tools to assess climate risks, support strategic climate resilience planning and build capacity on specific aspects related to infrastructure. For instance, the Office of Civil Defence supports the integration of DRR measures in local DRR plans such as the local comprehensive development plans and the comprehensive land-use

³ <https://www.officialgazette.gov.ph/2015/07/02/oplan-listo-adopted-by-ndrrmc/>

plans (Republic of the Philippines, 2010^[23]). The research community in the Philippines is also actively engaged in supporting capacity development for climate action at LGU level, e.g., through the University of Philippines' Nationwide Operational Assessment of Hazards Center and the Resilience Institute.

29. LGUs are therefore well placed to mainstream climate resilience in development plans, land-use plans and therefore in infrastructure plans. Yet, the workshops and interviews conducted by the OECD highlighted a continued lack of capacity for climate adaptation. This is partly explained by the numerous plans that LGUs are required to develop and implement (i.e. more than thirty regardless of whether they are provinces or barangays) and by limited resources or technical skills (UNDRR, 2022^[24]). For example, not all LGUs can count on a local technical or engineering office. Implementing existing plans and updating them on the basis of new information is also a key challenge at local level. The limited consistency and standardisation of existing tools for climate adaptation and DRR also hampers their uptake at local level (Republic of the Philippines, 2023^[8]). In addition, the interviews revealed a lack of funding, as its availability depends on the size and revenue generated by the LGUs that do not necessarily reflect their actual exposure to climate impacts. Besides, while some minimum requirements exist, the guidelines and checklists provided to LGUs by national agencies such as DILG are in most cases not mandatory. Overall, the high level of institutional decentralisation – which often does not go hand in hand with sufficient resources and co-ordination efforts – often results in siloed dispersed interventions and in the incomplete uptake and implementation of climate policies (World Bank Group, 2022^[25]) (UNDRR, 2022^[24]).

30. Recent reforms to further increase autonomy of LGUs have been scaled back about doubts of LGU's absorptive capacity. In 2018, the Supreme Court of the Philippines passed the *Mandanas-Garcia* ruling to expand the share of the national government revenue allocated to LGUs in the Philippines. While the *Mandanas-Garcia* ruling increased the financial autonomy of LGUs and provided additional budgets for the development of local projects, the limited capacity of LGUs to absorb such funds remains a key challenge.

➤ *Towards an action plan: Faced with capacity challenges, the responsibilities of LGUs could be revised to better consider the size and difficulties met by smaller LGUs such as barangays. This could be done through granting further role to the provinces who can in turn support smaller levels of LGUs in their activities (Actions 12, 13 and 14, Action plan)*

2.5. Mobilising the private sector to ensure climate resilience mainstreaming in key sectors.

31. The private sector's role in infrastructure development and operations has grown significantly. The important infrastructure financing needs and the role of economic competition in markets, such as those for the energy or telecommunications, have carved out an important role for the private sector. The private sector contributes to filling the infrastructure financing gap with many Private-Public Partnership (PPP) projects in the energy, connectivity, water and social sectors (e.g., expressways, airports, hospitals...). In 2024, 45 projects accounting for 27.8% of the estimated investment requirements are expected to be funded through PPPs, accounting for more than 30% of the total cost of projects.

32. It is important to engage with the private sector to ensure climate resilience building in infrastructure. Private infrastructure stakeholders are either regulated or guided by line ministries. These line ministries can play a role in ensuring the climate resilience of the infrastructure planned, built or operated by the private stakeholders. For instance, the Department of Energy launched a taskforce on resilience in 2018 aiming at co-ordinating all stakeholders, most of them private companies, to ensure energy resiliency.

33. The Private-Public Partnership Center (PPPC) has taken numerous measures to facilitate the consideration of climate resilience in PPP projects, including the development of clear safeguards. The

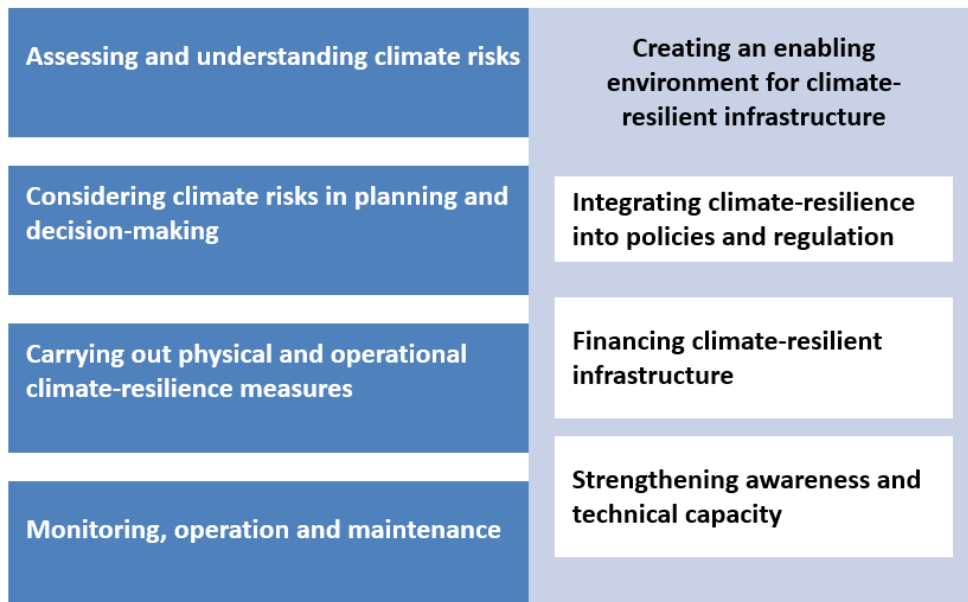
PPPC, which is the central co-ordinating and monitoring agency for public-private partnership (PPP) projects within the country, assists local governments in preparing projects, clarifying procedures, and evaluating PPP projects as well as providing training and capacity building programmes, and financing for pre-investment process for potential PPP projects. It recently launched a PPP strategy for local governments including the preparation and dissemination of a PPP manual for local governments. In addition, the private sector is guided by a solid public-private partnership framework law and can benefit from a well-established experience in the implementation of PPPs in the country (World Bank Group, 2022^[25]). The PPPC has also issued safeguards that encompass climate hazard resilience, requiring assessments and risk management plans, as well as business continuity plans if applicable, thereby reinforcing climate resilience as a key criterion in project selection. Additionally, the PPPC revises its PPP Framework to incorporate economic indicators and climate resilience into project development processes. Finally, a dedicated PPP Act is currently being drafted.

34. Strategic efforts pursued by the PPPC might soon produce results through the implementation of pilot projects. At local level, the Department of Environment and Natural Resources and the PPPC developed investment portfolios for risk resilience involving twelve provinces and four cities. These portfolios consist of potential PPP projects in the sectors of water supply and sanitation, solid waste management, renewable energy, health, flood control and drainage, green buildings. These potential projects will be developed, evaluated, and packaged by the PPPC under PPP arrangements. The assistance to LGUs will include formulation of resilience roadmaps, advice on climate resiliency measures, climate change vulnerability assessment, land-use and development planning and GIS. PPPC will also prepare an Assessment Tool to include climate change and resilience in the evaluation criteria for PPP projects being submitted to the approving bodies, such as the NEDA Investment Coordination Committee.

3. Policies and tools to mainstream climate resilience in infrastructure planning and development

35. Section 2. demonstrated that the importance of climate resilient infrastructure is increasingly recognised as a strategic development priority. The broader PDP as well as the sectoral infrastructure development strategies integrate climate resilience building as a priority objective. The following sections will summarise findings on how these priorities are translated into practice on the ground. It will do so by looking at each of the core steps of the climate resilient infrastructure planning and implementation process (Figure 3.1). First and foremost, this starts by assessing current and future risks to infrastructure assets under climate change. This is followed by integrating climate risks in infrastructure planning and decision-making. Supported by adequate financing means and matched with appropriate technical capacity, it then involves implementing measures to strengthen the climate resilience of assets. Last, but not least, monitoring infrastructure projects over time is important to adjust operation and maintenance measures to evolving climate risks.

Figure 3.1. The steps of building climate resilient infrastructure



Source: OECD, forthcoming.

3.1. Climate risk assessment at the planning, designing and construction stages

36. Climate risk assessments play a fundamental role in informing policy development and infrastructure planning and management. Reliable and sufficiently downscaled information on hazards, exposure and vulnerabilities is required to inform infrastructure planning, as well as the design, operation, maintenance and retrofitting of assets. As new risks are likely to emerge over time, the analysis of climate risks must be an iterative process that monitors the evolution of risks. Such approach will allow to measure progress on existing climate adaptation measures and implement actions to ensure climate resilience in the long term (OECD, 2015^[26]). Yet, the lack of consideration of climate change scenario in hazard maps also represents a key challenge (Republic of the Philippines, 2023^[8]).

37. There has been steady progress in the Philippines in responding to climate and disaster related information needs. The Department of Science and Technology, and its two agencies the Philippine Atmospheric, Geophysical and Astronomical Services (PAGASA) and the Philippine Institute of Volcanology and Seismology (PHIVOLCS) have created a series of tools and applications to support communities, decision makers and infrastructure stakeholders to assess possible disaster risks, including both extreme weather events and geophysical events. In 2018, the Department of Science and Technology launched GeoRisk, a platform for sharing data and developing analysis across agencies. GeoRisk is intended to be the Philippines' central source of information for accurate and efficient hazards and risk assessment (Box 3.1). In parallel, PAGASA provides access to climate projection data (e.g. on wind and rainfall patterns) at national and local level and has implemented an early-warning system for specific hazard such as cyclones or floods.

38. At national level, climate risk assessment is reported by many stakeholders with doubts on the breadth of such assessment. The OECD questionnaire (see Questionnaire and list of stakeholders in Annex B) conducted among the different sectors and implementing agencies at national level revealed that climate risk assessments are performed by 60% of the respondents. However, the survey shows that there remains some confusion on what climate risk assessment should entail. For instance, some agencies mention climate risks assessment but focus only on geological risks such as earthquakes. Others consider assessing climate risks, when they consider hazard maps to design infrastructure, without integrating possible changes in magnitude or frequency of these hazards induced by climate change. In addition, climate risk assessments tend to focus on floods or storms and to oversee slow-onset events, reflecting the predominantly reactive nature of risk management in the country.

39. When climate risk assessment is performed, it is not always used for urban or infrastructure planning. At local level, climate risk assessment is very seldom integrated in Local Comprehensive Development Plans (28%) or Comprehensive Land-Use Plans (60%) (Climate Change Commission, 2021^[27]). Among the main challenges identified by infrastructure stakeholders are the lack of information and guidelines to perform climate risk assessment. Different national institutions promote different tools and methodologies for climate risk assessments (Table 3.1). During the workshops conducted in the Philippines, stakeholders also mentioned that it was difficult to access data. While some data are available online, many still require formal letters for actual use/access to files. Finally, the lack of historical hydrometeorological data creates challenges to address the inherent uncertainties in modelled projections.

Table 3.1. Examples of methods and tools for climate risk assessment

Agency	Tools	Description
Climate Change Commission (CCC)	Climate and Disaster Risk Assessment	Training programme proposed by the CCC to support stakeholders in assessing risks by breaking down all the different steps of the climate risk assessment.
Department of Environment and Natural Resources (DENR)	Climate Risk Diagnostic Tool	The Provincial Climate Risk Diagnostic Tool seeks to develop a comprehensive, robust, and accessible data repository and analytics application for provincial local government units, to aid in risk-based planning, decision-making, and investment programming. It provides thematic/sectoral and cross-sectoral risk analysis. The tool will help LGUs come up with climate-risk information in metrics, lists, and graph views
Department of Science and Technology (DOST)	Tools	GeoHunter, Hazard Hunter and other applications created by DOST are meant to automate most of the climate risk and vulnerability assessments. It is available publicly

Source: (UN Habitat, 2023^[28]) (Climate Change Commission, n.d.^[29]) (Department of Science and Technology, n.d.^[30]).

