



United Nations

FCCC/TP/2017/7



Framework Convention on
Climate Change

Distr.: General
2 October 2017

English only

Adaptation-related information included in nationally determined contributions, national adaptation plans and recent national communications

Technical paper by the secretariat


Summary

Parties are currently developing further guidance in relation to the adaptation communication, including, inter alia, as a component of nationally determined contributions, referred to in Article 7, paragraphs 10 and 11, of the Paris Agreement. Prepared in response to a request by the Ad Hoc Working Group on the Paris Agreement at the third part of its first session, this technical paper synthesizes adaptation-related information included in nationally determined contributions, national adaptation plans and recent national communications by providing an overview of the types of information that appear in those documents or plans.

GE.17-17253(E)



* 1 7 1 7 2 5 3 *

Please recycle 



Contents

	<i>Paragraphs</i>	<i>Page</i>
I. Introduction	1–5	3
A. Mandate	1	3
B. Scope and synthesis approach.....	2–3	3
C. Structure.....	4–5	3
II. Adaptation-related information in nationally determined contributions	6–42	3
A. Background.....	6–7	3
B. Types of information	8–42	4
III. Information in national adaptation plans	43–74	15
A. Background.....	43–49	15
B. Types of information	50–74	16
IV. Adaptation-related information in recent national communications	75–101	20
A. Background.....	75–76	20
B. Types of information	77–101	21

I. Introduction

A. Mandate

1. At the third part of its first session, the Ad Hoc Working Group on the Paris Agreement (APA) requested the secretariat to prepare, by 1 October 2017, a technical paper synthesizing adaptation-related information included in nationally determined contributions (NDCs), national adaptation plans (NAPs) and recent national communications (NCs).¹

B. Scope and synthesis approach

2. This technical paper is a synthesis of adaptation-related information included in:

(a) All NDCs that included adaptation-related information (108 out of the 160 NDCs contained in the interim NDC registry);²

(b) Seven NAPs submitted through NAP Central;³

(c) A total of 195 NCs (the most recent NC of each Party).

3. In the synthesis approach, the general types of information that Parties included in their documents, plans and communications were first identified, and the adaptation-related information was considered in relation to the non-exhaustive list of possible elements of an adaptation communication identified by Parties at APA 1.2 and synthesized by the secretariat in an information note.⁴ This technical paper outlines whether and how the NDCs, NAPs and NCs contain the types of information that are being discussed as possible elements of an adaptation communication under item 4 of the APA agenda.

C. Structure

4. Following the introductory chapter, this technical paper has three chapters. Chapter II contains a synthesis of the adaptation-related information in NDCs, and chapters III and IV have the same for NAPs and NCs, respectively. Each chapter is structured along the non-exhaustive list of possible elements of an adaptation communication (see para. 3 above). The titles of the elements have been slightly streamlined for this document.

5. The synthesis includes information from three very different UNFCCC instruments. Each one has its own specific mandates, purposes, functions and history. For each instrument, background information is provided at the beginning of each chapter on the nature of the different instruments to provide necessary context.

II. Adaptation-related information in nationally determined contributions

A. Background

6. At the twentieth session of the Conference of the Parties (COP), the Lima Call for Climate Action provided Parties with the opportunity to include an adaptation component in their intended nationally determined contributions (INDCs) or to communicate their undertakings in adaptation planning.⁵ In response, 165 INDCs were submitted during 2015 and 2016, 137 of which contained an adaptation component.

¹ FCCC/APA/2017/2, paragraph 24(b).

² <http://www4.unfccc.int/ndcregistry/Pages/Home.aspx>.

³ http://www4.unfccc.int/nap/News/Pages/national_adaptation_plans.aspx.

⁴ FCCC/APA/2017/INF.1.

⁵ Decision 1/CP.20, paragraph 12.

7. Decision 1/CP.21 stipulates that the INDC of each Party that ratifies the Paris Agreement will be considered an NDC upon ratification, unless the Party notifies the secretariat otherwise.⁶ These NDCs are being captured in an interim NDC registry maintained by the secretariat. As at 1 October 2017, the registry included the NDCs of 160 Parties; the NDCs of 108 Parties contain adaptation-related information. The following subchapter describes the types of adaptation-related information included in those NDCs.

B. Types of information

1. Information related to national circumstances

8. In their NDCs, Parties described their national circumstances and discussed how those relate to their vulnerabilities, adaptation and overall capacity. Information related to national circumstances includes:

(a) Development status, including status as a small island developing State (SIDS) and/or a least developed country (LDC) as well as a general characterization of the level of development (e.g. middle-income country);

(b) Economic circumstances, for example, total or per capita gross domestic product (GDP), economic growth and key sectors. Countries also highlighted successes (e.g. high growth, progress in basic services) as well as constraints, such as: insufficient GDP growth for meeting development needs and climate challenges; dependence on specific sectors such as hydrocarbon production, tourism, agriculture or finance; lack of economic alternatives; reliance on imported fuels, desalinated water, food or foreign aid; low access to electricity; and poor infrastructure;

(c) Location, geography and size, including factors such as location in a seismically active area, isolation and landlocked location. Other highlighted aspects include the country having an island, archipelago, atoll or mountainous geography, low elevation (e.g. 80 per cent of the country within 1 m of mean sea level) or a long coastline, and the country being a fully urbanized city state. Descriptions of geographical zones are also included;

(d) Climate, including its type (e.g. temperate, Mediterranean, continental, equatorial, tropical), climatic zones (e.g. arid, semi-arid) and characteristics such as annual average temperature and rainfall, climatic variability and geographical features that influence the climate (e.g. mountain chains);

(e) Natural resources, for example, availability of land and of water, energy, mineral, fish, forestry and biodiversity resources. Countries highlighted reliance on natural resources (e.g. fresh water, groundwater, forests and fuelwood), healthy coastal areas and a stable climate. They identified challenges such as limited or degraded resources, fragility of ecosystems and land-use competition;

(f) Population, including size, growth rate, levels of urbanization and poverty, distribution (e.g. in urban and rural areas or along coasts), cultural characteristics and constraints created by a small population or different lifestyles within a population. Countries also included information on indicators such as the human development index and the Gini coefficient, and highlighted health challenges, such as the Ebola virus, a high prevalence rate of the human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS), and other chronic health problems;

(g) Security situation, for example, security, development and governance challenges arising from conflicts, as well as the implications of security challenges for climate efforts. Examples include the need to divert resources to defence and reconstruction, the disruption of development projects by conflict, and the additional pressures brought on by absorbing large numbers of refugees. A successful recovery from a recent conflict was also described;

⁶ Decision 1/CP.21, paragraph 22.

(h) National greenhouse gas emissions, including the consideration that it is fair for countries with small contributions to global greenhouse gas emissions to prioritize adaptation.

2. Information related to capacity, development priorities and sustainable development

9. Countries described their development efforts, including priorities, progress in sustainable development, relevant scenarios and sectors of most importance. They also reflected on specific challenges related to sustainable development and resilience, and described how NDCs can be a development opportunity.

10. NDCs include information on general development visions, priorities and goals. These were expressed in terms of, for example:

(a) Achieving a specific development status within a certain time frame, such as becoming a middle-income country by 2030;

(b) Improving development indices (such as the human development index) or achieving economic growth to a specific level;

(c) Elaborating specific objectives, such as a resilient green economy, decent employment, capable labour, poverty elimination, sustainable production and consumption, equitable risk management, justice, good governance, democracy, legal security, transparency, macroeconomic balance, environmental protection, technology development and innovation, a knowledge economy, gender equity, the empowerment of society (e.g. women, youth and/or indigenous peoples), national security, an active civil society, and cultural and spiritual development;

(d) Ensuring the sustainability of key sectors, such as food production, water, health, forestry, energy, mining and tourism;

(e) Providing basic services and infrastructure, including education, hospitals, roads, airports, docks, welfare, housing and telecommunications;

(f) Diversifying the economy or reducing its dependence on imported fuels;

(g) Establishing harmony between the economy and the environment;

(h) Applying international development frameworks (United Nations Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs)).

11. NDCs also include specific national development frameworks, for example, visions for development, strategies for green growth and sustainable development, plans for development and for poverty reduction, and sectoral strategies.

12. Countries described how their policies link adaptation and disaster risk management with sustainable development, identifying that:

(a) While adaptation efforts described in NDCs contribute to achieving development goals, such as national goals, MDGs and SDGs, and help a society to transition into a resilient one, climate risks divert resources from the attainment of those goals and threaten to roll back development gains;

(b) NDCs are aligned with or built around national sustainable development priorities and/or sectoral plans, and could be adjusted as development goals evolve;

(c) National development plans already integrate adaptation priorities and objectives (e.g. increasing protected forest coverage);

(d) National institutions have been mandated to mainstream adaptation into development frameworks;

(e) Adaptation actions are contingent on economic growth and diversification;

(f) Resilience can be threatened by the intensive development of certain sectors, the unequal sharing of development benefits and the lack of or dependence on foreign aid.

