Additional information from adaptation components of nationally determined contributions

In their nationally determined contributions (NDCs), Parties identified a wide range of adaptation measures for their adaptation priority sectors. The table below provides examples of these measures.

Examples of adaptation measures in priority sectors communicated in nationally determined contributions

Sector	*Examples of adaptation measures*
Food security and nutrition	**Agriculture** - Promoting sustainable and climate-smart management practices aimed at conserving and improving agricultural soils - Using heat-, drought- and pest-resistant crop varieties and establishing seed banks for climate-adapted seeds - Ensuring the integration of climate change risks, adaptation measures and disaster risk reduction into agricultural policies and plans - Implementing rainwater harvesting and storage systems and community irrigation systems in Indigenous territories to increase resilience against drought - Developing and implementing an integrated pest and disease management system to protect croplands and manage invasive species - Expanding access to real-time weather forecasts, seasonal climate outlooks and early warning systems - Strengthening communication systems for agricultural extension and agro-weather services by drawing on essential local, traditional and Indigenous knowledge - Accelerating the adoption of innovative and climate-smart agricultural practices, including vertical farming, hydroponics, efficient irrigation systems and agroecological production systems - Establishing climate-resilient input credit systems, risk insurance schemes and blended finance from public-private partnerships - Investing in climate-resilient processing, storage and logistics infrastructure for the agrifood system - Expanding the use of fortified rice across social protection programmes and food reserves - Implementing nationwide gender-sensitive agroforestry practices and regenerative agriculture extension and capacity-building programmes - Establishing agricultural centres in strategic locations, including agricultural laboratories and facilities for conducting accredited training programmes tailored to women and youth **Livestock** - Expanding the adoption of genetic improvements and the use of climate-resilient livestock breeds - Accelerating the adoption of sustainable and regenerative livestock technologies and practices - Transitioning to climate-smart livestock systems by promoting conservation tillage, zero grazing, rotational grazing and traditional erosion control methods - Developing small-scale water collection infrastructure for herder households, including reservoirs, ponds and pools utilizing excess snow and rainwater - Deploying early warning systems for animal disease surveillance and extreme weather events - Raising awareness and increasing preparedness among livestock producers in terms of climate-related hazards affecting animal production by using risk communication strategies in collaboration with veterinary services and agricultural extension officers - Protecting livestock infrastructure against floods, hurricanes and other extreme weather events - Enhancing climate-smart fodder management practices to improve livestock nutrition by promoting drought-tolerant forage species, optimizing harvesting and storage techniques and integrating agroforestry and rotational grazing systems

Sector	*Examples of adaptation measures*
	- Increasing access to insurance and other climate risk transfer instruments for the livestock sector - Training women, Indigenous Peoples and young farmers in drought-tolerant breeds at farmer field schools - Integrating conflict sensitivity into interventions for climate-resilient livestock by conducting conflict risk assessments, supporting community-based mechanisms for resolving disputes over land, water and other resources and providing livelihood support to marginalized groups **Fisheries and aquaculture** - Diversifying the product portfolio of fisheries and developing the aquaculture sector by cultivating micro- and macroalgae - Establishing marine protected areas and co-managed fishery areas in coastal and aquatic ecosystems associated with fish production - Increasing the community-driven restoration and sustainable management of marine and inland water habitats, including mangroves, seagrasses, coral reefs and flooded forests - Implementing climate-proofing strategies for fishing ports and aquaculture infrastructure, such as artisanal fish landing and processing centres - Deploying monitoring, evaluation and enforcement processes to ensure the conservation of fish biodiversity and habitats - Strengthening a climate information management system for providing early warnings and timely responses to fishers and aquaculture producers - Conducting fish surveys in degraded areas and restocking depleted fish stocks - Scaling up sustainable aquaculture while preserving reefs by operating a hatchery for clams, sandfish and other species - Providing fishers with modern, environmentally friendly and legally compliant fishing vessels, nets and equipment - Conducting studies on the impact of climate change on fishing productivity and coastal economies - Developing an awareness-raising programme in schools to promote climate-smart fisheries and mangrove conservation - Integrating fisheries fully into climate change adaptation and food security policies
Water resources	- Increasing the number of meteorological and hydrometric stations to improve the monitoring of heavy precipitation events across watersheds - Building rainwater collection and storage systems in drought-prone areas to ensure a continuous water supply - Expanding the construction of dams and reducing silt build-up to enhance water storage capacity - Building flood and erosion barriers along main rivers using nature-based solutions - Strengthening integrated early warning systems for extreme weather events in river basins - Implementing drought management measures to enhance groundwater recharge and increase soil moisture in water-stressed areas - Establishing a national monitoring system for observing surface–groundwater interactions - Advocating for effective transboundary river basin management and basin-level cooperation - Proposing a basin-wide and community-based watershed management system to restore, harvest and optimize the use of water resources - Implementing conservation and regeneration measures in wetlands and peat bogs to reduce run-off and soil erosion and to increase groundwater infiltration - Ensuring the mainstreaming of issues related to climate change into water-related legislation, policies and strategies - Improving rural water supply security by developing small dams and hill dams - Accelerating the adoption of the artificial recharge of groundwater aquifers and the reinjection of treated water into coastal aquifers