Box 3.1. GeoRisk

40. The objective of GeoRisk is to establish protocols and platforms for disseminating information regarding hazards, exposure, and various risks, with the overarching goal of assisting individuals, communities, local governments, and national agencies in their efforts to prepare for and mitigate the risks associated with natural hazards. The GeoRisk initiative comprises several publicly accessible applications, such as Hazard Hunter or GeoAnalytics, which are free and public tools designed to identify hazards and produce assessment reports detailing exposure levels and the potential impacts associated with specific hazards. Other tools such as GeoMapper that facilitate data collection, or the 3D Philippines information system are only accessible to academia, LGUs and students. In 2023, the Department of Science and Technology was in the process of preparing the launch of "Plan Smart," an innovative tool designed to automate the planning process for LGUs. This tool considers the physical and social profiles of cities, as well as potential hazards, exposure levels, and associated risks. This tool considers the physical and social profiles of cities, as well as potential hazards, exposure levels, and associated risks.

Source: (Department of Science and Technology, n.d.^[30])

➤ *Towards an action plan: The line ministries, infrastructure stakeholders and LGUs can benefit from a unique platform with specific guidelines on the choice of climate scenario, the use of information to assess climate risks homogeneously across the country (Action 1, Action plan)*

3.2. Planning and designing infrastructure projects

Considering climate resilience in projects selection and approval processes

41. The criteria employed in the selection of the "Build-Better-More" flagship infrastructure projects assume a pivotal role in ensuring the integration of climate resilience considerations in planning. The process of infrastructure project appraisal and selection is contingent upon the evaluation conducted by the investment coordination, infrastructure and budget committees of NEDA. Their evaluation is then submitted for endorsement to NEDA's Board (as detailed in Box 3.2). For major projects (above USD 45.5 million in budget), the NEDA Secretariat contributes to the evaluation of the projects by the committees,

especially to assess the environmental and social safeguards of projects. Yet, all projects undergo a review by the Investment Coordination Committee of NEDA.

42. The project evaluation is based on the alignment of the project with the national and regional development priorities as well as those of strategic priorities of line ministries. The appraisal criteria include environmental and social impacts, such as environmental impact assessment (EIA). The EIA is mandatory for every infrastructure project. The Environmental Management Bureau of the Department of Environment and Natural Resources (DENR) is responsible for conducting a review of the EIA, the environmental risk analysis, and the proposed risk reduction measures. This review covers the integration of climate change adaptation measures and disaster risk reduction. The DENR then issues an Environmental Clearance Certificate, which is required to start construction works.

43. Despite concerted efforts, climate resilience remains conspicuously absent from the criteria influencing project approval and appraisal processes. For instance, infrastructure stakeholders have consistently highlighted the absence of a universally agreed-upon method or standard for assessing climate-related risks and devising effective mitigation strategies. Consequently, the integration of climate adaptation measures remains vague and lacks the necessary specificity to significantly impact the issuance of Environmental Clearance Certificate, except for flood risks that are well regulated. NEDA acknowledges the limitations in evaluating infrastructure projects labelled as climate resilient. This underscores the need for robust frameworks and tools to systematically assess and enhance the resilience of critical infrastructures. It is nevertheless important to highlight recent efforts undertaken by the DILG to elaborate tools and guidelines for LGUs to conduct infrastructure audits. Such guidelines can contribute to assess the resilience of infrastructure to disasters. In addition, at the time of writing, the DILG was considering launching an Infrastructure Audit Programme to monitor the integration of national infrastructure standards at local level, for both public and private infrastructure.

Box 3.2. The flagship infrastructure projects: Approval process

44. In February 2024, 185 flagship projects were identified. Twenty-two projects were approved for implementation in 2024. The other projects will be funded and implemented in the coming years. All flagship projects undertake a thorough approval process relying on the below committees:

- **The Investment Coordination Committee (ICC)** is a key component of NEDA's organisational structure. Its primary role is to evaluate and prioritise major infrastructure projects and programs proposed by various government agencies. These projects typically require significant funding and involve complex decision-making processes. The ICC assesses the feasibility, financial viability, and socio-economic impact of these projects. Once evaluated, the ICC makes recommendations to NEDA's Board. Beyond the flagship projects, the ICC examines the environmental and social impacts of each infrastructure project led by national agencies.
- **Infrastructure Committee (INFRACOM):** The INFRACOM is an inter-agency committee under the NEDA Board. The INFRACOM is responsible for reviewing and approving the main investment programming such as the Public Investment Programme and the Infrastructure Flagship Programme. It plays a critical role in guiding the preparation and prioritisation of projects for budget allocations. It also shapes the technical aspects of infrastructure projects before they move forward for further evaluation by the ICC and then confirmation of the NEDA Board.

Source: (Calras, 2017^[31]) (Republic of the Philippines, 2023^[8]) (Republic of the Philippines, 1987^[32])

45. Despite the presence of key governmental bodies such as the Climate Change Commission, the Department of Environment and Natural Resources, or the Department of Science and Technology within the Investment Coordination Committee, the task of effectively evaluating and incorporating climate resilience measures into proposed projects remains a challenge. The committee grapples with hurdles that include the absence of a standardised and homogeneous set of criteria to guide assessments, a lack of established standards or methodologies for determining a project's degree of resilience, and uncertainties regarding whether the integration of climate resilience factors has been executed accurately and comprehensively. These challenges underscore the complexity of embedding climate resilience as an essential criterion in the project selection process.

46. NEDA faces significant challenges in revising its guidelines to include climate resilience as a crucial criterion for project approval. During interviews, the agency revealed lacking the requisite tools and frameworks to effectively evaluate climate resilience of infrastructure projects. This predicament was further highlighted during sectoral workshops held in the Philippines. Line agencies consistently express concerns about the absence of a coherent and universally applicable definition of climate resilience, as well as the absence of guiding principles. These limitations pose obstacles for both practitioners seeking to seamlessly integrate climate resilience considerations into their daily activities and oversight agencies tasked with assessing the resilience levels of infrastructure projects. The absence of specific label or certification to harmonise definitions of climate resilient infrastructure does not exist in the Philippines (cf Box 3.3).

47. Furthermore, the prescribed project cost cut-off constrains NEDA's authority to scrutinise smaller projects, which predominantly fall within the purview of infrastructure agencies. In case of guidelines to support NEDA's committees in integrating climate resilience considerations, a critical challenge emerges, that is ensuring that these guidelines extend beyond the confines of larger infrastructure development endeavours and that smaller-scale projects, outside NEDA's scope of intervention, must also benefit from such guidelines. Institutional capacity to implement such guidelines can be a barrier to line agencies responsible of the project's elaboration.

Box 3.3. Examples of labels or certifications to identify climate-resilient infrastructure projects

48. Different countries, organisations and industry associations have developed methodologies and standards for certifying climate-resilient infrastructure.

- The Global Infrastructure Basel Foundation has developed a global voluntary standard, the Standard for Sustainable and Resilient Infrastructure (SuRe), for the certification of sustainable and resilient infrastructure projects. It integrates 61 sustainability and resilience criteria into infrastructure development and upgrade across environmental, social and governance factors.
- BREEAM Infrastructure (formerly CEEQUAL) is a sustainability assessment tool for infrastructure and civil engineering projects that assesses climate resilience criteria. The tool identifies the risks to which concerned assets are exposed, specifically flooding and surface water run-off, and assesses required asset resilience and whether natural hazards and climate risks are assessed and mitigated. As an illustration, the Peace Bridge in Northern Ireland earned a CEEQUAL-Excellent rating in recognition of its preparedness for flood risk: the underside of the deck was located above the level of a 1-in-200-year tidal flood event, including an additional allowance for climate change.
- The Institute for Sustainable Infrastructure has developed ENVISION, a consensus-based framework for assessing sustainability and resiliency comprising 64 sustainability and resiliency criteria. While it does not provide a certification explicitly for climate-resilient infrastructure, ENVISION considers resilience factors in its rating system.
- FAST-Infra: The FAST-Infra is a globally applicable label reflecting sustainability performance, and building on four pillars which include “adaptation and resilience”. These pillars are broken down in a set of 14 criteria to assess infrastructure projects.

Some countries also have domestic agencies that developed certification schemes for infrastructure or compliance schemes for the selection and approval of infrastructure projects. In the UK, major infrastructure project applications are reviewed by the Planning Inspectorate to ensure they comply with a set of National Policy Statements, which set out how to account for climate change. Developers of major projects have to provide evidence of how the latest climate projections have been considered and their proposal's robustness to extreme changes beyond the range provided by those projections. In Canada, the Infrastructure Resilience Professional certification, offered by the Institute for Catastrophic Loss Reduction, is designed to certify professionals who work on infrastructure projects with a focus on resilience and climate adaptation.

Source: (Vallejo and Mullan, 2017^[33]) (OECD, n.d.^[34]) (Bre Group, n.d.^[35]) (Institute for Sustainable Infrastructure, n.d.^[36]) (USGBC, n.d.^[37]) (Engineers Canada, 2015^[38]) (ISO, 2021^[39]) (The Planning Inspectorate (UK), 2012^[40]). (FAST-Infra Group, 2022^[41])

➤ *Towards an action plan: Developing unified guidelines and the definition of a Climate Resilient Infrastructure Label to support infrastructure practitioners, and also to help in selecting and approving climate resilient infrastructure projects. An independent unit of NEDA can certify infrastructure projects ahead of committees, but more generally for line ministries or infrastructure stakeholders who would like to signal efforts towards such standard. Fostering such approach nevertheless require building capacity (Actions 1, 2, 3 and 4, Action plan)*

Considering climate resilience in procurement and public-private partnerships

49. Public procurement and public-private partnerships (PPPs) can play a key role in mainstreaming climate resilience in the infrastructure sector. Public procurement can incorporate climate resilience as a criterion to be covered by bidding documents, while PPPs can crowd in private finance for climate resilience through legal frameworks, contractual requirements, and enhanced access to capital markets.

50. Despite increasing considerations given to environmental issues in procurement processes, climate resilience remains rare. The latest version of the Philippine Bidding Document does not include any reference to climate change or climate resilience. Instead, the Philippine Green Public Procurement Roadmap aims to strengthen green public procurement until 2022 and beyond. Green public procurement adds new or alternative technical specifications which refer to the potential environmental impacts of an item regarding its material composition and in its use and its disposal phase. Green criteria express the environmental relevance of products and services over their life cycle or parts of it.

51. Despite a solid strategic approach to mainstream climate resilience in PPPs (Section 2), challenges persist. According to the PPPC, the perception of extra-costs required to climate-proof infrastructure projects can hinder the incentive to invest in *ex ante* adaptation measures. In the context of public road agencies, for instance, the separation of investment and maintenance budgets can pose challenges as lower maintenance and repair costs do not directly offset higher investment costs. The integration of climate resilience in PPPs also lacks established criteria at the appraisal level, which may create competitive disadvantages in tendering processes. These challenges are further compounded by the lack of competitiveness in the PPP market, making it difficult to incentivise private sector involvement as very few actors take part in the tendering processes (Senate of the Philippines, 2023^[42]).

Box 3.4. Examples to mainstream resilience in PPP projects

52. Countries can include climate resilience as a condition for public contracts, which can help ensure the consideration of climate risks in the financing and management of PPP projects. This allows, for instance, public authorities to reject inappropriately low bids if the proposal indicates a failure to observe social or environmental provisions' obligations. Belgium, for example, refers to climate adaptation in its management contracts between the state and national railway operator (SNCB), defining the missions of public utility of SNCB and payments for delivering them.