3. Information related to impacts, vulnerabilities and risks

13. In their NDCs, Parties included information on their vulnerability, factors contributing to their vulnerability, observed and projected changes in climate parameters, specific impacts, climate risks, and socioeconomic consequences and costs of projected impacts.

14. Regarding factors contributing to vulnerability, Parties highlighted their status as SIDS or LDCs, geographical isolation, limited land resources, location in areas of high climate risk, degradation of land and nature, population growth, poverty, poor infrastructure, concentration of activities or populations in areas of high climate risk, dependence on natural resources (e.g. rainfall), economic sectors (e.g. export of hydrocarbons) or processes (e.g. desalination), low capacity to respond to climate risks, food shortages and health problems.

15. NDCs include methodologies used in vulnerability studies, such as the Intergovernmental Panel on Climate Change (IPCC) model MAGICC/SCENGEN,⁷ the Pacific-Australia Climate Change Science and Adaptation Planning programme's projections for 2100 and various local studies.

16. In terms of observed gradual changes, Parties reported on:

(a) Increase in temperature in the past 50–60 years, expressed in absolute numbers, as change per decade or as a qualitative description of warming trends;

(b) Change in precipitation in the past 50–60 years, expressed as percentage change, as change in the number of rainy days or as a qualitative description of regional or seasonal changes;

(c) Rise in sea level in the past 50–100 years, expressed in absolute numbers or as a rate of change.

17. In terms of projected changes, Parties provided information on the expected changes in:

(a) Temperature, for various time frames, in particular for the medium term (to around 2050) and the long term (to 2100). These changes were expressed as an absolute increase or a rate of increase, or as expected maximum temperatures. Regional differences were highlighted;

(b) Rainfall, expressed as quantified estimates (e.g. a reduction of 20–70 per cent by 2100) or as general descriptions of changes and/or regional variations;

(c) Sea level, mainly for the long term (up to 2100), expressed as absolute rise (e.g. 78–100 cm by 2100) or as a rate of change (e.g. 1.5–3.0 mm per year).

18. Parties provided information on climate risks, including risks that have already been observed and those that are estimated to increase in frequency or intensity in the future. The following risks were identified:

(a) Higher temperatures, heatwaves and wildfires;

(b) Variable rainfall, torrential rain, reduced river flows and floods;

(c) Droughts, longer dry seasons, desertification and sand storms;

(d) Erosion, soil degradation and landslides;

(e) More intense or frequent hurricanes, cyclones and storms;

(f) Sea level rise, storm surges, coastal degradation, erosion and saltwater intrusion;

(g) Ocean acidification, higher ocean temperatures, coral bleaching and reduced coral photosynthesis, and sargassum seaweed;

⁷ Model for the Assessment of Greenhouse-gas Induced Climate Change/A Regional Climate Scenario Generator.

- (h) Changes in ocean circulation and changes in El Niño/Southern Oscillation;
- (i) Outbreaks of pests and of vectorborne or waterborne diseases;
- (j) Changes in species distribution, including invasive species;
- (k) Permafrost and glacier melt, and glacial lake outburst floods.

19. NDCs also include information on observed extreme events, in particular storms, floods, heavy rainfall and droughts, and costs, losses and/or damage caused by such events. These were expressed in absolute sums, as the proportion of GDP or national budget, as loss of life or as the number of injured people, as lost crops or farmland or as fluctuations in prices of significant resources such as food.

20. Parties described the possible socioeconomic impacts of climate risks as well as the past and projected socioeconomic and financial costs, losses and/or damage. These were expressed as absolute financial losses, proportion of GDP, annual financial losses, losses in specific sectors (e.g. agriculture, water, infrastructure, energy), proportion of lost agricultural production or losses caused by specific impacts. The descriptions of impacts include information on risks related to, inter alia:

- (a) Loss of life, property, livelihood, culture, tradition and heritage;
- (b) Increased social inequality, instability and conflict, and risks of migration;
- (c) Vulnerable sectors and resources, including:
 - (i) Food security and associated areas (agriculture, animal husbandry, fisheries);
 - (ii) Water, health, tourism, energy, education, natural resources, ecosystems, biodiversity, forests and wildlife;
 - (iii) Settlements, infrastructure and buildings;
 - (iv) Trade and economic activities (e.g. mining, insurance and financial services);
 - (d) Vulnerable groups, including children, youth, women, the elderly, poor people, smallholders, people with disabilities, indigenous peoples, ethnic minorities and people living with HIV/AIDS;
 - (e) Particularly vulnerable areas (e.g. river deltas, low-lying territories, mountain ranges, drought-prone regions, cities or specific municipalities).

4. Information related to legal and policy frameworks and institutional arrangements

21. In their NDCs, countries provided information on adaptation-related national laws, policies and development frameworks. This included information on:

- (a) Laws and other legal frameworks relevant to adaptation. Parties highlighted, inter alia, general climate change laws as well as laws focused on environmental protection, the sustainable use of natural resources, disaster risk management, forestry and physical planning. The importance of the legal harmonization of climate-related issues was mentioned;
- (b) National climate change policies, programmes, strategies and plans that have been relevant for the preparation of the adaptation aspects of the NDCs;
- (c) National adaptation policies, strategies and plans, in particular on:
 - (i) The status and aims of the process to formulate and implement NAPs, and the functions of the NAPs vis-à-vis the NDCs;
 - (ii) National adaptation programmes of action (NAPAs);
 - (d) Other national adaptation policies, action plans, strategies, programmes and frameworks, as well as resilience strategies and programmes;
 - (e) Policies and action plans for disaster risk reduction and risk management, including the integration of such policies with climate change adaptation efforts, for example by formulating joint national disaster risk management and adaptation plans;

- (f) The relationship between national development policies, plans and frameworks and the adaptation aspects of the NDCs;
- (g) Sectoral plans, strategies and programmes, including for:
 - (i) Agriculture and rural development, including specific sectors such as coffee;
 - (ii) Food security, for example a national agrofood policy;
 - (iii) Water resources, water security and flood resilience;
 - (iv) Human health, including pilot projects in the health sector;
 - (v) Forestry, including national forestation and reforestation plans;
 - (vi) Biodiversity, protected areas and the environment;
 - (vii) Coastal zones, including a national coastal risk assessment programme;
 - (viii) Fisheries;
 - (ix) Energy, such as a national energy policy or an energy road map;
 - (x) Infrastructure, including plans for public works and transport, and building codes;
 - (xi) Disaster risk management, and emergency preparedness and response;
 - (xii) Natural resources, such as a national commodity policy;
 - (xiii) Science, such as a programme for the study and preservation of glaciers.

22. The NDCs include descriptions of the national institutional arrangements relevant to adaptation, highlighting institutions such as:

(a) National climate change committees, councils and cabinets or a focal point network responsible for, for example, the coordination of implementation, monitoring and evaluation, and advising the government, and often comprising representatives of different branches of government, of regions or of sectors;

(b) Divisions, advisory boards, bureaux and directorates for climate change or adaptation, in charge of, for example, coordination, technical assistance, monitoring and exchange of information;

(c) Government ministries, agencies and departments, in particular those for environment and sustainable development and for sectors such as tourism, infrastructure, sanitation, natural resources, forestry, oceans, science, technology and disaster management;

(d) National meteorological institutions and climate information systems;

(e) Funding mechanisms, including national funds and financial mechanisms for climate change, adaptation, sustainable development and disaster risk reduction, as well as associated arrangements such as national implementing entities of designated national authorities for international funds.

23. The NDCs also include information on relevant international frameworks, highlighting, for example, the importance and key provisions of the Convention, NCs, biennial update reports and technology needs assessments. Parties drew attention to regional adaptation plans, strategies and frameworks, and to the importance of ensuring synergies with other international conventions and treaties.

5. Information related to decision-making processes and prioritization of adaptation options

24. In terms of decision-making processes, countries described, inter alia, how the NDC process was initiated, which institutions were involved, how stakeholders were consulted and how the NDC was approved. While each country applied an approach most suitable to its national circumstances, the approaches often comprised:

(a) The involvement of various ministries, a national climate change authority and the highest levels of government in different roles;

(b) An inter-agency working group or a task force, which coordinated the preparations of the NDC;

(c) A technical advisory committee of sectoral experts that provided technical guidance and support for drafting;

(d) Consultations with stakeholders, including through written inputs or in the form of a national workshop, a conference or a dialogue.