Sector	*Examples of adaptation measures*
	- Developing cost-effective wastewater treatment and reuse plants to preserve the quality of surface and groundwater and to enhance measures for preventing water pollution - Building large-scale seawater desalination plants with high production capacities to improve the supply of drinking water - Constructing new water points and boreholes - Installing temporary or permanent salinity barriers along coastal aquifers affected by saltwater intrusion - Promoting equitable and climate-resilient water management strategies by integrating traditional and Indigenous water management practices into modern water management planning - Improving irrigation schemes by transitioning from fossil fuel energy to solar power - Rehabilitating spring catchments and outflow systems and upgrading river embankments to optimize the availability of water from springs and storm water - Engaging children and youth and women in the development of gender-responsive water management solutions - Conducting climate risk assessments for piped water systems to identify vulnerabilities and inform adaptation options - Enhancing water governance by strengthening the capacity of national institutions and developing the required human resources - Developing emergency water supply plans and infrastructure to address water shortages during prolonged droughts and other extreme weather events - Conducting community awareness-raising programmes on watershed management and the reuse of wastewater
Health	- Conducting research into the impact of climate change on health conditions related to extreme heat and air quality and on non-communicable diseases, respiratory diseases, cardiovascular health, mental health, vector-borne diseases and food-borne diseases - Establishing an epidemiological surveillance system to detect and monitor extreme temperatures, vector-borne diseases and waterborne diseases and to send early warning alerts at national and subnational levels - Providing medical personnel and public health officials with training in the detection and treatment of vector-borne diseases and waterborne diseases - Retrofitting public healthcare facilities to make them resilient to extreme weather events by equipping them with improved water, sanitation and waste management systems, as well as renewable energy sources, to ensure uninterrupted services during climate shocks - Developing a culturally sensitive awareness-raising campaign on climate-sensitive diseases and prevention measures for Indigenous Peoples and local communities and creating an outreach strategy with child- and youth-friendly materials that explain the impact of climate change on health - Establishing health-specific emergency response programmes to reduce the risk of widespread transmission during disease outbreaks, with a particular focus on women, children and youth, the elderly, people with disabilities and people on low incomes - Improving health programmes, protocols and guidance to manage new climate change related diseases and risks and using gender-disaggregated data to track and manage these diseases - Strengthening mental health support services, paying special attention to psychological distress and trauma caused by extreme weather events - Conducting a climate risk assessment in the health sector and ensuring that climate change risks and related diseases are incorporated into national health policies and plans - Supporting the strengthening of existing and planned legal frameworks in different sectors to ensure that the impact of climate change on health is meaningfully considered in national legislation
Terrestrial ecosystems	**Ecosystems, biodiversity and forestry** - Developing models based on national and regional climate change scenarios to analyse the impact of climate change on biodiversity and ecosystems