53. The contracts may be expanded to demand reliable services in the event of extreme weather events. Clauses in the management contracts between the state and the operator can help ensure effective risk management of infrastructure assets. Notably “un-insurability” provisions and “force majeure” clauses may ensure the operator has an appropriate incentive to manage climate risks. In the UK, for instance, concessionaires are not eligible for financial compensation following hydro-meteorological events.

54. The use of insurance or proof of financial capacity of private companies in contractual requirements can help ensure concessionaires are able to bear the risks allocated in the contract and avoid financial liabilities held by the government. In Colombia, for example, the national infrastructure agency enhanced and clarified insurance requirements, clearly allocating climate risks to the concessionaires. They must hold sufficient insurance to cover their expected Probable Maximum Loss.

55. Several guides have been developed to support the integration of climate resilience in PPP projects such as the Inter-American Development Bank's 'Climate-Resilient Public Private Partnerships: A Toolkit for Decision Makers' or the Global Centre on Adaptation's 'Knowledge Module on Public-Private Partnerships for Climate-Resilient Infrastructure' to build upstream capacity of practitioners to integrate climate resilience into infrastructure PPPs. The OECD also provides eight recommendations for incorporating climate resilience into the PPP process.

Source: (OECD, 2018^[7]) (IDB, 2020^[43]) (GCA, 2021^[44]) (Republic of the Philippines, 2018^[45]).

➤ *Towards an action plan: Documenting the results of the pilot projects undertaken by the PPP Centre (Section 2.5) to integrate climate resilience and pursuing the PPP Centre efforts through new projects can facilitate the gradual integration of climate resilience in PPP projects (Action 11, Action plan).*

3.3. Considering relevant measures to foster climate resilience mainstreaming in infrastructure planning and financing

56. Rendering infrastructure resilient to climate impacts can rely on both structural and non-structural measures. The climate resilience of infrastructure can be enhanced by selecting asset locations that are less exposed to climate hazards and by strengthening new and existing assets' capacity to cope with and recover from climate impacts when these occur, ensuring that an acceptable level of performance is maintained (OECD, 2018^[7]) (OECD, 2014^[46]). This can be achieved through structural (or “grey”) adaptation measures, as well as through nature-based solutions (NbS), and hybrid approaches (i.e. “green-grey” measures) that rely on a mix of ecosystem services and structural measures. Structural measures include for example raising the level of coastal roads and bridges to account for sea-level rise,

changing road surface materials so that they do not deform with extreme heat, building seawalls, or using permeable paving to reduce run-off during heavy rainfalls (OECD, 2018^[7]). Besides, the climate resilience of infrastructure can also be achieved through non-structural interventions such as improved maintenance, monitoring, emergency planning or early warning practices (OECD, 2018^[7]) (Table 3.2).

57. To ensure that infrastructure remains relevant and functional amid changing conditions, infrastructure resilience must be a continuous effort that propagates throughout the entire lifecycle of an asset (OECD, 2018^[7]). By integrating resilience considerations in the initial planning and design stages, infrastructure can be better prepared to withstand extreme weather events. Adequate provisions in project appraisal, selection and prioritisation can ensure that new assets effectively consider local risk levels. Operations and maintenance processes that ensure the continued climate resilience of assets and networks can also contribute to climate-proof infrastructure systems, ensuring their ability to adapt and recover from potential impacts.

Table 3.2. Examples of measures

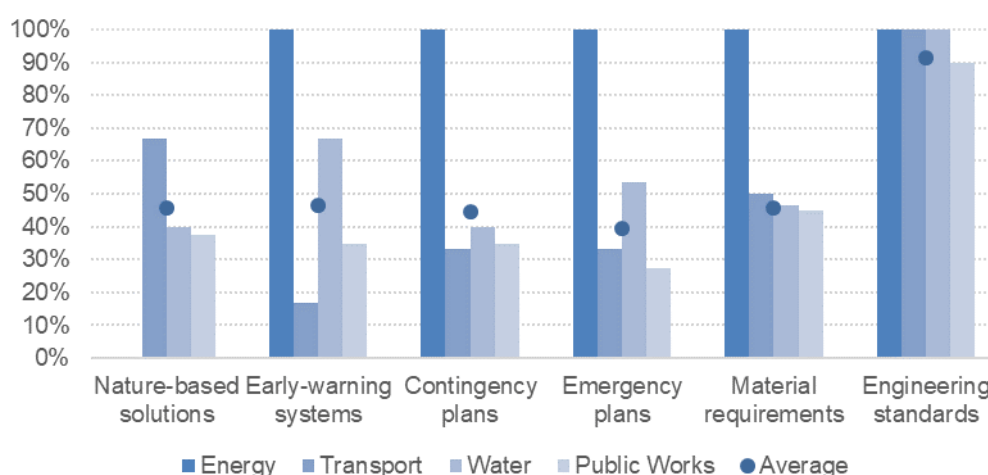
Infrastructure type	Climate hazard(s)	Possible impacts on infrastructure	Physical measures		Operational measures
			Grey solutions	Green solutions and Nature-based Solutions (as replacement or complement)	
Storm- and wastewater infrastructure	Extreme precipitation	Overloading of storm- and wastewater infrastructure, resulting in potential floods	Retrofitting urban drainage pipes to increase capacity, build concrete swales or concrete retention pools	Urban gardens and other green spaces, bioswales, bio retention pools, riparian vegetation restoration and management, urban wetlands Green roofs on top of buildings, permeable pavements	Integrated water management Implement regulations or and guidelines governing infrastructure design, such as through building codes, operation, and maintenance
Water supply infrastructure	Droughts	Reduced source of potable water	Reservoirs, dams, aqueducts	Watershed restoration and management (reforestation, afforestation, management of riparian wetlands and forests) Watershed restoration around dams and reservoirs to balance water supply	Introduce demand side management of water use for other purposes; enhance water re-use; improve operating strategies and rules with adjusted management and maintenance measures to current and projected hydrological conditions
Transport infrastructure	Riverine floods	Inundation and blockage of road, rail and riverine transport routes, airports	Elevating and strengthening dikes and levees, constructing reservoirs to store excess water during floods.	Re-naturalised and extended floodplains, wetland/forest restoration and conservation. Combine dikes and levees with re-naturalised floodplains, allow more room for rivers and restore forests and wetlands	Change maintenance schedules to identify vulnerabilities; deploy flood forecasting and early warning systems to alert transport authorities and users; Establish alternative transportation routes and modes to provide redundancy and flexibility in the event of disruptions Implement spatial planning regulation to avoid building in flood-prone areas

Electricity transmission infrastructure	Wildfires	Burning of transmission lines and poles	Introduce new management patterns for vegetation management (make it earlier or all year round dependent on changes in the wildfire season). Ensure land use regulations restrict the installation of power transmission lines in areas of very high wildfire risk. Mandate the use of concrete or steel poles for transmission lines in infrastructure and building codes.	Manage vegetation, create natural buffer zones around infrastructure assets	Introduce new management patterns for vegetation management (make it earlier or all year round dependent on changes in the wildfire season). Ensure land use regulations restrict the installation of power transmission lines in areas of very high wildfire risk. Mandate the use of concrete or steel poles for transmission lines in infrastructure and building codes.
Telecommunications	Extreme typhoon Wildfires	Damage to the transmission line	Retrofitting		Changing maintenance schedules

Source: Based on (OECD, 2018⁽⁷⁷⁾) and (IISD, 2021⁽⁴⁷⁾).

58. The survey conducted by the OECD revealed that various measures are already in place in the Philippines to address climate risks (Figure 3.2). These measures vary depending on the stakeholders (e.g., oversight or implementing agency) as well as on the sectors at hand, with some agencies holding a pioneering role in this area. Most existing measures were identified in the survey, except climate risks disclosure that can facilitate private sector mobilisation.

Figure 3.2. Measures already adopted by different sectors



Note: The survey relies on 117 answers, with an important representation of the different units (at local or national level) of the Department of Public Works and Highways. The interpretation of the results for the energy sectors should be done carefully as only four stakeholders answered. The numbers are nevertheless useful to assess the knowledge and preferences for specific measures.

Source: Based on OECD survey conducted in the Philippines in 2022.

59. This section focuses on the existing measures reported in the OECD survey, covering mostly structural measures, and explore the enabling environment underlying some of these measures. In fact, some structural measures (e.g. design features, material requirements, etc.) can be facilitated by strong regulations, financial incentives or simply the knowledge of these measures and of their cost-effectiveness. This section therefore explores first the existing regulatory provisions to design infrastructure (building and technical codes) and how they integrate climate considerations. It also focuses on nature-based solutions, which were highlighted as one of the most promising and priority measures in the Philippines. Finally, the section highlights existing contingency or emergency plans, which are non-structural measures conducive to the resilience of critical infrastructure services.

Building codes and engineering measures

60. The National Building Code regulates the design, location, construction, occupancy or maintenance of both public and private buildings, making it an important tool to consider climate resilience at planning stage. The document, which represents a reference for all new constructions in the country, provides a list of standards, rules and regulations for different types of construction and their structural framework. Up until its latest update in 2008, the National Building Code has included no reference or provision for climate resilience. In this code, the only hazards mentioned is fire. The approval of the Philippines Building Act in 2023, aims at establishing stricter regulations in the planning and design of buildings with a view to increasing their resilience to earthquakes, floods, typhoons and other risks.

61. The Philippines also has a Green Building Code since 2015. The code aims to ensure that large buildings and infrastructures have minimal impact on the environment and comply with standards of quality and efficiency. The code seeks to improve building performance through a set of minimum standards. Although this code mostly relates to climate change mitigation objectives, it also entails numerous standards that aim to increase the efficiency (water, energy) of buildings, which can contribute to build resilience to slow-onset climate events such as increased temperatures. However, this code only applies to buildings larger than 20 000 km², thus leaving out smaller ones.

62. Other technical codes encompass various types of hazards, including both climate hazards such as severe wind speeds and flooding and non-climate hazards such as earthquakes. Floods are covered by specific technical standards elaborated by DPWH. Similarly, DPWH provides various guidelines (Department of Public Work and Highways; Japanese International Cooperation Agency, 2003^[48]), such as those to conduct feasibility studies for roads, bridges, flood controls, and drainage infrastructure, among others.

63. Such technical standards or requirements are often proposed by regional offices, fostering an approach tailored to local conditions. For instance, quantified rainfall thresholds that road culverts should withstand often requires contextual adjustments and can prove inappropriate for local conditions. To ensure that infrastructure assets are equipped to manage region-specific hazards, the development of standards tailored to each geographical area and for broader asset categories, such as primary, secondary, and tertiary roads, is therefore essential.

64. Beyond regulations, agencies can also voluntarily incorporate technical measures to reinforce the resilience of their infrastructure or to ensure cost-effectiveness of their activities. It is for example the case of Manila Water, one of the water utilities serving the East Zone of Metro Manila, who extended retaining walls, strengthened dam, installed floating pumps for monitoring turbidity, built storm drains, deployed flood emergency equipment, and replaced PVC pipes with HDPE pipes to enhance resilience and mitigate risks during disasters (Manila Water, 2023^[49]).

65. However, the Department of the Interior and Local Government as well as other national agencies that participated in the workshops conducted in Manila highlighted challenges in identifying appropriate measures, but also in implementing and enforcing existing codes. This issue is particularly strong at local

level, due to a lack of capacity among LGUs and local stakeholders. Similarly, another challenge might stem from the lack of public awareness, or from the deliberate decision to ignore some provisions to save time and money (Philippines Property, 2023^[50]). In the absence of effective enforcement, reinforcing technical standards does not ensure their implementation.

Box 3.5. Examples of technical standards

International and national technical standards provide recognised best practices and benchmarks that can help infrastructure developers mainstream climate resilience in different stages of infrastructure development and help scale up climate resilience in infrastructure investments.