25. In terms of factors for prioritization of adaptation options, countries highlighted that prioritization could be based on, for example:

(a) National development priorities and plans, for example, priority would be given to actions that help to meet national development objectives;

(b) The SDGs;

(c) An analysis of the impacts, vulnerabilities, solutions and challenges related to each adaptation option;

(d) Human rights, the rights to health and/or development, and the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and/or vulnerable people;

(e) Other social objectives, such as gender equality, the empowerment of women, intergenerational equity and a just transition of the work force;

(f) The potential of actions to generate co-benefits, promote economic diversification, reduce the impacts of response measures or enhance synergies with mitigation;

(g) Existing climate policy instruments, such as: NAPs; national climate change action plans, strategies and laws; NCs, NAPAs and associated projects; plans by subnational and local governments; and cross-cutting, sectoral and geographical policies that include climate change considerations;

(h) Local and indigenous knowledge.

6. Information related to key economic sectors in which adaptation action takes place

26. In the NDCs, adaptation actions are identified mainly for the following sectors: agriculture and livestock, water resources, biodiversity and ecosystems, disaster risk management, health, infrastructure and transport, forestry, energy, coastal zones, buildings and settlements, land use, fisheries and tourism.

7. Information related to priorities, plans and actions, programmes and strategies

27. Parties referred to various general approaches they intend to implement, including their intentions to:

(a) Strengthen vulnerability analysis;

(b) Formulate and implement national adaptation plans or sector-specific plans;

(c) Design and implement local adaptation plans or community-based adaptation, and strengthen the role of local governments;

(d) Mainstream and/or integrate climate impacts and adaptation into development, plans, strategies, laws, policies, regulations, environmental programmes and projects, reforms, and measures for ensuring political stability and security;

(e) Undertake actions with mitigation and sustainable development co-benefits, including economic diversification actions;

(f) Promote regional and international cooperation and partnerships with civil society, including community groups and non-governmental organizations;

- (g) Identifying sources and modalities for adaptation finance, and strengthening investment capacity through, for example, national funds and enabling environments for the private sector;
- (h) Implement insurance schemes, measures to manage financial risk and social safety nets;
- (i) Put in place measures for conflict prevention and resolution;
- (j) Implement gender mainstreaming;
- (k) Address the needs of most vulnerable communities and groups;
- (l) Enhance efforts related to science, monitoring, data and analysis, including: training, early warning and climate information systems, meteorological frameworks, climate change indicators, climate models, representative concentration pathway (RCP) scenarios of the IPCC and traditional knowledge;
- (m) Build capacity of various segments of society through, inter alia, technical training, research and development, data collection and application;
- (n) Raise awareness by integrating adaptation into education and strengthening communication and outreach, including through public awareness campaigns.

28. Parties also highlighted their intended efforts in specific sectors or areas, including:

(a) Agriculture and food security, identifying techniques such as enhanced irrigation, resilient crops or livestock, and climate-smart agriculture, as well as economic measures such as agricultural diversification, investments and insurance. Parties also referred to integrating climate criteria into agriculture and food security policies and including agriculture in the NAPs. Many other measures, such as early warning systems, adapting agricultural calendars and enhancing food storage, were mentioned;

(b) Water, mentioning, inter alia: mainstreaming climate change into the water sector; establishing national laws, strategies, institutions, regulations or plans, including a NAP for the water sector; cooperating on transboundary waters; applying technologies for saving, recycling, treatment and irrigation; implementing integrated water resources management and watershed management, early warning systems and emergency measures; monitoring resources and quality; transferring water to distressed areas; and restoring wetlands. Parties also referred to controlling demand by, inter alia, promoting public awareness; improving metering and distribution, reducing leakage and pricing water; and improving supply by desalination, rainwater or floodwater harvesting, multipurpose dams, artificial lakes, groundwater recharge, improved pumps and wells, and water imports;

(c) Biodiversity and ecosystems, such as ecosystems-based adaptation, the adaptation of species and ecosystems, and the restoration of biodiversity. Parties referred to adopting national strategies, plans, programmes and specific measures, such as monitoring biodiversity, conserving wetlands and marine environments, establishing protected areas on land or sea, and enhancing ecotourism and other revenue-generating activities, agroforestry, habitats, biological corridors, water points for wildlife and disease control;

(d) Health, referring to, for example: integrating climate change into sectoral planning, disease control and prevention; combating vectorborne and other diseases; implementing early warning systems, emergency plans, health surveillance, information systems and databases; conducting research; building hospitals and health centres; and building capacity in medical services, communication, education and awareness, and implementing MDGs and development goals;

(e) Disaster risk management, outlining, inter alia, early warning systems, monitoring and forecasting, enhanced communication systems, emergency preparedness and response, vulnerability mapping, integration of disaster management into climate change and development strategies, insurance, shelters and protective measures, knowledge and awareness, and regional institutions and policies;

(f) Infrastructure and transport, noting, for example, risk assessment guidelines, the integration of adaptation into physical development plans and into land-use and

technical and building codes, urban planning, the expansion of mass transport, stronger local planning and infrastructure relocation, and the inclusion of infrastructure as a sector in the NAPs. In terms of water infrastructure, the NDCs also mention water catchment protection, flood barriers at underground railway stations and dam security;

(g) Forestry, such as sustainably managing forests, protecting and regenerating forests (including quantitative targets), halting deforestation and reducing illegal logging (including quantitative targets), introducing drought-resistant forest species, conserving watersheds, introducing agroforestry, providing tax and economic incentives for forest protection, promoting community forest management and enhancing governance;

(h) Energy, identifying, inter alia, diversification (renewable energy or fuel substitution), the adaptation of hydropower to reduced rainfall, performance standards and awareness campaigns to increase energy efficiency, ‘climate proofing’ and the integration of climate change into investments, enhanced access to electricity and the review of codes, regulations and policies;

(i) Coastal zones, emphasizing, inter alia: integrated coastal zone management; the incorporation of climate change into coastal development policies, guidelines and regulations; the construction of dykes, breakwaters and other coastal protection measures; the use of monitoring tools, hazard maps and a coastal vulnerability index; planting mangroves and coastal forests; the relocation of vulnerable populations or economic activities; and education and awareness-raising;

(j) Buildings, for example, improving building codes and providing incentives for compliance, making homes ‘cyclone proof’ (e.g. preparing all buildings for extreme events by 2030), relocating settlements in vulnerable areas and providing alternative housing, and enhancing urban planning;

(k) Land use, outlining measures such as those designed to integrate land management and mainstream climate change into land reform policies, fight erosion, combat soil degradation and rehabilitate land;

(l) Fisheries, highlighting measures such as those related to sustainable fishing management, insurance for fishers, artificial reefs to recover local fish stocks, protection of breeding sites, cage-culture farming, multipurpose dams, aquaculture on land farms, non-destructive fishing, technological solutions to fisheries management (e.g. radar reflectors on fishing boats) and capacity-building for, inter alia, fishers and institutions;

(m) Tourism, highlighting, for example, adaptation norms for coastal tourism facilities and nature-based and sustainable tourism.

8. Information related to progress in implementation of adaptation efforts

29. The NDCs contain information on the implementation of adaptation efforts and on investments made to promote resilience, with an emphasis on the adaptation component of the NDCs as a contribution to global efforts to address climate change. Information is included on:

(a) Quantified domestic investments made in the past to enhance resilience in various sectors as well as through specific programmes and measures;

(b) Progress in the process to formulate and implement NAPs, including the development of a NAP road map and laying the groundwork for formulating and implementing a NAP;

(c) Legal frameworks established to enhance adaptation efforts;

(d) Projects that have been successfully implemented, in particular in the areas of water and food security. These include projects identified in the NAPAs;

(e) Steps to integrate climate change into national development plans;

(f) Measures taken to strengthen institutions and technical arrangements;

(g) International support that has been received for the implementation of various projects and programmes, and information on participation in international frameworks that has enabled successful implementation;

(h) Steps taken to designate protected areas, including the designation of the entire exclusive economic zone of a country as a marine park, or to protect a specific proportion of the national territory.

9. Information related to costs of adaptation

30. Countries provided information on the estimated costs of their adaptation efforts. They referred to, inter alia, the costs of implementing the adaptation efforts outlined in the NDCs, including NAPs, policies and specific projects and programmes in various sectors. The costs were expressed in different ways, including as total costs during a specific implementation time frame, annual costs during implementation, proportion of GDP, proportion of government expenditure or proportion of net official development assistance.

31. Countries also described the costs of adaptation that they have incurred in the past. These were expressed, for example, as a total amount spent during a specific time frame, the proportion of the total climate budget spent on adaptation or the investment in adaptation in specific sectors.

32. In addition, countries highlighted in the NDCs, in relation to adaptation costs, the lack of studies, insufficient information and methodological uncertainties. It was emphasized that strong and early mitigation will reduce the need for adaptation efforts and associated costs.

10. Information related to implementation and support needs, and adaptation needs

33. In their NDCs, Parties identified various types of implementation and support needs, and adaptation needs, including their overall needs as well as specific needs for finance, technology and capacity-building support. Possible sources of support were also identified.