Sector	*Examples of adaptation measures*
	- Implementing integrated biodiversity and ecosystem monitoring and reporting systems that align with global standards and monitoring land use changes using geospatial analysis and field surveys - Combating desertification by planting regenerative native species - Developing plant and tree species that are tolerant to climate stress and promoting genetic diversification - Enhancing preparedness for and the response to climate-induced pest and disease outbreaks to protect forests and forest resources - Integrating traditional ecological knowledge when designing green and blue spaces in urban and rural areas - Implementing gender-sensitive fire prevention measures and early warning systems - Using the customary practices and knowledge of Indigenous Peoples and local communities to develop climate-driven ecosystem conservation and restoration initiatives - Championing afforestation and reforestation campaigns led by children and youth - Implementing an integrated national programme for the control, monitoring and eradication of invasive non-native species - Expanding and managing protected areas to conserve key species and habitats, ensuring that the process of creating protected areas includes the negotiation of legally recognized agreements on community land and resource rights - Rehabilitating degraded public and private land to enhance ecosystem-based adaptation through afforestation, reafforestation and protective measures such as agroforestry, commercial forestry and community forestry - Strengthening public-private partnerships to promote and operationalize payment for ecosystem services in protected areas - Conducting vulnerability assessments to determine areas and species of flora and fauna that are vulnerable to climate change - Developing policy instruments to integrate climate change considerations into biodiversity policies, conservation guidelines and community-level biodiversity campaigns - Conducting training courses for forestry authorities and forest-dependent communities on climate-related risks, adaptation solutions and adaptive forest management practices - Implementing nature-based adaptation measures for terrestrial, wetland and marine ecosystems **Wildlife** - Researching and monitoring animal species and their populations and distribution - Establishing community-based in situ and ex situ conservation measures to rescue endangered species and create wildlife refuges - Opening and maintaining wildlife corridors and combating illegal hunting - Developing a national wildlife adaptation strategy and enforcing its timely implementation
Key economic sectors	**Infrastructure, transport and energy** - Undertaking a national study to define the climate vulnerability of critical infrastructure - Enforcing the use of climate-proof construction standards and materials for new energy, transport and health infrastructure - Designing and upgrading flood-control infrastructure in accordance with international standards on flood resilience - Implementing climate-proof measures for existing transport infrastructure, such as elevating sections of road, improving drainage systems along railways and reinforcing embankments against sea level rise - Upgrading the ‘climate proofing’ of infrastructure using nature-based solutions, such as planting trees along transport corridors and installing green roofs on schools and health facilities - Improving the road network to guarantee evacuation capacity and access for emergency services to the most isolated places

Sector	*Examples of adaptation measures*
	- Strengthening grid resilience by reinforcing transmission infrastructure with flood-resistant substations, storm-proof towers and heat-tolerant conductors - Promoting the diversification of energy sources, such as solar, wind and biofuels, with priority given to Indigenous Peoples, the elderly, women and children and youth, in order to secure uninterrupted access to energy - Rolling out a centralized national multi-hazard early warning system - Considering climate change scenarios when designing new public and private infrastructure - Improving access to insurance schemes for private infrastructure - Developing the infrastructure-related adaptation and disaster risk reduction plans - Reviewing and updating the national building code to integrate climate resilience
	Cultural heritage - Developing research methods, documentation and inventories for the knowledge and practices of local communities and Indigenous Peoples and promoting their revitalization - Promoting community-led water management, ecosystem conservation and agricultural practices by applying Indigenous knowledge and techniques, such as traditional rainwater harvesting and irrigation systems, sustainable moss harvesting, terrace farming, fencing, pest management control, and crop rotation and calendars - Integrating the knowledge of local communities and Indigenous Peoples into national and subnational climate adaptation policies and plans, as well as into school curricula - Implementing adaptation measures to protect and preserve tangible and intangible cultural heritage against climate-related risks - Conducting surveys and assessments to determine the vulnerability of cultural heritage sites to climate change - Developing standardized indicators to quantify and monitor cultural heritage loss and creating systems to collect and share data on cultural heritage loss and damage - Developing national relocation guidelines for cultural heritage sites
	Tourism - Developing a national assessment of vulnerable coastal tourism areas - Integrating the activities of the tourism sector into coastal zone management and restoration efforts, including activities for monitoring water quality and ecosystem services - Integrating climate change risks and adaptation considerations into the tourism sector's value chain, policies and planning processes - Encouraging community-based adaptation projects developed through partnerships between tourism operators and tourism-dependent communities, such as local communities, Indigenous Peoples and women, in order to reduce their vulnerability to climate change - Providing training programmes for tourism authorities and running awareness-raising campaigns on climate hazards and adaptation across tourism-dependent communities and enterprises - Enhancing tourism diversification to reduce reliance on types of tourism that are vulnerable to climate change, such as sea- and snow-based tourism, and to mitigate seasonal variations by developing year-round mountain, historical, religious and rural tourism and ecotourism - Ensuring climate-resilient tourism infrastructure by promoting gender-responsive design, implementing water-saving technologies and strengthening regulations and standards to make tourism facilities more resilient to extreme weather events - Facilitating access to affordable climate insurance schemes for tourism operators - Deploying weather and emergency alerts in main tourist destinations
	Industry and mining - Conducting climate risk assessments for industrial facilities - Implementing heat stress adaptation measures for industrial workers, such as providing heat-tolerant clothing and ventilation systems, installing green roofs and running awareness-raising campaigns about heat stress