International technical standards

- The International Organization for Standardization (ISO) has been actively developing standards and guidelines that can contribute to fostering climate resilience in the assessment, design, and management of infrastructure. For instance, ISO 14091 gives guidelines for assessing climate risks, which can inform the risk assessment development in the infrastructure planning phase.
- Many countries adopt or adapt ISO standards in accordance with national objectives. Australia, Canada, the Netherlands, Japan, and the UK, for example, have been integrating ISO 14001, ISO 22301 (Business continuity), ISO 14046 (Water Footprint), and 22320 (Emergency Management) into their infrastructure development projects to enhance resilience.

National technical standards

An increasing number of national governments are also revising existing infrastructure standards, by which builders and operators in the field of infrastructure construction and maintenance are bound, to include climate resilience criteria. For instance, Australia and New Zealand have recently changed its 'Structural Design Actions - Wind Action Standard AS/NZS 1170.2' to include a climate change multiplication factor for cyclonic regions, in order for the design of structures to be adapted to higher climate impact uncertainty.

Source: (ISO, 2022^[51]) (GSES, 2023^[52]) (Vallejo and Mullan, 2017^[33])

➤ *Towards an action plan: Unified guidelines and clear standards can facilitate the elaboration of technical standards and building codes considering climate resilience (Action 1, Action plan)*

Nature-based solutions

66. Nature-based Solutions (NbS) – i.e. measures that protect, sustainably manage or restore nature, with the goal of maintaining or enhancing ecosystem services to address a variety of social, environmental and economic challenges (OECD, 2020^[53]) – are a key tool to enhance climate resilience at both landscape and project level. NbS can be used as a substitute, complement or safeguard of grey infrastructure. Examples of NbS include coral and oyster reefs, which can help reduce coastal erosion and flooding during storm surges, providing an alternative to breakwater structures. Bioswales and permeable pavements can reduce the impact of extreme precipitations on urban wastewater infrastructure, thus representing winning measures to enhance the resilience of “grey” assets. Forests and coastal wetlands can also contribute to reduce the exposure of urban and coastal assets and whole communities to the impacts of extreme

weather events such as coastal flooding, heatwaves, and storm surges (OECD, 2020^[53]). In addition, while strengthening climate resilience, NbS can also contribute to broader policy objectives, e.g. supporting fisheries and food security, timber, forest products and tourism and, in some cases, acting as carbon sinks.

67. In recent years, nature-based solutions have gained significant attention in the Philippines as measures to enhance the climate resilience of infrastructure assets. The protection and restoration of mangrove forests is a notable example in the country. Indeed, mangrove forests in the Philippines are estimated to avoid more than USD 1 billion in damages to residential and industrial infrastructure annually, while also protecting over 600 000 people from flooding every year (Beck et al., 2018^[54]). The critical role of nature-based solutions in strengthening the country's resilience is also recognised in the Philippine Development Plan (Republic of the Philippines, 2023^[8]).

68. Yet, while the various stakeholders interviewed demonstrated a clear intent to advance NbS, the implementation of NbS still faces significant challenges in the country. The difficulty to assess their anticipated benefits (e.g. performance metrics such as cost-benefit indicators) and the change of paradigm they represent often make grey infrastructure the preferred option by decision-makers. In recent years, the Department of Environment and Natural Resources (DENR) has outlined plans for NbS deployment throughout the country, but implementation is often hampered by technical and organizational challenges that vary across sectors and geographic areas. Indeed, the stakeholder interviews held in 2023 often emphasised the need for technical guidelines to assist stakeholders as well as the need for better co-ordination between DPWH and DENR.

69. As part of the OECD's Sustainable Infrastructure Programme in Asia (SIPA), the World Wildlife Fund (WWF) supports the Philippines in better identifying nature-based solutions and their potential. WWF has developed maps of priority areas of potential NbS that support climate resilience for people and infrastructure (roads in particular). These maps were developed in collaboration with the DPWH, DENR, and NEDA at the national and subnational levels, alongside targeted LGUs in Mindanao. Analysing four priority ecosystem services important for climate resilience sediment retention, flood risk reduction, water supply, and coastal protection and the potential impacts to those services under current and future land use change and climate scenarios, their results show where investment in NbS through conservation or restoration approaches could maximize the delivery of these critical services and hence better inform infrastructure planning.

70. One notable area for strategic improvement is the co-ordination between DPWH and the DENR. Collaborative efforts between these agencies can pave the way for the promotion of NbS in infrastructure planning. Nature-based solutions, such as wetland restoration and green infrastructure, offer sustainable and resilient alternatives to traditional engineering approaches. There is currently no strategy or plan to integrate such solutions.

➤ *Towards an action plan: To build capacity on the implementation of nature-based solutions to strengthen the resilience of infrastructure to climate change, the Department of Environment and Natural Resources (DENR) can document existing or ongoing case studies to raise awareness. Considering the major role of the Department of Public Works and Highways, it is crucial to enhance collaboration with DENR to facilitate the integration of nature-based solutions in their infrastructure plans (Actions 5, 6 and 7, Action plan)*

Contingency and emergency planning

71. Climate resilience also encompasses recovery and rehabilitation considerations in case of climate extreme events. Implementing agencies from the water and energy sectors mentioned existing

requirements for contingency and emergency plans, which are supposed to rehabilitate access to basic lifelines.

72. The Philippines has elaborated a legislative framework to foster contingency and emergency planning, incentivising the integration of such considerations in infrastructure planning. The National Disaster Risk Reduction and Management of 2010 requires a management process to anticipate potential events and establish arrangements to cope with response and recovery. It is considered as “preparedness” within the DRRM framework (Section 2.). Such responsibility is shared by national and local governments which must consider critical infrastructure, essential to fulfil access to basic services such as water or energy in case of damages induced by disasters.

73. The national and local governments can require utilities to plan contingency measures to ensure access to basic services. For instance, the Department of Energy (DOE) has established its own set of guidelines mandating energy facilities to formulate and furnish contingency plans as integral components of their operational prerequisites. Similarly, the city of Quezon elaborated a contingency plan to address hazards such as fire (Quezon City, 2022^[55]) which maps all the critical infrastructure assets, their exposure, and the identification of key infrastructure role in case such hazards occur. Based on a scenario analysis, the city is therefore able to plan for transport or communication disruption as well as power cuts and can for instance require water utilities to design emergency plans to protect key water resources.

74. Effective contingency planning is dependent on existing risk assessment, accountability mechanisms and financial resources for recovery, which requires capacity. For instance, while climate risk assessment is performed by numerous local government units, the quality remains uneven depending on the access to data or lack of technical capacity (see above). In addition, while the Philippines has a contingency mechanism in place that provides financing in the event of a disaster, on some occasions, this has proven unable to readily anticipate and disburse the needed resources to the relevant authorities (Bowen et al., 2020^[56]). LGUs usually have their own funds for disaster response, which can be complemented by national funding when particularly extreme disasters occur (Bowen et al., 2020^[56]).

3.4. Monitoring and evaluation

75. There are no quantifiable objectives for climate-resilient infrastructure within the budget priorities framework or the Philippine Development Plan (PDP) on which the budget proposal builds. NEDA expects to define quantitative indicators to measure progress on climate resilience mainstreaming in infrastructure planning and investment hoping this will encourage action and alignment of funding across all agencies for them.

76. Defining indicators would also facilitate the monitoring of budget allocation to ensure that the PDP is implemented. Such indicators require the establishment of a baseline, in accordance with statistical agencies. Examples are provided in Table 3.3. Defining indicators would also facilitate the monitoring of budget allocation to ensure that the PDP is implemented.

Table 3.3. Examples of indicators to measure progress in climate resilience mainstreaming at sectoral level.

Connectivity	Water	Energy	Social
<ul style="list-style-type: none"> Percentage of roads requiring maintenance based on climate risk assessment. Number of weather and climate related disruptions to the road network Proportion of Telecoms, Digital and ICT assets protected from flooding by return period and asset type Number of airports in areas of flood risk Establish measures on emergency response fund availability and accessibility 	<ul style="list-style-type: none"> Number of LGUs with an inventory of water infrastructure assets Expected recovery time for water infrastructure after a disaster. Average time of water outages due to climate hazards per year Number of water utilities who have a contingency plan to reduce water disruptions periods in case of disasters 	<ul style="list-style-type: none"> Number of utilities who have an adaptation plan, Number of utilities who have contingency plans in case of disaster. Share of transmission lines in disaster prone areas Average duration of electricity interruption in case of disaster Number of power outages per year Number of utilities implementing cooling requirements for energy generation 	<ul style="list-style-type: none"> Number of critical social assets insured

➤ *Towards an action plan: Defining indicators for climate resilient infrastructure in the PDP can facilitate budget allocation and guide infrastructure stakeholders (Action 8, Action plan)*

3.5. Financing climate-resilient infrastructure

77. The Philippine Development Plan (PDP) 2023-2028 sets the objectives for the country that guide the national budget allocation. This section first explores current funding for climate resilience and focuses on the national budget expenditures to understand whether it reflects the PDP's objectives. Finally, as the PDP envisages a greater mobilisation of the private sector, the section discusses existing incentives to better align private funding (either for companies or financial institutions) with climate resilience infrastructure.

Dedicated public funds for climate resilience

78. Climate and disaster resilience are objectives acknowledged by budgetary processes, with dedicated funding mechanisms that can contribute to finance climate resilient infrastructure. Disaster risk reduction or climate adaptation funds were created to support local and national governments to prepare for climate or disaster risks, anticipate potential disasters or recover from extreme events. These include the National Disaster Risk Reduction and Management Fund, the Local Disaster Risk Reduction and Management Fund, and the People Survival Fund (Table 3.4).

79. These funds reflect the ambition of the country to strengthen its resilience but remain too focused on emergency responses. Between 2017 and 2024, the government's allocation for climate change adaptation and mitigation increased from PHP 195 billion to PHP 543 billion in 2024⁴. However, over the same period, its share as part of the total national budget shrank from 6.99% to 5.77% (Republic of the Philippines, 2023^[8]). Besides, over the past decades as well as in recent years, disaster risk management funds at both national and local level have mostly been used to support emergency response, recovery and rehabilitation (e.g. for cash assistance and resettlements), at the detriment of risk prevention and climate change adaptation.

⁴ At the time of writing, this allocation was yet to be approved by the Philippines' Congress.

Table 3.4. Public funds for climate resilience

Funds	Description
National Disaster Risk Reduction and Management Fund (or Calamity Fund)	The fund is used to fund a wide range of disaster-related expenditures. Between 2016 and 2021, the fund received an average budget allocation of PHP 20 billion (Republic of the Philippines, 2023 ^[8]). The fund's remaining balance for 2022 is PHP 6.8 billion. The Department of Budget and Management has increased the fund's allocation from PHP 20 billion to PHP 31 billion in the 2023 National Expenditure Programme. However, one key limitation of the National Disaster Risk Reduction and Management Fund is that it is not suitable for immediate emergency response and recovery, since it cannot disburse rapidly its funds (Hallegatte, Rentschler and Rozenberg, 2020 ^[57]).
Local Disaster Risk Reduction and Management Fund	Local disaster funds, which are named local disaster risk reduction and management funds and rely on local budgets, as LGUs are required to set aside 5% of their budget for resilience (Republic Act No. 10121). If this budget is not spent, it should be kept for future disaster risk reduction projects.
People Survival Fund	The People's Survival Fund provides long-term financing streams to finance climate change adaptation measures and projects at local level. It serves as a buffer to ease the impact of disasters on affected households and communities. Specifically, it is used for adaptation activities that include water resources management, land management, agriculture and fisheries, and health, among others. Established in 2012, the fund is managed by the Climate Change Commission and consists of funds of the National Treasury as well as grants and donations. In the 2016 national budget, PHP 1 billion was allocated under the People's Survival Fund (Republic of the Philippines, 2014 ^[11]) (International Federation of Red Cross and Red Crescent, 2021 ^[14]).