34. The NDCs provided various perspectives on overall support, including that:

(a) Support, means of implementation, international assistance, and regional and international cooperation are important for meeting national adaptation objectives;

(b) National resources may be available for implementation of the entire NDC or specific parts of it (e.g. pilot projects, planning, capacity-building);

(c) Adaptation needs and the scale of necessary action may have to be reconsidered in the light of emerging scientific information and future levels of mitigation ambition.

35. The NDCs also highlight specific adaptation needs and gaps, in particular, needs for:

(a) Expertise, human resources and training;

(b) Research, information (including climate data), scaling down climate models, research and systematic observation, monitoring and weather stations;

(c) Mapping vulnerabilities and risks, and early warning systems;

(d) Planning, including the formulation of NAPs and of regional, local and spatial plans;

(e) The integration of climate change into development;

(f) Awareness, communication and education, and evidence for the benefits of adaptation;

(g) Institutional coordination, laws, regulations and governance;

(h) Adaptation-related research and development;

(i) The capacity to assess adaptation costs in order to quantify impacts in economic terms;

- (j) Instruments and markets for finance, insurance and risk;
 - (k) Focused adaptation projects;
 - (l) Action in sectors such as health, food security, water, energy, disaster risk reduction, land management, agriculture, infrastructure and transport, as well as cross-cutting efforts.
36. In terms of the needs for international finance, countries included information on, for example:
- (a) Total needs for international support for the implementation of the adaptation aspects of the NDCs, expressed as absolute numbers for specific time frames, or as annual needs;
 - (b) Finance needs to implement specific projects.
37. Countries also provided information on technology needs, including:
- (a) Noting that their contribution is conditional on access to technology, that the formulation of a NAP requires technology, that institutions are needed to introduce adaptation technology and to strengthen legal protection of intellectual property rights and that international support is needed to develop domestic technology and for technology training;
 - (b) Areas where technology is needed, for example:
 - (i) Vulnerability assessments;
 - (ii) Forecasting, climate and weather modelling, early warning systems and Doppler radar networks;
 - (iii) Coastal infrastructure and coastal protection;
 - (iv) Water management, including hydrological monitoring, recycling of water, protection of rivers and construction of canals;
 - (v) Agriculture and food security, including zero-tillage farming, crop varieties, drip irrigation, precision farming, livestock health, and biotechnology for combating pests;
 - (vi) Forestry, including aeroplanes to fight wildfires;
 - (vii) Transport systems, in order to make them resilient;
 - (c) Progress, results or constraints of technology needs assessments;
 - (d) Intended technology cooperation, for example with universities, research institutions and the private sector, to meet technology needs.
38. Capacity-building needs were identified in the following specific areas:
- (a) Human resources and a roster of national experts;
 - (b) Development of adaptation plans and strategies;
 - (c) Community resilience and participation;
 - (d) Vulnerability and risk assessment, monitoring, detection and prediction;
 - (e) Research on the impacts of response measures and on economic diversification;
 - (f) Evaluation of adaptation needs and prioritization of efforts;
 - (g) Legal frameworks, institutions, taxation and regulations;
 - (h) Health institutions;
 - (i) Soil protection, water resources management and forest management.
39. In addition, the NDCs highlighted ongoing work, including the mainstreaming of gender and the incorporation of human rights into capacity-building, the preparation of

national regulations and long-term plans, and the strengthening of links between government departments. They also highlighted that capacity gaps have not yet been assessed.

40. The NDCs also identify possible sources of support, including:

(a) National sources of finance, for example, specific monetary amounts (expressed in absolute numbers or as a proportion of the total cost of the adaptation component of the NDC) to be mobilized, funds and investment plans;

(b) International sources of finance, for example, bilateral, multilateral and regional sources, international institutions such as the Adaptation Fund, the Green Climate Fund (GCF) and the Global Environment Facility (GEF), foreign direct investments, grants and loans;

(c) North–South and South–South cooperation;

(d) Private sector investments, including by creating adaptation opportunities that can attract private sector investments;

(e) Market and non-market mechanisms;

(f) Support by UNFCCC institutions (e.g. technology support by the Climate Technology Centre and Network).

11. Information related to indicative level and adequacy of support provided

41. Regarding the level and adequacy of support provided, the NDCs describe, inter alia:

(a) Support received, including information on and acknowledgement of bilateral support, and the sources and amounts of finance received for adaptation;

(b) Readiness of countries to provide support to other countries through various channels, including South–South and bilateral cooperation, for specific areas, including awareness-raising, education, capacity-building, research and development, resilient agriculture, forestry, and protected areas;

(c) Challenges that developing countries face in relation to access to support, including ineligibility, difficulties in accessing international climate funds, a low level of commitments and a lower share of adaptation funding compared with similar countries.

12. Information related to monitoring and evaluation of adaptation, process used and findings

42. Regarding monitoring and evaluation, the NDCs contain information on, inter alia:

(a) Overall aims of monitoring and evaluation, for example aims that help to ensure the implementation of efforts towards economic diversification and mitigation co-benefits;

(b) Elements and indicators that could be monitored, including:

(i) Adaptation goals, targets and baselines;

(ii) Implementation of NAPs and climate strategies;

(iii) Quantified indicators, such as the proportion of development plans integrating adaptation, poverty level, forest coverage, access to health care and access to clean water;

(c) Systems used, the relationship of such systems to other frameworks, and the process of developing and operating such systems (e.g. in a consultative and participatory manner);

(d) Institutions involved, including a national climate change committee, a focal point network, a monitoring and evaluation unit at the head of government’s office, a designated national authority and specific ministries;

- (e) Communication of information, for example, the inclusion of monitoring and evaluation in NCs, BURs and periodic monitoring reports at the national level;
- (f) Timelines, for example, review of NAPs every five years and submission of annual reports to the head of government.

III. Information in national adaptation plans

A. Background

43. By decision 1/CP.16, the COP established the process to formulate and implement NAPs to enable the Parties that are LDCs to address medium- and long-term adaptation needs, and invited other developing country Parties to employ the modalities formulated to support the NAPs.⁸ Between 2011 and 2016, the COP adopted six decisions⁹ on NAPs containing mandates in relation to, inter alia, their overall framing, technical guidelines,¹⁰ financial and technical support, reporting, communication of NAP documents and relevant outputs through NAP Central.¹¹

44. The objectives of the NAP process are:¹²

- (a) To reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience;
- (b) To facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate.

45. The initial guidelines adopted by the COP for the formulation of NAPs include the following elements:¹³

- (a) Laying the groundwork and addressing gaps;
- (b) Preparatory elements;
- (c) Implementation strategies;
- (d) Reporting, monitoring and review.

46. The “Technical guidelines for the national adaptation plan process” (hereinafter referred to as the NAP technical guidelines), prepared by the Least Developed Countries Expert Group (LEG) as mandated by the COP, are based on the elements listed in paragraph 45 above. The Adaptation Committee reviewed the NAP technical guidelines and invited developing country Parties that are not LDCs to apply them, depending on individual country circumstances.

47. The LEG continues to provide technical guidance and support to developing countries as they make progress in formulating and implementing their NAPs. The LEG is developing supplementary guidelines on achieving coherence between the NAPs and the SDGs within the framework of the 2030 Agenda for Sustainable Development.

48. Many developing countries have communicated their progress in undertaking the process to formulate and implement NAPs.¹⁴ While many are still in the laying the groundwork or preparatory stages of the process, seven developing countries have communicated their NAPs through NAP Central.¹⁵

⁸ Background information on the NAP process is available at <http://unfccc.int/7279>.

⁹ Decisions 5/CP.17, 12/CP.18, 18/CP.19, 3/CP.20, 4/CP.21 and 6/CP.22.

¹⁰ Available at <http://www4.unfccc.int/nap/Guidelines/Pages/Technical-guidelines.aspx>.

¹¹ <http://unfccc.int/nap>.

¹² Decision 5/CP.17, paragraph 1.

¹³ Decision 5/CP.17, annex.

¹⁴ See document FCCC/SBI/2016/INF.11.

¹⁵ Available at <http://www4.unfccc.int/nap/Pages/national-adaptation-plans.aspx>.

49. There is no standard structure and format for the NAP. The NAP guidelines allow for a flexible approach depending on the needs of the country. In the round of workshops on NAPs held in 2017, country participants discussed what information would go in the NAP, supported by other outputs that could be appended or referenced in annexes to the main plan. The following elements were suggested for inclusion in the NAP (in addition to an executive summary and relevant annexes):¹⁶

- (a) Essential background and development context, including national overview of development and past climate change activities;
- (b) Vision, mission and objectives of the NAP, and links to SDGs and other relevant frameworks;
- (c) Mandate and institutional arrangements;
- (d) Strategic framework and road map for the NAP process;
- (e) Climate risk analysis;
- (f) Assessment of impacts, risks and vulnerabilities;
- (g) Priority adaptation needs and actions;
- (h) Implementation strategy (action plan);
- (i) Monitoring and evaluation framework, including plans for reporting and contributions to sustainable development.