Sector	*Examples of adaptation measures*
	- Developing technical courses to train engineers about the risks of climate change to the mining sector - Coordinating the relocation of industrial facilities from high-risk flood zones - Enforcing standards for resilient industrial infrastructure built to withstand extreme climate events - Transforming existing industrial parks into eco-industrial parks and rehabilitating degraded mining land to restore ecosystem services
Disaster risk management	- Conducting multi-hazard risk assessments to identify the most vulnerable areas - Building gender-, age- and disability-sensitive and climate-proof emergency centres and shelters that adhere to building codes in disaster-prone areas - Introducing risk transfer mechanisms and parametric disaster risk insurance for agriculture, fisheries, forests and settlements - Setting up multi-hazard early warning systems and climate services that are sensitive to vulnerable groups such as women, children and youth, the elderly and people with disabilities - Modernizing the automated meteorological networks and data management systems to improve meteorological forecasting - Accelerating the integration of nature-based solutions and Indigenous Peoples' knowledge into the national disaster risk reduction planning process - Raising awareness among vulnerable local communities of emergency responses and livelihood protection schemes in the event of climate-induced disasters and ensuring access to sufficient psychosocial support services - Ensuring the integration of disaster risk reduction into sectoral climate adaptation plans and of climate adaptation into disaster risk reduction strategies - Developing training on climate-responsive child protection strategies and disaster risk reduction for social services workers - Strengthening and expanding the decentralized community-based disaster risk management system to promote locally led efforts, with a particular focus on the participation of women, children and youth - Promoting resilient reconstruction using low-carbon building materials and energy-efficient retrofitting practices - Developing a comprehensive disaster risk database to ensure that communities and stakeholders can easily access hazard information and disaster management knowledge
Coastal and low-lying areas	- Conducting coastal hazard and vulnerability mapping to cover the entire coastal belt - Assessing the defence capacity of existing coastal protection structures in areas at high risk of sea level rise and evaluating the feasibility of investing in new coastal protection - Reinforcing inspection mechanisms to limit the occupation of coastal territory at high risk of flooding and erosion to essential infrastructure only - Extending the coastal greenbelt to protect coastal habitats - Integrating coral reef resilience strategies into coastal management - Strengthening coastal protection by regulating the removal of beach sediment - Implementing nature-based solutions along vulnerable coastlines, such as the restoration of coral reefs and seagrass beds, the planting of mangrove forests and dune vegetation and the construction of grey infrastructure like breakwaters, revetments, groynes and sea walls - Establishing an early warning system and predictive scenario modelling for sea level rise, coastal flooding, erosion, saltwater intrusion and storm surges - Establishing research and innovation centres in coastal areas - Identifying and prioritizing climate-sensitive coastal and marine areas and preparing adaptation action plans - Incorporating climate-related risk and adaptation criteria into the coastal zone management plans

Sector	*Examples of adaptation measures*
	- Developing awareness-raising programmes and multi-stakeholder platforms to share information on climate hazards and adaptation actions and to promote incentives that enhance the climate resilience of Indigenous Peoples and local communities - Conducting training sessions for coastal managers and local authorities on climate change risks, adaptation solutions and climate-smart infrastructure development - Integrating climate-induced relocation into national development policies and planning frameworks and developing relocation site identification guidelines tailored to women, children and youth, people with disabilities and Indigenous Peoples
Urban and rural areas	**Cities and settlements** - Conducting vulnerability assessments of human settlements at risk of flooding, erosion, hurricanes and landslides - Expanding participatory climate-responsive planning in urban areas by emphasizing the resilience of low-income and marginalized communities - Implementing advisory services for heatwaves and climate-related disease outbreaks, as well as a national multi-hazard early warning system - Enforcing climate-resilient building codes that integrate climate resilience and comply with the needs of women, children and youth, the elderly and people with disabilities - Advancing the integration of nature-based solutions, such as parks, community gardens, ecological corridors, and green roofs and walls on buildings, into urban planning to reduce the heat island effect - Preventing the construction of new homes and infrastructure in urban areas at high risk of coastal flooding and erosion - Coordinating the relocation of populations at risk from climate-related hazards, including housing and infrastructure, and redefining areas by assigning new uses - Ensuring that climate change scenarios are incorporated into territorial and urban plans and guidelines - Implementing flood-resilient infrastructure in urban slums and informal settlements, paying attention to flood-proof materials and designs - Extending climate-sensitive housing assistance to poor urban populations living in informal settlements exposed to climate hazards - Developing the urban climate adaptation plans and policies - Establishing research centres to provide training on the use of technologies such as climate risk mapping and spatial planning tools, as well as on multi-layered vulnerability assessments and the integration of adaptation into urban planning **Rural areas** - Upgrading the durability and improving the accessibility of rural road infrastructure by integrating climate-resilient design and construction practices - Developing and disseminating tailored agrometeorological advisory services in rural areas - Scaling up the use of renewable energy alongside off-grid and mini-grid systems to strengthen rural energy access, system reliability and energy security - Developing a programme with a strong capacity-building component to engage rural communities in alternative sustainable industries - Conducting a multi-hazard risk assessment of rural areas in oases and mountain regions to identify those that should be prioritized for adaptation planning - Developing model climate-resilient villages that showcase integrated adaptation in the housing, water and livelihoods sectors - Updating guidelines and plans for rural buildings and infrastructure, integrating climate resilience criteria into these guidelines and plans and enforcing climate-resilient building codes and standards - Enforcing land use and zoning regulations to restrict rural development and construction in areas at high risk of flooding and landslides - Providing access to finance, credit and market opportunities to improve the livelihoods and economic empowerment of rural communities