80. While these funds are not fully appropriated, efforts are ongoing to further implement projects through the People Survival Fund. From 2016 to 2018 only six LGUs accessed the People Survival Fund (Republic of the Philippines, 2023^[8]), largely due to low awareness of and capacity to submit proposals to access the fund. Through strengthened inter-agency collaboration, the PSF Board nevertheless approved additional five new projects in 2023. These developments resulted in acceleration of PSF's utilisation rate from 32% to 89%. This acceleration comes from the various technical assistance and knowledge products disseminated by the CCC, highlighting the importance of raising awareness on the existence of these products and their impact.

➤ *Towards an action plan: To shift away from recovery and strengthen resilience building through preventive measures, the share of preventive financing required from LGUs' budget can increase. Allocation of local budget towards prevention can also be monitored (Action 15, Action plan)*

Strategic allocation of the national budget for climate resilient infrastructure

81. The national budget allocation for climate and disaster resilience, as well as the monitoring of national and LGU expenditures, are both considered inadequate in the country (Republic of the Philippines, 2023^[8]). This is the case also for the financing of climate-resilient infrastructure. Currently, climate-resilient infrastructure is mostly funded through public resources, either from national or local budgets (92% according to the survey) as part of traditional infrastructure financing. These budgets include Official Development Aid, but also budget from the General Appropriation Act, which is the national budget approved yearly by the congress. While most international donors are now considering climate resilience in their projects, this is not necessarily a given for projects funded by national agencies, often because climate resilience is perceived as an extra cost against no benefit (74% of the agencies that participated in the survey) or because it competes with other priorities.

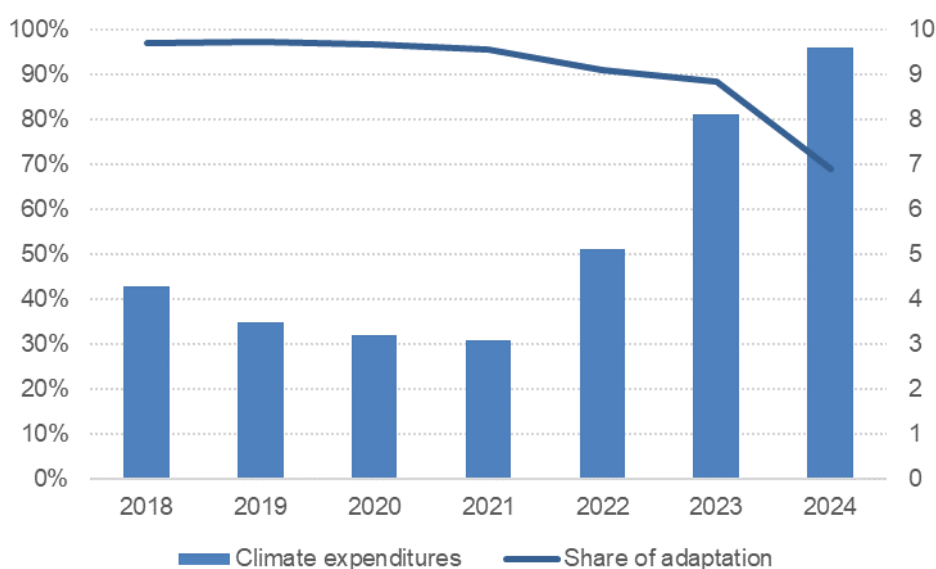
82. While climate resilience is mainstreamed in government processes, it does not appear as a priority in the final budget submitted to the Congress. The budget priorities framework provides guidance to national agencies of strategies, programmes and projects that may be prioritised annually. In 2023 and 2024, this framework included specific portions on climate and disaster resilience. Analysing the overall budget, efforts are nevertheless mostly directed towards flood management and reconstruction or rehabilitation of infrastructure (57.5% of the whole national climate adaptation budget). Finally, while maintenance, retrofitting and upgrade or infrastructure have been allocated specific budgets, there has

been barely any mention of climate resilience for infrastructure in the President's Budget Message sent out to the Congress (Department of Budget Management, 2024^[58]).

83. Additional measures have contributed to track progress in the allocation of public finance to these objectives. The Climate Change Commission has provided a definition to identify such investments. In parallel, a sustainable finance taxonomy has been identified as part of the Philippine Sustainable Finance Roadmap (see below, Private finance section) and may include specific criteria for climate adaptation investments. In 2023, at national level, budget for climate change could account for USD 8.3 billion, with 88.53% of this budget directed toward adaptation (Figure 3.3) and 77.83% in the hands of the Department of Public Works and Highways due to their flood protection role (Climate Change Commission, 2023^[20]). Climate expenditures have increased over the past years with always a major share dedicated to adaptation projects. In addition, the formulation of the National Asset Management Plan 2022-2023 provides guidelines to manage the national infrastructure assets in a cost-effective manner. The plan suggests to first map asset investments and disclose publicly relevant asset information for increased accountability for asset management. Such plan aims at maximising government funds by targeting scarce resources to the most critical asset needs.

Figure 3.3. Climate expenditures and corresponding share of climate adaptation expenditures since 2018

Billion USD



Note: The analysis of these trends is subject to data quality issues in the first years as the exercise started in 2018.

Source: Based on data from (Climate Change Commission, 2023^[20])

84. Despite an important attention given to climate adaptation, it is unclear whether these funds are allocated to the right projects. For instance, an important share of these funds is allocated to flood protection, among which road drainage is standard practice for the Department of Public Works and Highways. However, the workshops revealed that new roads might be created while existing ones would require maintenance and upgrade first. Similarly, in the absence of good understanding of climate risks revealed by the OECD survey, the appropriate use of fund for adaptation can be challenging.

85. Similarly, a separate guideline was issued to encourage the LGUs to increase their budgetary allocations for basic services and facilities responsive to climate change to improve the adaptive capacity

of their communities and reduce the adverse impacts of climate change, chargeable to local funds. All climate change-related strategies and investments of the LGUs in the Annual Investment Programme shall be identified as climate change adaptation or mitigation responses. In 2023, 42% of all LGUs have fully completed their expenditures tagging⁵.

Box 3.6. Philippines' definition of climate adaptation

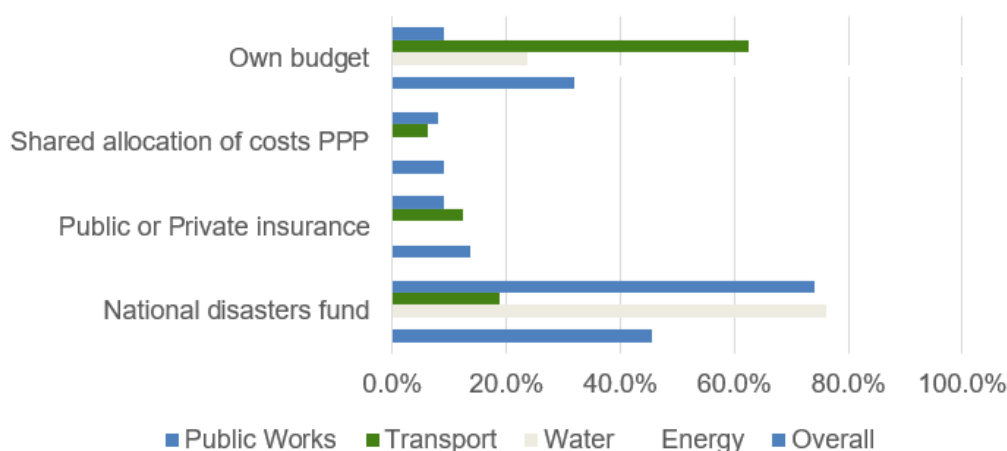
86. Philippines defines adaptation responses as actions aimed at addressing factors contributing to vulnerability. These actions may involve relocating populations or assets to safer areas by means of zoning regulations or enhancing the ability to cope with adverse conditions. Additionally, adaptation can involve the construction of infrastructure designed to incorporate climate change considerations and minimise the effects of climate-related risks. Furthermore, adaptation actions might include efforts to reduce land degradation, reforestation initiatives, upgrading existing roads to meet climate-resilient design standards, adopting climate-resistant crop varieties and farming techniques, installing effective early warning systems, and making investments tailored to respond to projected climate changes and variability.

Source: (Climate Change Commission, 2018^[59]).

➤ *Towards an action plan: Conducting regular expenditures review, based on the criteria set by the PDP to monitor the alignment of budget with local and national plans can help further consider climate-resilient objectives in spending for infrastructure (Action 9, Action plan)*

87. Finally, while there are no insurance requirements for infrastructure assets today, the Department of Budget and Management is developing a national indemnity insurance programme to provide insurance coverage for strategically important government assets against typhoons, earthquakes and volcanic eruptions. This explains the important share of recovery financed by disaster funds (Figure 3.4).

Figure 3.4. Sources of funding for recovery and rehabilitation



⁵ [NICCDIES | Climate Change Expenditure Tagging](#)

Note: The survey relies on 117 answers.

Source: Based on OECD survey conducted in the Philippines in 2022.

Private finance

88. By encouraging climate risk disclosure of national companies, the Philippines strengthened awareness of the private sector and support investors' strategies. The Philippines Securities and Exchange Commission (SEC) has established Sustainability Reporting Requirements for listed companies. These requirements compel listed companies to disclose their sustainability action plans and risks, including those related to climate change. As of now, 66 companies have reported their climate-related risks. In 2023, the SEC transitioned from a "comply and explain" approach to mandatory compliance with sustainability reporting guidelines. Additionally, the SEC aims to introduce voluntary and, eventually, mandatory reporting for non-listed companies. This reporting framework aligns with globally recognised standards and frameworks, including the GRI Sustainability Reporting Standards, IIRC Integrated Reporting Framework, SASB Sustainability Accounting Standards, and TCFD recommendations.

89. In addition the Philippines Central Bank (*Bangko Sentral ng Pilipinas, BSP*) also imposed requirements to banks which are directly exposed to climate risks. Commercial banks are assumed to account for 90 percent of the financial system and invest significantly in infrastructure sectors, such as energy (10% of the loan exposure concentrations of banks) (Regelink, 2019^[60]). The Central Bank has recognised the importance of addressing climate-related risks to ensure financial stability and issued a Sustainable Finance Roadmap in 2020 which requires banks to disclose in their annual reports on their sustainability strategic objectives and risk appetite or information on existing and emerging environmental and social risks and their impact on the bank among other things (Department of Finance, 2020^[61]). The Central Bank also emphasises the role of the financial industry in achieving sustainable development in the Philippines. The BSP will soon issue a regulation to conduct climate stress-testing by banks.

90. Such incentives can foster private investments in climate-resilient infrastructure project, thanks to improved risk management strategies. First, by encouraging climate risk assessment, private companies and financial institutions may improve their understanding of risks which in turn will inform their investments' strategies in new infrastructure projects. Such requirements therefore constitute an improvement towards strengthen climate risk management and provides market signals to financial institutions.

91. Despite encouraging efforts to align private sector financial flows with climate resilience objectives, climate adaptation and climate risks remain unevenly addressed. The issuance of the Philippine Sustainable Finance Taxonomy Guidelines developed by the SEC, BSP and Insurance Commission may provide guidance towards further consideration of climate resilience by financial institutions. For instance, while large banks are issuing green bonds to finance energy infrastructure projects, institutional capacity to identify and assess climate risks onto infrastructure are limiting the spread of such instruments to finance climate-resilient infrastructure (Regelink, 2019^[60]).