B. Types of information

1. Information related to national circumstances

50. Information on national circumstances varies from one NAP to another, and may include some or all of the following:

- (a) An overview of national development circumstances and priorities, highlighting, for example, which sectors or thematic areas play a major role in the economy and how they are becoming more vulnerable to climate change;
- (b) Information on participation in the UNFCCC process, including the status of submission of national reports and how the formulation of a NAP and its submission complies with the agreement under the process;
- (c) Presentation of various stressors, including climate risks and vulnerabilities as well as non-climatic stressors, such as armed conflict, high incidence of poverty and exposure to geological hazards;
- (d) Rationale for the formulation of the NAP, including how it builds on existing policies and structure at the national level and how it consolidates the country's climate actions towards the attainment of its vision;
- (e) An executive summary, including the objectives and the linkages of the NAP to existing policies and the sustainable development agenda;
- (f) A population profile of vulnerable groups and communities, citing women, youth, the elderly and marginal groups belonging to these categories, and how they affect the achievement of the national development goals;
- (g) Geographical and climatic characteristics of the country and how these are likely to change by 2100, determined by using climate scenarios based on the recent IPCC assessment reports;
- (h) A description of key systems and priorities for climate change adaptation and how these systems are connected to the characterization of development priorities as a whole.

¹⁶ Adapted from document FCCC/SBI/2016/INF.11 and modified based on the outcomes of the regional training workshops on NAPs held in 2016 and 2017.

2. Information related to capacity, development priorities and sustainable development

51. The NAPs reflect that countries have framed their planning in the context of their sustainable development priorities and achievement of their overall development visions. The NAP is seen as a tool that would enhance resilience and propel the countries towards achieving their visions, notwithstanding the climate vulnerabilities and risks.

52. NAPs also recognize, and build on, the inherent interlinkages between adaptation actions and the targets under the SDGs. This is expressed by, for example, identifying NAPs as a tool to advance the achievement of the SDGs within the framework of the 2030 Agenda for Sustainable Development, aspiring to integrate NAPs into the national development agenda for the realization of the SDGs and by describing the potential contribution of NAPs towards achieving the SDGs. For example, adaptation actions in the agriculture sector could contribute to the achievement of SDG 2 (“End hunger, achieve food security and improved nutrition and promote sustainable agriculture”). This type of interlinkage is true for most of the key sectors or development themes, such as food security, water, health and coastal systems.

3. Information related to impacts, vulnerabilities and risks

53. Most NAPs contain a dedicated section on the overall description of the country’s vulnerability to climate change. In several cases, the impacts are specific to priority development sectors.

54. Vulnerabilities to climate change and its impacts are often used interchangeably in most NAPs and mostly refer to droughts, floods, sea level rise (for coastal areas), extreme events and changing seasonal patterns.

55. The NAPs include the following information on the vulnerabilities, impacts and risks of climate change:

(a) Observed and/or expected changes in temperature, rainfall pattern and sea level;

(b) Observed and/or expected impacts and risks for specific sectors (e.g. agriculture, livestock, coastal management, water, health, energy, mining, industry, infrastructure, urban development/settlement and cities, social economy, tourism, education and training);

(c) National, regional or local perspectives on the vulnerability of livelihoods to climate change;

(d) Examples of vulnerable communities and groups, including indigenous peoples, artisanal fishers, farmers, informal settlers, riparian dwellers, youth, the elderly and pregnant women, as well as consideration of gender aspects of climate impacts.

56. A time horizon is associated with impacts in the NAPs; for example, for rising atmospheric temperature, the physical impacts of declining ecosystem services as a result of drought or changing seasonal patterns are long-term impacts.

57. The NAPs show the different methodologies that the countries used in assessing vulnerabilities and risks. Some Parties employed a multi-stakeholder approach to validate the vulnerabilities and risks they had based on existing studies, while others included a systematic use of scaled-down global climate models and generated climate simulations for studies of impacts and vulnerabilities.

4. Information related to legal and policy frameworks and institutional arrangements

58. Legal and policy frameworks included in the NAPs take into account existing relevant policies on climate change. A few NAPs referred to mandates issued specifically for the formulation and implementation of the NAP. Other relevant information includes:

(a) Legal frameworks and institutions supporting research on climate risks, impacts and vulnerabilities;

(b) Existing or expected national agencies, institutions or bodies dedicated to the implementation or coordination of the NAP;

(c) Existing or expected regional agencies, institutions or bodies dedicated to the implementation of the NAP;

(d) Responsibilities of each ministry or institution involved in the implementation of the NAP, both for sectoral and for cross-cutting issues;

(e) Existing or expected synergies among the national and local institutional frameworks, research institutes, civil society and the private sector regarding the implementation of the NAP;

(f) Information on progress in the formulation and implementation of a NAPA and how it served as an important starting opportunity for the NAP;

(g) An indication that the adaptation components of INDCs/NDCs are largely based on the adaptation options and actions identified in the NAP.

5. Information related to decision-making processes and prioritization of adaptation options

59. Most of the NAPs highlighted priority adaptation needs based on key sectors and systems that are highly vulnerable to climate change. While some NAPs provided information on how the needs were prioritized and which criteria were used, detailed descriptions of the methodology were not provided.

60. Proposed mechanisms to ensure mainstreaming of climate change functions across national and local governments in order to manage implementation of the actions identified in the NAPs were described.

61. One country highlighted the establishment of a technical advisory committee that would improve coherence and ensure that climate change data and information are aligned with national and local planning processes.

62. Descriptions of decision-making processes included information on how actions will be monitored, at both the national and the local level.

63. Stakeholder consultations were held to prioritize adaptation actions for different sectors. For example, a technical working group on adaptation further refined the list from the stakeholder consultations by using the following criteria: urgency and ease of implementation in the short term; compatibility with the national climate change action plan adaptation actions and with the medium-term plan actions; and inclusion of a low-regrets option, if implemented. Further refinement was done by the technical working group on macro-level adaptation actions, related sub-actions, ongoing projects and initiatives, time frames, budgets and proposed implementing agencies.

6. Information related to key economic sectors in which adaptation action takes place

64. The NAPs show how countries framed their NAP within their development context and how the NAP aligns with important sectors that drive the country's economy. The prominent economic sectors highlighted in the NAPs are agriculture, livestock, water resources, forestry, rangelands, biodiversity, ecosystems and wildlife, coastal and marine systems, fisheries and aquaculture, infrastructure, cities and settlements, transportation, industry, telecommunications, energy and mining, and tourism.

7. Information related to priorities, plans and actions, programmes and strategies

65. The NAPs contain comprehensive coverage of adaptation priorities, describing specific actions for each sector.

66. The actions referred to in the NAPs were classified into policies, programmes and projects. The methodologies used for arriving at a set of actions for each sector differ for each country. However, the common denominator among them is that the actions directly address vulnerabilities and risks to climate change based on the assessments conducted.

67. The NAPs identify, inter alia, the following policies, programmes and projects:

(a) Cross-cutting policies to enhance coordination mechanisms in the existing institutional arrangements, including by setting up a longer-term structure for implementing climate change activities;

(b) Policies that mandate ‘climate proofing’ of national and subnational plans in order to include climate change considerations and ensure the integration of adaptation into the planning and decision-making processes of the government;

(c) Policies that enhance university curricula so that they mainstream climate change adaptation into education and training. Other policies lean towards being regulatory, for example: an enhanced water use protocol to address future changes in water reserves; the prohibition of activities that exacerbate soil conditions hence minimizing the risks of rain-induced landslides; and other environmental protection strategies that are also considered adaptation actions;

(d) Programmes intended to be implemented over a longer time frame compared with projects, as well as programmes that include several components and may be implemented through projects;

(e) Programmes that are packaged by sector or thematic area, for example: (1) an adaptation programme for agriculture that is designed to foster a secure environment for decision-making by farmers and public policy managers through efficient access to information, technology and production processes; (2) rehabilitating livestock farming stations in order to use them for monitoring climate data that then feed into evaluating the availability of feed crops in pastoral zones; and (3) water harvesting for water resource management;

(f) A sustainable programme for capacity-building and training, mentioned in the majority of the NAPs, that would enable transfer of technology and knowledge among different branches of the government. For cities and settlements, this means designing and implementing resettlement projects (i.e. social housing and strengthened urban planning) with consideration of both climate change adaptation and disaster risk reduction in vulnerable cities;

(g) Adaptation actions packaged as projects based on priority sectors or thematic areas. Most adaptation options are presented as a general strategy that will form the basis of specific projects. Some examples of such projects described in the NAPs are:

(i) Rehabilitating the infrastructure of water sources such as wells, canals and springs;

(ii) Conducting spatial analysis of climate risk target populations;

(iii) Establishing simulation centres for identifying risks and vulnerabilities and implementing sector-specific projects with climate change considerations.