Sector	*Examples of adaptation measures*
Ocean ecosystems	- Assessing the impact of ocean acidification on marine habitats and resources and establishing an ocean acidification monitoring programme - Expanding the network of marine protected areas to conserve marine species and setting up an advanced control and surveillance system - Building coral nurseries, natural rock barriers and artificial caves to recreate natural habitats and breeding grounds for marine species - Developing an adaptation plan for coral reefs that includes restoration potential, a monitoring and evaluation framework and climate-responsive adaptive management strategies - Ensuring the protection of seagrass areas and increasing seagrass restoration - Accelerating the use of nature-based solutions such as mangroves, seagrasses, dune vegetation and coral reefs to rehabilitate degraded marine and coastal areas, boost biodiversity and reduce coastal flooding and erosion - Developing a transboundary conservation corridor to protect marine and fishery resources - Establishing a programme for the community-led restoration of coastal ecosystems and improving conservation actions for marine mammals and other threatened species - Updating the climate risk assessments and climate vulnerability atlas for ocean ecosystems - Strengthening education and training on the impact of climate change on oceans and ocean-based livelihoods, including through the incorporation of Indigenous Peoples' knowledge - Reinforcing the monitoring system for meteorological, oceanographic, sedimentological and topographic-bathymetric variables at national and subnational levels
Poverty and livelihoods	- Designing targeted social protection programmes for populations vulnerable to the socioeconomic impacts of climate change, such as those whose livelihoods depend on agriculture, fisheries and tourism - Ensuring equitable access to climate-resilient infrastructure and basic social services for women, people with disabilities, children and youth, and Indigenous Peoples to reduce their exposure to rising sea levels, saltwater intrusion and flooding - Strengthening the mechanisms for providing safe shelter, social protection, effective insurance and microcredit to people displaced by the impacts of climate change - Developing alternative livelihood programmes for forest-dependent local communities, including the development of models and markets for non-timber forest products and sustainable ecotourism initiatives - Building climate-sensitive housing for people living in poverty - Providing training in livelihood diversification and skills development at a community level, with a focus on women and youth - Eliminating child abuse, early marriage and domestic violence triggered by climate-induced disasters - Developing operational guidelines, climate hazard risk assessments and inclusive climate adaptation planning for poor and vulnerable populations - Training social services workers in climate resilience programming and climate-responsive child protection case management systems informed by climate change data - Consolidating existing relief funds to compensate for losses incurred, targeting the poorest and most vulnerable groups in society, including Indigenous Peoples affected by climate events - Setting up a national policy and mechanism for climate-induced displacement, including post-disaster relocation
Education	- Integrating climate resilience, adaptation and climate-related loss and damage into the curriculum from preschool to higher education - Updating textbooks and other pedagogical documents - Disseminating disaster warning and climate change messages in formats accessible to children and youth, such as storytelling, comics, games and radio - Producing child- and youth-friendly versions of NDC 3.0 and related plans and policies

Sector	*Examples of adaptation measures*
	- Providing training for teachers and educators on climate change and disaster risk reduction education, including training for local community and Indigenous leaders in their own languages using methods that are culturally appropriate - Creating culturally sensitive awareness-raising campaigns that highlight the importance of environmental and climate education for local communities and Indigenous Peoples - Developing and implementing broadcasting and awareness-raising programmes on concepts and scientific information related to climate change using banners, radio, television and online media - Organizing training sessions for journalists on climate change information to tackle fake news and misinformation - Promoting the mainstreaming of climate change in strategic and operational education plans - Using school facilities to support disaster risk reduction measures by transforming them into temporary learning spaces and safe shelters during and after disaster events - Allocating financial support for adaptation innovation projects led by children and youth - Ensuring that students have uninterrupted access to education through a climate-resilient education system that can withstand extreme weather events - Upgrading or retrofitting school buildings to make them structurally sound and functional and to equip them with climate-resilient water and energy facilities - Creating counselling services in schools to address climate-related anxiety and trauma