➤ *Towards an action plan: Building on current efforts from the SEC and Philippines Central Bank, develop specific climate risks disclosure guidelines, inspired from the national guidelines to understand what constitutes climate resilience to contribute to further support private companies to assess climate risks (Action 10, Action plan)*

4. Sectoral climate resilience mainstreaming

92. The following section explores the challenges faced by specific economic sectors in the Philippines and outlines the key priorities identified by sectoral stakeholders. This builds on the analysis laid out in the PDP, as well as on the findings of the OECD survey and of the sectoral workshops held throughout 2023. The objective of this section is to identify areas to improve the capacity of sector to comply with the objectives of climate-resilient infrastructure laid out in the PDP and foster the integration of climate resilience also in projects that are in the hands of the sectoral implementing agencies, and not flagship projects. Understanding the challenges faced by each sector will enable the elaboration of specific sectoral targets to reach this goal.

4.1. The energy sector

93. Energy infrastructure in the Philippines is currently subject to numerous challenges. Electricity prices are among the highest in the Asian region, with impacts on energy affordability for citizens as well as on the attractiveness of energy-intensive foreign direct investments. These issues are often exacerbated by the heavy dependency on energy imports – which makes domestic energy prices highly volatile and dependent on external shocks – as well as by the frequent extreme events, which often cause unplanned power shortages or outages. The significant grid fragmentation and the limited power supply and transmission capacity also represent key challenges in the country. The efficiency of existing energy infrastructure is also an issue, with more than 9% of the total electricity output lost during transmission and distribution stages (Republic of the Philippines, 2023^[8]).

94. Building on this assessment, the new PDP establishes the goal to provide “affordable, accessible, reliable and clean energy to all”. Most policy interventions in this sector will therefore focus on reducing the costs of energy and enhancing the reliability of power supply, by improving power generation and supply capacity. These objectives are pursued by the Department of Energy who is responsible for the restructuring of the electricity industry and for preparing the country’s annual Power Development Programme, which incorporates plans for power transmission, generation, and distribution.

95. Through its overarching role in the sector, the Department of Energy has a key role in creating the enabling environment for mainstreaming climate resilience in infrastructure. In 2018, the Department of Energy launched a Resiliency Taskforce. This taskforce gathers all stakeholders from the power generation, distribution and transmission utilities, as well as the Oil & Gas sector and security stakeholders (army, intelligence, police...). The taskforce’s objective is to elaborate an energy resiliency policy, define requirements for utilities to elaborate resiliency compliance plans or incentivise resiliency mainstreaming more broadly (e.g. “Excellence Awards”). The Department of Energy will publish a Resilience Scorecard to assess companies’ resilience and monitor progress on that front. Finally, to support companies, the DOE published a national contingency plan for extreme event and work on a hazard map to identify the most vulnerable utilities. Resilience standards have been identified for 2025 but were highlighted as an important priority for the energy sector who needs further guidance to better understand what climate

resilience means for infrastructure. In addition, as of 2023, the taskforce was mostly focusing on disasters and had focused on earthquakes.

96. Within the framework of this taskforce, the Department of Energy has also instituted disclosure mechanisms aimed at providing incentives for the assessment of climate risks and the contemplation of adaptive measures. In fact, the energy market in the Philippines is among the most liberalised ones in Southeast Asia, with many private actors involved in the generation, transmission or distribution business either as owners or concessionaires of energy infrastructure. Hence, mobilising the private sector is essential to achieve the objectives set by the PDP.

97. Nevertheless, there exists no established set of standards for the promotion of climate resilience in infrastructure projects and for the attraction of investments. Furthermore, the taskforce has predominantly focused its attention on geophysical hazards, particularly a potential megathrust earthquake, “the Big One”, with limited consideration given to other climate-related hazards. Finally, these plans are now only shared with the Department of Energy as they contained confidential information related to contingency plans and location of critical assets.

98. Due to the elevated energy expenses involved, the reconciliation of affordability, accessibility, and climate resilience is perceived as a key challenge within the sector. This challenge has the potential to result in added expenses for end-user consumers. In this context, the advancement of renewable energy sources and the electrification of the nation represent a distinctive opportunity for reducing electricity costs and ensuring the long-term provision of services, while integrating climate resilience.

99. Building upon this evaluation and following a sectoral workshop aimed at discussing gaps and opportunities for promoting climate resilience in infrastructure planning and investment, stakeholders within, key players in the energy sector have identified three main priorities:

- Mobilising finance for climate resilience (Action 16, Action plan)
- Formulating standards to effectively assess climate risks (Action 16, Action plan)
- Formulating policies to mainstream climate resilience in infrastructure planning (Action 17, Action plan)

4.2. The transportation and ICT sectors

100. The Filipino population and economy face significant mobility challenges due to inadequate transportation facilities. The provision of public transport, e-mobility and active mobility options hamper everyday mobility of millions of citizens, while the inadequate capacity of the country’s railways, seaports and airport facilities pose significant challenges to cross-region mobility and trade (Republic of the Philippines, 2023^[8]). Furthermore, outdated laws and regulations have failed to address entry barriers in the digital services market, resulting in limited competition among service providers, elevated broadband prices, and constricted investments in infrastructure expansion. Consequently, despite the existence of digital services, access to such services is not widespread throughout the country.

101. For this reason, the PDP emphasises the need to modernise and expand both transport and digital infrastructure to alleviate traffic congestion, enhance transport security, and provide support to economic sectors and trade. This entails the improvement and construction of high-quality roads, the enhancement of airports and seaports, and the promotion of active mobility. Furthermore, the 2023-2028 PDP acknowledges the potential of climate resilience in bolstering asset reliability and service provision, albeit its integration into connectivity infrastructure planning remains limited (Republic of the Philippines, 2023^[8]).

102. Numerous stakeholders actively participate in the development of transports’ infrastructure, encompassing governmental entities such as the Department of Transportations, Department of Information, Communications and Technology, the Department of Public Works and Highways and LGUs.

Consequently, the challenges faced by LGUs have a cascading impact on the broader sector. The private sector also plays a pivotal role in the government's digitalization strategy, though the number of key players in this sector remains limited. Consequently, persistent obstacles remain in incentivising the private sector to incorporate climate resilience into its infrastructure projects.

103. Overall, the survey suggests that the consideration of climate resilience in infrastructure projects mostly occur during the design or planning phases. However, only 46% of the survey participants within the sector actively engage in climate risk assessments, a figure that falls below the average of 61% observed across all infrastructure stakeholders. The participants have highlighted the lack of essential information and guidelines required to facilitate the incorporation of climate resilience, extending beyond the existing directives and policies which primarily pertain to flood risks and drainage management. Additionally, survey participants expressed their perception of inadequate funding to support the integration of climate resilience into their operations.

104. Building upon this evaluation and following a sectoral workshop aimed at discussing gaps and opportunities for promoting climate resilience in infrastructure planning and investment, stakeholders within, stakeholders within the connectivity sector have delineated three primary priorities for the sector:

- The development of clear guidelines to facilitate the integration of climate resilience into infrastructure planning (Action 1, Action plan)
- Enhanced financial allocation towards resilience measures (Actions 18 and 19, Action plan)
- Comprehensive climate risk assessment encompassing multiple hazards (Action 1, Action plan)

4.3. The water infrastructure sector

105. The effective management of water resources in the Philippines is subject to many challenges. The country can count on limited water resources and has yet to achieve efficient, sustainable and affordable water supply and sanitation services. Irrigation facilities are rather inefficient in their use of water and are often not resilient to extreme weather events such as typhoon, which can cause additional water leakages and thus additional inefficiency in water management. Besides, large parts of the territory are highly vulnerable to water-related hazards such as floods, whose frequency and severity are only projected to increase under climate change. Considering the important share of climate adaptation finance dedicated to flood controls, there might be a need for better flood control (Republic of the Philippines, 2023^[8]). Therefore, the PDP aspires to a secure access to water resources and improved resilience to water related hazards. A major focus for the next six years will be the improvement of water governance, acknowledged as fragmented and an impediment to an efficient integrated water resource management. The Creation of a Department of Water Resources can contribute to address such institutional challenges.

106. The institutional setup for water management in the country is rather weak and fragmented, with more than thirty water-related agencies with overlapping and sometimes conflicting roles and responsibilities. This is often exacerbated by the lack of clear or aligned objectives and by low coordination among agencies, which often give rise to a multiplicity of regulations and tools. For example, the lack of consistency and standardization of early-warning tools for local flood prevention tends to generate confusion among local authorities (Republic of the Philippines, 2023^[8]). To date, the Department of Environment and Natural Resources serves as the lead agency to ensure water security, while the Department of Public Works and Highways is primarily responsible for flood protection and the National Irrigation Administration, an attached agency of the Department of Agriculture for irrigation. Such fragmentation poses challenges to consider the important role of nature in flood risks' mitigation for instance.

107. The sector seems further attuned to climate resilience objectives, likely due to the existing quantitative targets set by the National Risk Management Framework for the sector. For instance, the

Philippines Water Supply and Sanitation Master Plan 2019-2030 provides specific objective and guidelines on climate adaptation, while existing flood risk masterplans for major river basins have allowed to improve ecosystem health and to enhance their resilience to the impacts of climate change (Republic of the Philippines, 2023^[8]). Overall, 65% participants to the survey mention existing policies to strengthen resilience and measures such as the Climate Change Adaptation Work Programmes related to agriculture infrastructure and specifically irrigation facilities. The sector also implemented early warning systems to anticipate future extreme weather events. Finally, 61% of the survey participants already assess climate risks and their potential impacts when planning or designing water infrastructure. However, the use of climate risk assessment in infrastructure planning and management remains limited due to the perceived absence of clear standards and common methodologies.

108. Overall, data availability on water resources (e.g. on streamflow gauge levels and groundwater levels) remain limited, as does the monitoring activity of groundwater extraction and watershed health. Limited technical and financial capacity in planning and implementing water infrastructure projects also represent key challenges (Republic of the Philippines, 2023^[8]). Finally, stakeholders from the water sector also highlighted the difficulties to integrate nature-based solutions in their projects and to secure sufficient funding to finance resilience. Analysis at watershed management would probably be beneficial to integrate nature-based solutions.

109. Building upon this evaluation and following a sectoral workshop aimed at discussing gaps and opportunities for promoting climate resilience in infrastructure planning and investment, stakeholders within the water sector have identified the following key priorities for the sector:

- Better support the use of nature-based solutions (Action 20, Action plan)
- Better allocate finance to climate resilience objectives (Action 21, Action plan)

110. Beyond the priorities highlighted by the stakeholders interviewed during the workshops conducted in the Philippines, the institutional fragmentation observed in the water sector needs to be addressed to ensure climate resilience mainstreaming in infrastructure building. This aspect is not studied in depth in this report as this challenge relates more broadly to water management in general.

4.4. The social infrastructure sector

111. In the PDP, the social infrastructure sector includes all infrastructure associated to education and healthcare provision, as well as to the treatment of solid waste. Today, these infrastructures in the country are largely inadequate to respond to the needs of the population. Education infrastructure mostly suffers from a generalised shortage of classrooms, which is exacerbated during extreme events such as typhoons and floods, when existing facilities are used as temporary evacuation centres, thus disrupting education services. Healthcare facilities are also deemed inadequate and are characterised by inequitable access and by the ineffective use of existing funds. Solid waste treatment infrastructure are also largely inadequate and struggle to keep up with the levels of waste generation, especially in urban areas. For example, only 39% of all barangays have their own material recovery facilities, while only 29% have sanitary landfill facilities (Republic of the Philippines, 2023^[8]). All these sectors are significantly affected by the impacts of extreme climate events, which in recent years have caused large damages to existing infrastructures.

112. Building on this assessment, the PDP aims to contribute to socio-economic development by streamlining funding for health or education infrastructure as well as pursuing waste management development. Building long-term resilience to hazards including climate-related ones is a key element in this direction.