8. Information related to progress in implementation of adaptation efforts

68. The NAPs contain some references to adaptation actions already undertaken, including examples of ongoing projects on specific sectors, and descriptions of institutions and other arrangements that have been put in place to implement adaptation. Information related to progress by developing countries in the process to formulate and implement NAPs is submitted by Parties to the Subsidiary Body for Implementation (SBI) as part of the ongoing assessment of progress. An online questionnaire, based on a request from the SBI, is available on NAP Central,¹⁷ and in addition, the LEG collects information during NAP events. This information is summarized annually in a progress report on NAPs submitted to the SBI.¹⁸ Detailed information on past and ongoing adaptation activities is also contained in stocktaking reports that some countries produce as part of their outputs on NAPs.

¹⁷ Available at <http://www4.unfccc.int/nap/Pages/assessingprogress.aspx>.

¹⁸ FCCC/SBI/2014/INF.25, FCCC/SBI/2015/INF.11 and FCCC/SBI/2016/INF.11.

9. Information related to costs of adaptation

69. The majority of the NAPs contain the estimated costs of the adaptation actions identified. The costs are presented by sector or thematic area, as total costs of implementation of the NAP in its entirety, as costs of priority adaptation measures or as regional estimates. Cost estimates were provided for different implementation time frames (e.g. for a five-year period or up to 2030). The NAPs also contain information on the processes, models or formula used for arriving at the cost estimates.

10. Information related to implementation and support needs, and adaptation needs

70. Information on support needs is included in some of the NAPs, with a detailed description of the implementation strategy. In most of the NAPs, the implementation and support needs refer to:

(a) Financial needs to support the implementation of the policies, programmes and projects identified in the NAPs;

(b) Technical capacity to undertake key milestones of the NAP process, including: assessing vulnerability, undertaking climate modelling, interpreting climate information, implementing adaptation actions, drafting project proposals, and monitoring and assessing progress;

(c) Climate information and data that are up-to-date and localized.

11. Information related to indicative level and adequacy of support provided

71. Information on support provided and received is compiled as part of the annual information paper on progress by developing countries in the process to formulate and implement NAPs, which is submitted to the SBI. The progress report provides a compilation of data from various sources without an assessment of adequacy.¹⁹

72. Parties are also cognizant of how the NAPs link to the country programmes being prepared to access the GCF and how the adaptation actions can be packaged into proposals aligning with the result areas on adaptation under the GCF.

12. Information related to monitoring and evaluation of adaptation, process used and findings

73. The majority of the NAPs include a strategy for the monitoring and evaluation of both the process and the adaptation actions indicated in the NAPs. Information includes:

(a) Detailed indicators for each strategic objective of the adaptation actions identified;

(b) Timeline for assessment, indicating a two- to three-year period of assessment;

(c) Timeline for review, indicating review every five years (with one mid-term review after two-and-a-half years);

(d) Methodology for the assessment;

(e) Responsible agency for conducting the assessment.

74. Some of the NAPs give additional information about:

(a) Specific indicators for each adaptation strategy or measure;

(b) The role of the various actors responsible for conducting the assessment, which in most cases is the climate change office of the country in partnership with the planning ministry and the respective sectors.

¹⁹ FCCC/SBI/2014/INF.25, FCCC/SBI/2015/INF.11 and FCCC/SBI/2016/INF.11.

IV. Adaptation-related information in recent national communications

A. Background

75. All Parties submit NCs, but the content and timetable for submission are different for Parties included in Annex I to the Convention (Annex I Parties) and Parties not included in Annex I to the Convention (non-Annex I Parties). In terms of adaptation-related information, Annex I Parties provide information on, inter alia, expected impacts and vulnerability, adaptation actions taken, plans for coastal zone management, water resources, and agriculture, and adaptation support. Non-Annex I Parties provide information on, inter alia, national circumstances, expected impacts and vulnerability, policy frameworks, programmes containing adaptation measures, barriers, support received and an evaluation of adaptation strategies and measures. In terms of timing, Annex I Parties submit NCs in accordance with the deadlines established by the COP, in general every four years, and non-Annex I Parties should submit their NCs within four years of the initial disbursement of financial resources to assist them in preparing their national communications.

76. The type of information that should be included in NCs is outlined in the following guidelines:

(a) “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications”,²⁰

(b) “Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention”.²¹

B. Types of information

1. Information related to national circumstances

77. The NCs contain broad information related to national circumstances, including information on:

(a) Geography and physical characteristics of the country, such as location, size, topography and geology, as well as administrative regions;

(b) Population characteristics, including size, growth rate, density, demographic profile and trends, social situation, health, welfare, households, labour force, urbanization level and development indicators;

(c) Climate and environment facts and figures, including on natural resources, climate vulnerabilities, extreme events, biodiversity, water resources, forests, mineral resources, land use and land-use change, ecosystems, flora and fauna, protected areas, rainfall, temperature and wetlands;

(d) Economic circumstances, including economic profile and trends, development and the relationship between climate change and the domestic economy;

(e) Key economic sectors, identifying sectors such as energy, transportation, industry, manufacturing, agriculture, waste, tourism, fisheries, communication, buildings and housing, construction and livestock. Some Parties included analyses of sector vulnerabilities and their greenhouse gas emissions;

(f) Governance and institutions, specifically, domestic political systems, decision-making structures, legal frameworks, institutional arrangements for monitoring,

²⁰ FCCC/CP/1999/7, chapter II. In these guidelines, adaptation-related information is identified in paragraphs 49, 52, 53, 55 and 63.

²¹ Decision 17/CP.8, annex. In these guidelines, adaptation-related information is identified in paragraphs 3, 4, 26, 28, 29, 30–36, 41, 44, 47 and 53.

reporting and verification, and relevant environmental policies and programmes, including those specific to the implementation of activities under the Convention;

(g) Social characteristics, including history, culture, health, education, gender, youth, social services, social infrastructure, and poverty and quality of life estimates;

(h) National priorities, targets and challenges, specifically, economic, environmental and political challenges, short-term objectives, regional development priorities, challenges related to the MDGs, national development strategies and targets, and emission reduction targets;

(i) Science and technology, such as environmental and other ongoing research activities, national research institutions, and technology transfer and related funding mechanisms.

2. Information related to capacity, development priorities and sustainable development

78. In their NCs, Parties included information on the general development goals to which their domestic programmes and policies are directed, including objectives such as elevating the standard of living for the country's citizens, economic growth, increasing resilience of the country to the effects of climate change, and capacity-building for domestic actors and institutions. In describing goals, references were made to relevant development indicators and trends used for assessing progress, such as GDP growth rate, population growth, urbanization and food consumption patterns.

79. In addition, explicit connections between sustainable development and adaptation actions were made. For example, it was indicated that climate change has posed a threat to development progress to date and will do so for future development goals, and may in fact reverse progress made in economic development, livelihoods, living standards, infrastructure, food and energy security, and other key areas.

80. The NCs also contain information on specific development plans, frameworks and strategies. For example, there were references to:

(a) National sustainable development strategies;

(b) Strategic development plans;

(c) Frameworks linking climate change adaptation and disaster risk reduction;

(d) National health action plans;

(e) Strategies for growth and poverty alleviation;

(f) Five-year plans for national economic and social development;

(g) Sustainable development plans;

(h) Climate-resilient green economy strategies;

(i) Framework acts on low-carbon, green growth;

(j) Ways in which adaptation plans and measures can further progress sustainable development.