113. The social infrastructure sector is characterised by a complex landscape of stakeholders and responsibilities, often resulting in a fragmented approach to its development, with uncoordinated planning, unclear policy directions, and a limited consideration of climate resilience. Limited data availability and financing. Various entities play distinct roles in this sector:

- The departments of education and health are responsible for planning and budget allocation, setting the stage for infrastructure initiatives in their sector.
- Housing is primarily the responsibility of government agencies (The Department of Human Settlements and Urban Development and National Housing Authority), but local government units are tasked with the delivery of social infrastructure and social housing through land-use planning and investment plans. The private sector also plays a pivotal role in the housing programmes.
- The Department of Public Works and Highways assumes the role of building most social facilities (e.g. administrative buildings, health facilities, schools...) according to the plans of the departments of education, health, or local government units.

114. The various line agencies and local government units from the social infrastructure sector are however quite aware of the risks posed by climate change and several plans or programmes are already in place to encourage the consideration of climate resilience in infrastructure. For instance, the National Housing and Urban Development Coordinating Council for 2040 bases spatial and sectoral development on climate change resilience. Similarly, the Department of Human Settlements and Urban Development has initiated efforts to integrate climate resilience objectives into procurement bidding documents, alongside the implementation of various measures such as early-warning systems, contingency plans, emergency plans, and material requirements. The Department of Science and Technology has also piloted initiatives in collaboration with the Department of Education to map all school facilities and assess their exposure and vulnerability to specific hazards. In addition, critical national assets including schools and health facilities will now be part of the National Asset Management Plan and will be covered by insurance programmes.

115. Yet, while social infrastructure's exposure is known, few climate projections have been used to assess the vulnerability to future climate risks of existing assets. Similarly, in case new facilities would be planned or built, such assessment does not exist yet. In addition, although most social infrastructure adheres to the national building code regulations (which lacks provisions for climate resilience), in most cases climate resilience is not a core element in the planning of these assets. Finally, despite existing efforts, the lack of technical skills at the LGU level remains a key challenge. This has resulted in a lag in the development of health facilities as well as in an overall lack of prioritisation among projects, with more focus on new assets rather than on retrofitting existing ones.

116. Building upon this evaluation and following a sectoral workshop aimed at discussing gaps and opportunities for promoting climate resilience in infrastructure planning and investment, stakeholders within the social sector have identified three key priorities for the sector:

- Improve climate risk assessment to inform infrastructure design (Action 1 and 22, Action plan)
- Project prioritisation to consider climate resilience (Action 23, Action plan)
- Better allocate finance to climate resilience objectives (Action 23, Action plan)

5. Conclusions: Towards a roadmap for building climate-resilient infrastructure

117. This paper underscores the indispensable role of the National Economic and Development Authority (NEDA) in advancing climate resilience in infrastructure planning and development. First, NEDA plays a pivotal role by elaborating the Philippine Development Plan (PDP), a foundational document laying out the key infrastructure objectives to sustain the countries' rapid development progress. Second, NEDA supports the planning and approval of key infrastructure investment project, thereby exercising a direct role in fostering climate resilience building. Finally, NEDA assumes leadership of the infrastructure committee, responsible for identifying and evaluating the most strategic infrastructure projects nationwide. In this function NEDA can furthermore foster and influence climate resilience building in flagship infrastructure investments. Altogether, NEDA has demonstrated a proactive stance towards enhancing the quality of infrastructure assets, with explicit emphasis on integrating climate resilience considerations. The PDP articulates a significant aspiration to bolster climate and disaster resilience, underscored by a clear directive to integrate climate resilience into infrastructure design.

118. Infrastructure sectors demonstrate heterogeneous levels of awareness about climate resilience:

119. The transport sector is by far the one that receive the most funding due to the priorities laid out in the Philippine Development Plan 2023-2028 (PDP) (National Economic and Development Authority, 2023^[18]). Yet, the workshops revealed that climate resilience was often perceived as an extra cost for the sector in a context of scarce resources. The workshops also shed light on some road projects that are stopped before completion, and the PDP revealed that roads get deteriorated rapidly due to heavy truck loads, showing inappropriate regulations or enforcement thereof (Republic of the Philippines, 2023^[8]). Hence, a more strategic allocation of existing funds could help make the bridge between insufficient funding and the need for better climate-resilient infrastructure.

120. Similarly, the water sector is one of the most advanced when it comes to climate resilience mainstreaming. However, water stakeholders also mentioned a lack of financing to integrate climate resilience in their infrastructure plans.

121. The energy sector has already started to disclose contingency and emergency plans. To further enhance the climate resilience of energy infrastructure, the energy sector can focus on defining common standards for climate resilience to be then used by all the private stakeholders.

122. The ICT sector trails behind in the adoption of technology compared to other Asian countries (Diop et al., 2020^[62]). This relatively poor performance stems from inadequate digital infrastructure, partly due to regulatory constraints that create barriers to market entry and limit competition in the telecommunications market. As the telecommunications market will open thanks to recent regulatory changes, the increased competition to expand digital infrastructure networks can be an opportunity to require climate resilience clauses to feature in future contracts and to require private stakeholders to disclose their climate risks to align financial investments in the sector.

123. The social infrastructure sector covers a large variety of assets, from school to health facilities, including solid waste management or housing. While each kind of infrastructure has its own set of challenges, most of these infrastructures are under the responsibility of the Department of Public Works and Highways when it comes to construction works. Hence, building codes or standards that integrate

climate resilience features are essential. If such requirement exists partially in the country for some climate hazards, one of the main barriers relate to the lack of enforcement of such codes (see Section 3.), reflecting sometimes a lack of capacity. In addition, the workshops also revealed a perception of a lack of funding due to competing priorities.

124. A notable challenge emerges across all sectors when it comes to fostering climate resilience. There is a discernible lack of consensus among stakeholders regarding the level of ambition and objectives that shall be pursued and how to evaluate these objectives. This disparity can be in part explained by a proliferation of tools and approaches to achieve infrastructure resilience, as well as by misaligned policies and regulations. Consequently, there is a compelling need to update and integrate policies and regulations across levels of government to foster climate resilience. Furthermore, there is a need for streamlining existing methods to assess climate risks and implement adaptive measures and establish consistency in defining and assessing climate-resilient infrastructure. Not only will it help NEDA in scrutinising projects within a precise and universally recognised framework, but it will also provide guidance to sectoral agencies and local governments who will be familiar with these criteria beforehand.

125. Annex A presents a comprehensive roadmap of actions, including responsible stakeholders, indicators of success and a suggested timeline that came out of the OECD policy dialogue with national and subnational infrastructure placeholders. Most importantly, these actions revolve around the following five pillars:

- **Pillar 1 – Development of common guidance:** The formulation of standard guidelines and the design of a climate-resilient infrastructure label can support both NEDA and infrastructure practitioners effectively. Such guidelines can provide a definition of climate-resilient infrastructure including, among other things the climate scenario to be considered for the resilience measures to be implemented. It could lay out an all-climate hazards approach and formulate minimum requirements to be implementing in each sector (e.g., minimal requirements in case of extreme weather events). Labels could help signal what makes a project climate-resilient, which can be developed based on international benchmarks (Examples in Box 3.3 and Box 3.5).
- **Pillar 2 – Capacity building:** To operationalise guidelines, it is important to focus on capacity building programmes to raise awareness on existing measures, funding resources available but also access to tools to integrate climate risks in infrastructure planning. Training sessions might contribute to develop new skills, so that infrastructure practitioners understand what is required by decision-makers in terms of climate resilience features. It can also contribute to implement nature-based solutions more systematically in infrastructure project's design.
- **Pillar 3 – Streamlined infrastructure assessment processes:** Climate resilience needs to be integrated as one of the criteria to appraise and approve infrastructure projects in the Infrastructure Committee. The proposed criteria may also be used in the prioritisation and validation of infrastructure projects for inclusion in the investment programming documents. In addition to the projects endorsed by the NEDA's Infrastructure Committee, it is imperative for government agencies (national or local) to integrate climate resilience considerations into all infrastructure projects. but also, possibly beyond.
- **Pillar 4 – Creation of a dedicated agency:** Creating an independent agency or a unit within NEDA to certify infrastructure projects going through the Investment Coordination Committee (ICC) and applying for climate-resilient labels.
- **Pillar 5 – Aligning financing with resilience building objectives:** The PDP advocates for leveraging private sector involvement, engaging with donors, revitalising Public-Private Partnerships (PPPs), and enhancing cost-sharing arrangements with Local Government Units (LGUs). Consequently, facilitating the integration of such objectives into funding mechanisms, whether at the budgetary level or for mobilising private sector resources, becomes imperative to effectively advance climate resilience within infrastructure development efforts.

Annex A. Action plan

A.1 Cross-sectoral action plan to mainstream climate resilience in infrastructure planning

Main findings	Recommended actions	Objectives of the action	Key stakeholders	Timeline	Indicator
A lack of standardised framework for climate-resilient infrastructure creating a deficiency in the shared comprehension of the concept of climate resilience, methods for evaluating resilience and actionable steps	<ol style="list-style-type: none"> 1. Formulate Unified Guidelines and Define Climate-resilient Infrastructure Label to support infrastructure practitioners 2. Organise capacity building programmes to foster the use of the guidelines 3. Create an independent agency or a unit within NEDA to certify infrastructure projects applying for climate-resilient labels 	<p>A national standardised approach to guide infrastructure stakeholders</p> <p>To facilitate the uptake of these guidelines by local actors, it is recommended to undertake the translation of the guidelines, tools, and resources into Filipino to ensure accessibility and comprehensibility at all levels, including engagement with local communities and stakeholders.</p>	NEDA, CCC, DENR, DOST; building on existing DOST tools.	Short-term	<ul style="list-style-type: none"> • Publication of guidelines by 2025 • Share of local government units who have assessed climate risks thanks to the new Department of Science and Technology's tool by 2028 • Number of staff trained to use the Department of Science and Technology's tool
This lack of consensus prevents climate resilience to be one of the criteria used to appraise/approve projects in the Infrastructure Committee	<ol style="list-style-type: none"> 4. Include climate resilience as one of the criteria to appraise and approve infrastructure projects in the Investment Coordination Committee. Examples of criteria or methods can be found in Box 3.3 and Box 3.5. These criteria can be added to the Environmental and Social criteria reviewed by the ICC 	Provide incentives to incorporate climate resilience	NEDA	Medium Term	<ul style="list-style-type: none"> • Revision of the INFRACOM criteria
A clear intent to advance nature-based solutions but challenges to comprehensively assess their outcomes, construction methods	<ol style="list-style-type: none"> 5. Document existing or ongoing case studies to raise awareness 6. Strengthen capacity building to foster the integration of nature-based solutions 	Build capacity on the integration of the guidelines	DENR	Short-term Medium term	<ul style="list-style-type: none"> • Inventory of existing case studies by 2025 • Assessment of five specific case studies in the water sector by 2026 • Number of LGUs and DPWH staff trained

A lack of coordination between the Department of Environment and Natural Resources and the Department of Public Works conducive to overlook nature-based solutions in the design of flood controls, roads or urban planning	7. Create a coordination mechanism to improve planning at national and local level and assess what areas might benefit from nature-based solutions with a view of reducing risks.		DENR and DPWH	Short term	<ul style="list-style-type: none"> • Elaboration of a Memorandum of Understanding (MoU) between DENR and DPWH
Broad climate-resilient objectives for infrastructure in the Philippines Development Plan hampering to ensure the alignment of budget expenditures with climate resilience objectives	8. Define indicators for climate-resilient infrastructure objectives of the Philippine Development Plan 9. Conduct regular expenditures review to monitor the implementation of local and national plans	Ensure consistency between budget expenditures and the implementation of the PDP Strengthen accountability	CCC, DILG and the Department of Budget and Management	Medium-Long term	<ul style="list-style-type: none"> • Criteria to be chosen by NEDA (examples provided in Section 2.) • One public expenditure review by 2028
Existing efforts to align private sector investments with sustainable objectives, with yet little emphasis on climate resilience	10. Building on the Philippines Securities and Exchange Commission (SEC) Sustainability Reporting Requirements for listed companies, elaborate climate risks disclosure guidelines for private companies	Provide information to attract investments	SEC; Central bank; Department of Budget and Management	Short-term	<ul style="list-style-type: none"> • Elaboration of climate risks disclosure guidelines
Existing efforts to integrate climate resilience in PPP contracts (PPP safeguards, pilot projects) that remain marginal due to low capacity and perception of competitive disadvantages in a PPP market counting few actors	11. Document the results of the pilot projects undertaken by the PPP Centre to integrate climate resilience and pursue the PPP Centre efforts through new projects.	Provide examples of success and build capacity	PPP Center	Short-term	<ul style="list-style-type: none"> • Number of climate-resilient infrastructure PPP projects in 2028. • Number of pilot projects in the water sector to increase by 2028
Lack of capacity of the local government units who are faced with too many responsibilities	12. Simplify local government's responsibilities: Limit the number of plans required at barangay level to focus on urban planning 13. Establish climate and disaster resilient funds at province levels to be allocated to smaller LGUs in case of extreme weather event. 14. Harmonise climate resilience and disaster risk management policies to alleviate the burdens of LGUs	Provide opportunities to better coordinate disaster and climate resilience policies	DILG; DBM	Medium-Term	

Lack of funding of the local government units who tend to prioritise disaster recovery and concentrate prevention finance to DPWH's flood projects.	15. Increase the share of preventive financing for infrastructure at local level and monitor the use of funding for prevention	Provide incentives to finance preventive actions	Department of the Interior and Local Governments; Department of Defense; Department of Budget and Management; LGUs; CCC	Medium-Term	<ul style="list-style-type: none"> Share of LGUs who report their climate adaptation financing with a distinction between recovery and prevention
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A.2 Sectoral action plan to mainstream climate resilience in infrastructure planning

	Main findings	Recommended Action	Objectives of the action	Key Stakeholders	Timeline	Indicator
Energy sector	Existing roadmap for the energy sector who identifies climate resilience label as a key objective, with a focus on disaster risks rather than climatic ones (e.g. the "big One")	16. Foster the use of climate-resilient infrastructure standards defined in the national guidelines to complement existing efforts to elaborate energy resiliency scorecards	Provide incentives to assess climate risks and adopt adaptation measures Provide information for financial investors	Department of Energy	Medium-Term	Number of companies to receive a certification
	Existing disclosure of the contingency and emergency plans of the energy stakeholders to the Department of Energy that remain confidential due to critical information, but no disclosure of climate risk assessment or adaptation measures for investors	17. Provide training and disseminate national guidelines to assess climate risks and disclose the assessment of risks and adaptation measures taken by companies	Provide information for financial investors	Department of Energy	Medium-Term	Number of companies who disclose their climate risks and mitigation measures: target to increase annually
Connectivity sector (transport and ICT)	Poor quality of the transport infrastructure despite being the most funded sector in the absence of prioritisation or adaptive approach for the transport sector	18. Encourage risk disclosure of transport infrastructure companies.		Department of Transportation	Medium-Term	<ul style="list-style-type: none"> Mapping of all connectivity infrastructure on GeoRisk; Increased share of ICT companies disclosing climate risks
	Important role of the private sector in the connectivity sector with few requirements to incorporate climate considerations	19. The department of Information and Communication defines clauses to require private	Mobilise private sector financing	Department of Information and Communication	Medium-Long term	

		companies to integrate climate resilience by conducting thorough climate risk assessment, identify vulnerable assets, set design standards and regularly monitor the vulnerability of assets				
Water sector	Nature-based solutions are considered as a priority for the water sector who regrets lacking capacity to consider such option in planning	20. Conduct pilot projects to implement nature-based solutions	Building capacity	DENR	Medium term	Five pilot projects by 2026 in the country
	A perception of competing priorities to finance climate-resilient water infrastructure	21. Integrate climate resilience clauses in PPP contracts for water infrastructure	Mobilise private sector financing	Local government units	Medium term	Number of pilot projects
Social sector	Lack of enforcement of codes and regulations that hamper the development of climate-resilient social infrastructure	22. Review skills certification of engineers to ensure updated and continuing learning programme.	Foster the implementation of standards Raise awareness	Department of Public Works and Highway, Department of Education, Department of Health; Department of Social Housing and urban Development, DENR	Medium term	
	A perception of competing priorities to finance climate-resilient social infrastructure explained by a lack of prioritisation among infrastructure projects	23. Improve prioritisation of projects to allocate scarce financial resources: Conduct an inventory of assets' vulnerability to define priorities and retrofitting actions.	Better allocation of public resources	Department of Education; Department of Health; NEDA Regional offices; Department of Science and Technology; DILG; LGUs; DHSUD/NHA	Short-term	Share of social infrastructure assessed as vulnerable

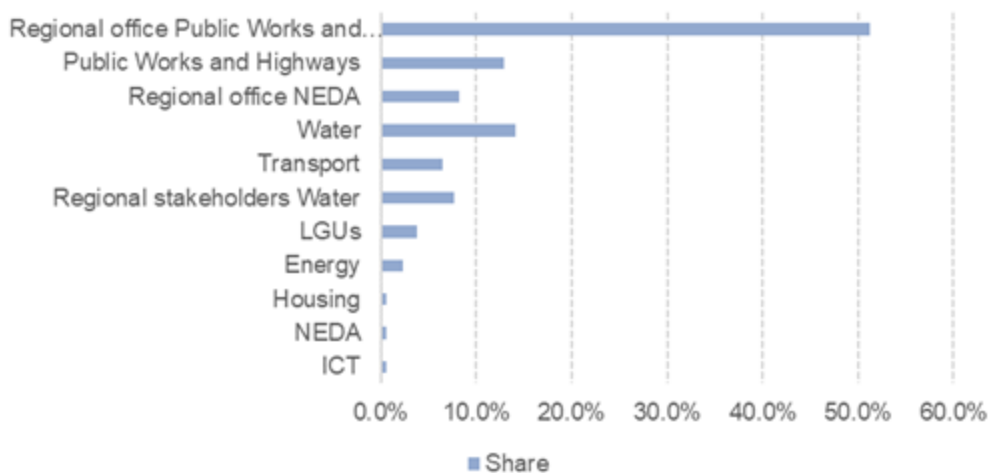
Annex B. Questionnaire and list of stakeholders consulted.

126. As part of the project, the OECD conducted a questionnaire among relevant national and local infrastructure agencies and stakeholders. The aim of the survey was to

- Gather information with respect to awareness and current engagement in climate resilience building in the respective infrastructure sector: perception of climate risks, existing practices and efforts
- Gather information on the coordination efforts and effectiveness among relevant stakeholders.
- Gather an understanding of current enabling environment: laws and regulations, access to financial resources, technical support in terms of to mainstream climate resilience.

127. The questionnaire was completed by most sectoral agencies, allowing for a good overview of the Filipino environment to consider climate resilience in infrastructure. Most Departments directly involved in infrastructure planning or construction completed the questionnaire, except the Departments of Education or Health. However, social infrastructure under the responsibility of these departments are often built by the Department of Public Works and Highway, the private sector or LGUs. While few LGUs completed the questionnaire, some have and many regional offices of national departments contributed, providing the opportunity to observe differences between regional and national perspectives. In total, 184 answers were collected with a significant share of the answers coming from the Department of Public Works and Highways (including regional offices).

Figure B.1. Share of respondents by sector and governance level



Source: Authors

128. Beyond the questionnaire, the OECD organised sectoral workshops bringing together senior government officials from the various sectors to discuss their engagement and achievements in mainstreaming climate resilience. These workshops identified a list of priority actions that were considered in the report. During these workshops, the OECD shared good practices and challenges identified in OECD countries to mainstream climate resilience in infrastructure planning. This led to a dialogue on the enabling environment required to overcome challenges and reproduce inspiring examples. Then, each sector was shown a brief assessment of the gaps and opportunities identified by the OECD, based on desk-based research and the answers to the questionnaire mentioned above. Based on this assessment, each sector was asked to select priority areas on which they wanted to work in the next six years, related to climate-resilient mainstreaming. Break-out groups focusing on each priority were then organised to discuss more in depth on the different steps required to make progress on the said priorities, but also to identify the stakeholders who would be involved in such process. Stakeholders who contributed to the various workshops are listed in Table B.1.

Table B.1. Agencies represented during the sectoral workshops

Connectivity	Energy	Water	Social
<p>NEDA</p> <ul style="list-style-type: none"> Investment Programming Group Infrastructure Development Office Land Use and Physical Planning Division Information and Communications Technology Division Transport Division <p>Department of Transportation</p> <p>Philippine Ports Authority</p> <p>University of the Philippines, National Center for Transportation Studies</p> <p>Toll Regulatory Board Light Rail Transit Authority Board</p> <p>Subic Bay Metropolitan Authority</p> <p>Department of Agriculture Department of Information and Communication Technology</p> <p>Department of Public Works and Highways</p> <p>Department of Human Settlements and Urban Development</p>	<p>NEDA</p> <ul style="list-style-type: none"> Investment Programming Group Infrastructure Development Office Regional Development Staff Information and Communications Technology Division Power Division, Energy Policy and Planning Bureau <p>Department of Energy</p> <p>Independent Electricity Market Operator of the Philippines</p> <p>Philippine National Oil Company</p> <p>National Transmission Corporation</p>	<p>NEDA</p> <ul style="list-style-type: none"> Infrastructure Development Office Regional Development Staff Land Use and Physical Planning Division Agriculture, Environment and Natural Resources Division Water Resources Division <p>Metropolitan Waterworks and Sewerage System</p> <p>Department of Environment and Natural Resources</p> <ul style="list-style-type: none"> River Basin Control Office Climate Change Service Policy and Planning Services Environmental Management Bureau <p>National Water Resources Board</p> <p>Local Water Utilities Administration</p> <p>Department of Interior and Local Government</p> <p>Department of Public Works and Highways</p> <ul style="list-style-type: none"> Environmental and Social Safeguards Division Flood Control Management Cluster National Irrigation Administration 	<p>NEDA</p> <ul style="list-style-type: none"> Education and Skills Development Division Social and Other Public Infrastructure Division Information and Communications Technology Division <p>Department of Human Settlements and Urban Development</p> <p>National Housing Authority</p> <p>Department of Education</p> <p>Department of Health</p> <p>National Irrigation Administration</p> <p>Department of Public Works and Highways</p> <ul style="list-style-type: none"> Buildings and Special Projects Management Cluster <p>Department of Interior and Local Government</p> <p>Philippine Atmospheric, Geophysical and Astronomical Services Administration</p> <p>Department of Environment and Natural Resources</p>

Source: Authors

129. Finally, the OECD was able to interview the following local and national stakeholders involved in climate resilience mainstreaming.

- Climate Change Commission
- The Department of National Defense
- The National Economic Development Authority (NEDA)
- The Department of Interior and Local Government (DILG)
- The Department of Science and Technology (DOST)
- The Department of Environment and Natural Resource (DENR)
- The Public Private Partnership Center (PPPC)
- The Department of Budget and Management
- In Butuan City
 - Regional office of DENR
 - Regional office of DPWH
 - Butuan City council
 - Butuan City mayor's office
 - Captain of the Lumbocan baranagay

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Adapting infrastructure to changing climatic conditions: The case of the Philippines

Infrastructure has been essential in supporting the Philippines' rapidly growing economy. Yet, infrastructure assets and operations are significantly exposed to climate-related risks. Building climate resilience into infrastructure planning and financing is therefore a strategic priority for the country. This policy paper presents the findings from an OECD policy dialogue carried out in the Philippines on mainstreaming climate resilience in infrastructure planning and development. It provides an overview of current policies and practices as well as policy recommendations for the government to further strengthen the resilience of infrastructure to climate change and raise future ambitions.

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