3. Information related to impacts, vulnerabilities and risks

81. In relation to this element, the NCs included information on:

(a) Climate conditions applied as a baseline for estimating impacts, vulnerabilities and risks, including information on indicators such as average temperature, water level, precipitation, ocean acidification, incidence of extreme weather and interactions between the national climate conditions and regional temperature cycles such as El Niño/Southern Oscillation;

(b) Socioeconomic conditions that are relevant to assessing vulnerabilities and risks, including information related to health, urbanization, poverty level, food security and level of reliance on local resources;

(c) Methodological approaches used to assess impacts, risks and vulnerabilities, including information on data collection and use, models used to make projections, institutions and actors involved in conducting and contributing to assessments, and general frameworks (e.g. top-down or bottom-up) used to guide assessments;

(d) Climate change experienced in the country to date and its impacts, including information on specific climate indicators and trends such as precipitation, temperature, extreme weather, climate-related disasters, glacier melt, coastal erosion, storm surges, ocean acidification and sea level rise. Information regarding seasonal variations, such as the duration of wet or dry seasons, was frequently included;

(e) Regional variations in climate trends experienced already and future projections, including information on regional divisions such as coastal zones, urban areas, rural areas and different ecological zones within countries;

(f) Projected climate change scenarios, including short-, medium- and long-term predictions and predictions based on different emissions scenarios. In describing these scenarios, Parties relayed information regarding the specific models used to arrive at the projections, including national models, RCP scenarios and general circulation models. The NCs describe projected changes in key indicators, such as surface air temperature, precipitation, frequency and severity of extreme weather events, ocean acidification, the frequency and duration of coral bleaching, and mean sea level rise;

(g) Ongoing or recently concluded vulnerability assessments, highlighting key areas of vulnerability and the links between climate risks and other national objectives and factors, such as food security, human health, pests and disease, human migration patterns, economic growth and competitiveness;

(h) Systematic variations in vulnerabilities, including descriptions of how some sectors, geographical regions and population groups are more vulnerable than others, as well as vulnerability assessments for different groups in society, evaluating which groups are most (or, in some cases, least) at risk from the predicted impacts of climate change. For example, a social vulnerability index was used to compare the vulnerabilities of different demographic groups, including the elderly, youth and ethnic minorities, across different municipalities;

(i) Key economic sectors that are vulnerable to the impacts of climate change, drawing attention to sector-specific vulnerabilities, damage to date, projected impacts, and links between these factors and general development trajectories and outcomes. Parties often highlighted the relative size and significance of their key sectors using information such as the contribution of each sector to the domestic economy in absolute or relative terms;

(j) Specific vulnerabilities of various sectors, including:

(i) Agriculture, in particular, vulnerabilities and risks faced by domestic agriculture sectors that are exacerbated or otherwise influenced by climate change, as well as relevant factors such as increased frequency and severity of crop diseases, increased soil erosion, and losses in agricultural production and crop yield due to extreme weather;

(ii) Water, including information on climate change related impacts, vulnerabilities and risks in the water sector, such as changes in the distribution of water that affect its availability and therefore livelihoods, and reduced water quality;

(iii) Health, referring to, for example, the relationship between climate change impacts and public health, noting vulnerabilities such as hunger and malnutrition due to increased food insecurity, increases in diarrhoeal diseases due to water scarcity, increases in vectorborne diseases such as malaria due to higher temperatures and direct impacts such as loss of life and injury from extreme events;

(iv) Forestry, noting various climate change related vulnerabilities, including an increase or projected increase in forest fires, a change in the distribution of forest species and a threat to biodiversity;

- (v) Biodiversity, identifying, inter alia, changes in the timing and duration of growing seasons, changes in the distribution of species, species endangerment and extinction, and general biodiversity loss;
- (vi) Coastal zones, outlining, for example, increased risks of flooding and inundation from extreme weather, increased coastal erosion, changes to coastal ecosystems, and alterations in sediment deposition patterns and coastal ecosystems;
- (vii) Fisheries, including changing population numbers and distribution because of ocean acidification and ocean circulation patterns, and habitat loss and degradation for marine animals;
- (viii) Tourism, describing threats posed to domestic tourism by climate change, including how reduced snow cover is threatening winter tourist traffic, how cultural heritage sites such as archaeological sites and ancient buildings are threatened by climate change impacts, and how coastal erosion and sea level rise are endangering key tourist areas;
- (ix) Energy, including challenges for thermal generation, shifts in energy consumption, higher demand for cooling, as well as economic losses due to interruptions caused by extreme weather;
- (k) Broader systematic variations in vulnerabilities and impacts, highlighting regional geographical and economic trends that render some regions more or less vulnerable than others;
- (l) Potential positive impacts and opportunities that may emerge, including longer growing seasons, higher agricultural productivity, and increased opportunities in the tourism sector. However, it was also reported that any benefits expected are likely to be offset by negative impacts;
- (m) Uncertainties in climate projections and vulnerability assessments, noting the coarse resolution, difficulties with scaling down and other limitations of climate models, as well as the wide range of dynamic factors that must be taken into account in projections and assessments. In the light of these uncertainties, information on confidence levels and intervals accompanied projections and estimates;
- (n) Frameworks and guidelines used to guide assessments of impacts, risks and vulnerabilities, including NAPA guidelines, the IPCC seven steps of climate impact assessment, and relevant United Nations Environment Programme handbooks.

4. Information related to legal and policy frameworks and institutional arrangements

82. The NCs contain information on a wide range of domestic and regional laws, policies, institutions and related frameworks that serve to facilitate the planning and implementation of adaptation actions, including information on:

- (a) Existing overarching mechanisms, institutions and policy instruments that are relevant to advancing adaptation actions. Parties mentioned, inter alia, national emergency management agencies, national action plans for the environment, disaster prevention and preparedness programmes, and other similar cross-cutting instruments;
- (b) Relevant sector-specific frameworks and policies involved in domestic adaptation efforts, such as national water policies, strategies and action plans for the protection of biological and landscape diversity, food security programmes, forest acts, national energy policies and public health policies;
- (c) Domestic institutions and agencies whose work is relevant to domestic adaptation efforts, including ministries of finance, environment, fisheries, health, agriculture and forestry, or their national equivalents. Ways in which these frameworks and institutions have contributed or will contribute to adaptation planning and implementation throughout the country were detailed, including, in some cases, details on how these frameworks and institutions are being integrated or synergized in order to advance adaptation efforts;

(d) Ways in which UNFCCC guidelines have shaped and facilitated domestic progress on adaptation.

5. Information related to decision-making processes and prioritization of adaptation options

83. The NCs contain broad information related to the processes underlying adaptation planning and prioritization. This information demonstrates the wide range of institutions, governmental bodies, community groups, individuals and other actors involved in adaptation. More specifically, the NCs include information on:

(a) Specific guidelines, criteria and strategies applied to identify adaptation priorities, such as NAPA guidelines, cost–benefit analyses, cost-effectiveness analyses and multi-criteria analyses;

(b) General approaches and guiding principles underlying adaptation decision-making and prioritization, including:

(i) Conducting stakeholder consultations, which are then integrated into adaptation efforts, partly as a means to identify and prioritize potential adaptation projects;

(ii) Prioritizing the use of cost-efficient no- and low-regret adaptation measures that do not involve large trade-offs with other objectives and areas;

(iii) Prioritizing sector-specific adaptation options based on sector vulnerabilities in the light of observed and projected climate change impacts, for example, by comparing the ratio of a sector’s adaptation implementation costs with the cost of losses reduced by the measures, or by considering the certainty, timing, importance and severity of projected impacts in order to rank sectors from most to least vulnerable;

(iv) Taking into account synergies with various environmental policies, tools and frameworks, including international frameworks such as the MDGs;

(v) Analysing which adaptation options are expected to yield the largest number of beneficiaries;

(c) The influence of regional frameworks and policies in guiding adaptation plans and priorities, for example regional policies that apply to relevant partners;

(d) The need to maintain flexibility in adaptation planning and prioritization, including by regularly updating strategies, programmes, plans and assessments so that they continue to meet the needs of citizens and other stakeholders.

6. Information related to key economic sectors in which adaptation action takes place

84. In terms of adaptation in specific sectors, in the NCs the following sectors, inter alia, are identified as adaptation priorities: agriculture, water, health, forestry, biodiversity, coastal zones, fisheries, tourism, infrastructure, services, energy, transportation, urban areas and industry. In the NCs Parties elaborated on the completed, ongoing, planned and proposed adaptation measures aimed at reducing damage and building resilience within each sector, as well as relevant sector-specific policies, frameworks and institutions that guide and facilitate adaptation planning and implementation.

7. Information related to priorities, plans and actions, programmes and strategies

85. The NCs include information on proposed or planned adaptation options intended to address the risks and vulnerabilities highlighted by the countries’ vulnerability assessments. Information is included on both concrete adaptation measures intended to be implemented on the ground, and indirect actions, such as legislation or institutional measures, intended to facilitate the implementation of concrete adaptation measures. Parties frequently included information on adaptation options specific to certain regions or sectors, as well as their engagement in international cooperation.

86. In terms of legislative, planning and institutional measures, the NCs include descriptions of efforts related to, inter alia: creating new laws, regulations and institutions; reforming and strengthening existing laws, regulations and institutions; improving coordination and collaboration between existing institutions; mainstreaming climate adaptation into relevant programmes and policies; conducting vulnerability assessments and mapping exercises to bridge existing knowledge gaps; conducting feasibility studies to demonstrate the efficacy and long-term sustainability of proposed adaptation measures; initiating training and educational programmes to improve local capacity; and strengthening local ownership and social linkages to advance resilience.

87. In the NCs Parties identified concrete adaptation measures proposed or planned throughout the country. These measures are often mentioned within the context of specific sectors, such that explicit links are made between the proposed measures and the sectoral vulnerabilities that they are intended to address. Adaptation efforts for specific sectors include:

(a) For agriculture, adjusting agricultural structures and implementing high-efficiency, water-saving irrigation systems and traditional methods of planting and food preservation;

(b) For water, improving water management strategies, enhancing storage, metering and pricing of water, conducting public awareness campaigns to advocate efficient use of water, and harvesting rainwater;

(c) For health, raising awareness about the health impacts of climate change, developing and implementing early warning systems for impending extreme weather events, and distributing free mosquito nets;

(d) For forestry, conducting sustainable forest management and reforestation efforts, and improving silviculture practices;

(e) For biodiversity, conducting workshops and adaptation training related to biodiversity adaptation, creating new institutions to support governmental decision-making, and better incorporating predicted climate change impacts into species and land management;

(f) For coastal zones, applying hard and soft structural technologies, planting mangroves and implementing local monitoring networks to detect changes and dangers in coastal areas;

(g) For fisheries, promoting and developing aquaculture, developing technology for open sea cultivation, and developing methodologies to monitor and diagnose diseases and other problems;

(h) For tourism, making artificial snow, diversifying the types of tourist attractions on offer and incentivizing the involvement of the private sector.

88. In their NCs, Parties also discussed strategic cross-cutting adaptation measures planned throughout the country, such as capacity-building, public education campaigns, participatory or community-based research and adaptation planning. Information was also included on cross-sectoral and thematic issues such as urban areas and agroecological zones.

89. Parties made reference to specific adaptation plans and programmes that have been or are being developed, such as:

(a) NAPAs;

(b) National climate change policies;

(c) National climate change adaptation strategies and policies;

(d) Adaptation policy frameworks;

(e) National policies on disaster prevention and preparedness.

90. In addition to descriptions of plans, programmes and proposals, the NCs also include information regarding the expected results of the outlined plans and proposals. In some

cases this information was qualitative, indicating the general trends and benefits expected to result from specific measures. In other cases, this information was quantitative, including numerical estimates of expected changes resulting from the successful implementation of specific measures.

8. Information related to progress in implementation of adaptation efforts

91. The NCs include descriptions of domestic adaptation efforts that are in progress or already completed. Information on these efforts includes their objectives and implementing actors, the time frames in which the measures were implemented or are being implemented, the projected costs of the measures, the anticipated benefits and co-benefits of the measures, and good practices and lessons learned throughout the process of implementation of the measures.

92. The NCs also include descriptions of the disadvantages and trade-offs associated with implemented adaptation measures and climate action more broadly. For example, while hard engineered structures are durable and effective coastal adaptation measures, they are also very difficult and costly to implement in dynamic and shifting environments. Another example is the experience of the tourism sector of adverse effects from measures such as air transportation fuel taxes, which render the sector more vulnerable.

93. In addition to sector- or region-specific adaptation measures, the NCs include information on general approaches to adaptation measures implemented throughout the country. For example, information is included on community-based adaptation efforts intended to achieve objectives such as enhancing local capacity, enhancing regional capacity, and developing new products and tools to integrate climate information into local development activities.

9. Information related to costs of adaptation

94. The NCs include information on the estimated costs of proposed adaptation measures. In some cases, these costs are contrasted with the estimated costs of inaction; that is, with the estimated costs of damage attributable to the impacts of climate change. When providing cost estimates for proposed adaptation measures, Parties discussed the various assumptions and uncertainties associated with the estimates.

95. The NCs also include Parties' reflections on the costs of proposed adaptation measures in relation to their domestic economy by including information on the costs as a percentage of the country's GDP.

10. Information related to implementation and support needs, and adaptation needs

96. In relation to this element, the NCs contain information on barriers and challenges impeding adaptation action as well as on the relative weight or importance of these challenges for domestic adaptation efforts, considering the Parties' particular national circumstances. The primary types of barriers and challenges include:

(a) Social, including low levels of public awareness and literacy related to climate change adaptation and climate change more broadly, and inadequate or underdeveloped mechanisms for involving local communities;

(b) Economic, including high levels of poverty and economic inequality, and challenges related to the composition of the domestic economy (e.g. economic dependence on fossil fuels);

(c) Financial, such as: inadequate funds to conduct comprehensive vulnerability assessments and to plan and implement adaptation measures; inefficient or ineffective domestic financial systems; and difficulties accessing international funding;

(d) Technical and knowledge-related, including information and capacity gaps that hinder the process of designing and implementing adaptation measures. Gaps are present in: availability of up-to-date, high-quality, peer-reviewed data tailored to local conditions; appropriate national expertise in areas such as vulnerability assessments and

adaptation; research and development institutions dedicated to climate change adaptation; and technological development and on-the-ground access to innovative technologies;

(e) Administrative and institutional, such as: overlapping or unclear mandates of national ministries leading to poor management of resources and problems; the absence of effective coordination mechanisms at the federal and regional levels; a lack of transparency in decision-making about or implementation of adaptation measures; the absence of information and knowledge management systems; and insufficient or inadequate guidelines for mainstreaming climate change into relevant policies and programmes;

(f) Political, such as political instability and inconsistent or insufficient engagement from political officials.

11. Information related to indicative level and adequacy of support provided

97. The NCs of non-Annex I Parties include information on the amount of funds received in aid and the sources of aid, with references to funding arrangements involving bilateral and regional partners. Information is included on the support received from multilateral development banks and designated funds operated under other international multilateral instruments, such as the Least Developed Countries Fund under the GEF, as well as on anticipated funding.

98. The NCs of non-Annex I Parties also include examples of projects, programmes and institutions funded by aid from Annex I Parties, and highlight the various ways in which this aid is helping to advance domestic adaptation efforts through research, planning, capacity-building, implementation and related efforts.

99. Further, the NCs of non-Annex I Parties elaborate on support provided by non-state actors, such as non-governmental organizations and international scientific and advisory institutions. Information is included on funding, on-the-ground capacity-building initiatives, research projects, assistance with submissions to the secretariat and fulfilment of other international obligations.

100. In their NCs, Parties included in Annex II to the Convention included information related to support provided, including:

(a) Qualitative descriptions of the adaptation programmes, projects and initiatives supported, as well as quantitative information on the levels of bilateral financial contributions (including for capacity-building, coastal zones, land-use planning, rural development and water management), and multilateral financial contributions (including to the Adaptation Fund, the GCF, the Least Developed Countries Fund, the Special Climate Change Fund and the World Bank's Pilot Program on Climate Resilience);

(b) Indications that particularly vulnerable countries had been prioritized when allocating adaptation support;

(c) Activities taken to support adaptation in developing country Parties, including: identifying and disseminating strategies; supporting the formulation of strategies and plans; identifying priority measures; enhancing access to meteorological services and data; building capacity to assess and respond to risks; responding to the needs and priorities identified by partners in bilateral agreements; increasing understanding and awareness of impacts and vulnerabilities by, inter alia, knowledge-sharing and South-South learning processes; establishing partnerships and alliances; 'climate proofing' bilateral development assistance; cooperating with the private sector; and supporting disaster risk reduction, ecosystem-based adaptation, insurance and prevention;

(d) The scaling up of adaptation support for, inter alia, national planning, disaster risk reduction, climate services and food security, and steps taken to strengthen support, such as the integration of adaptation into development assistance programmes;

(e) Efforts to mainstream climate change into development assistance and shifting investment patterns towards climate-friendly activities;

(f) Technology transfer, including bilateral support for climate observations and early warning systems, water, agriculture, infrastructure and settlements, as well as for cross-cutting measures;

(g) Capacity-building support for the implementation of adaptation, including efforts made in enhancing the resilience of vulnerable communities to long-term impacts, noting that capacity-building cuts across domains such as vulnerability assessment, disaster risk reduction, development and transfer of technologies, and education, training and public awareness, and that gender considerations should be taken into account in capacity-building.

12. Information related to monitoring and evaluation of adaptation, process used and findings

101. In relation to this element, Parties included information on:

(a) The importance of monitoring and evaluation as a key step in the climate change adaptation process and the corresponding necessity for building capacity in this area and developing continuous monitoring and evaluation schemes alongside domestic adaptation measures. It was noted that careful monitoring and evaluation of implemented adaptation actions is crucial in order to analyse what is working, what is not working, and why, and that a key barrier to adaptation is that monitoring and evaluation systems are weak or non-existent in many governmental agencies;

(b) Needs that must be met in order to design and implement harmonized monitoring and evaluation systems throughout the country;

(c) Proposed adaptation measures that are expected to facilitate monitoring and evaluation efforts, such as the establishment and implementation of sector-specific databases, the initiation of community-based monitoring systems, and the introduction of the requirement that each domestic ministry, department and agency prepare a monitoring and evaluation plan, including specific indicators, in order to track progress on climate change adaptation efforts;

(d) Specific indicators used in monitoring and evaluation efforts, and the consideration of how national indicators in other areas incorporate climate change.