

VI. PRIORITIES FOR MITIGATION AND ADAPTATION AS REPORTED BY DEVELOPING COUNTRIES UNDER THE CONVENTION

494. This chapter summarizes priority areas for climate change mitigation and adaptation as identified by non-Annex I Parties under the Convention process. It should be noted that, as these priorities have been identified in different contexts, they do not comprise a comprehensive view of the priorities and needs of non-Annex I Parties. However, they complement the discussions of investment and financing needs in CHAPTERS IV and V by highlighting particular mitigation and adaptation areas/activities important for non-Annex I Parties. These priorities should also be considered when discussing the role of different sources of investment and financial flows and their future potential.

495. Information on priority areas for mitigation and adaptation provided by developing countries under the Convention has been mostly of a qualitative nature, as Parties were not required to calculate costs of priority actions. Therefore, the analysis in this chapter does not include an assessment of total costs of mitigation and adaptation measures. It should also be noted that the priority rankings in this summary correspond to the

rankings provided by Parties in different reporting contexts and, because the data is only qualitative, it is difficult to compare these priorities with priorities for funding when costs are considered, as in the previous chapters.

496. This chapter provides information contained in initial national communications (INCs), technology needs assessments (TNA), NAPAs, reports from regional workshops and expert meetings on adaptation and response measures, and submissions from Parties under the Nairobi Work Programme on impacts, vulnerability and adaptation to climate change, in particular on climate-related risks and extreme events.

6.1. PRIORITY AREAS FOR MITIGATION

497. Two thirds of non-Annex I Parties⁴⁴ reported on the need for mitigation measures in the energy sector. Roughly half of the Parties identified measures to limit emissions and enhance removals by sinks in the LULUCF sector. About a third of the Parties reported on measures to abate GHG emissions in the agriculture and waste sectors. FIGURE VI-17 shows the distribution of mitigation project proposals by sector and region.⁴⁵

498. FIGURE VI-18 summarizes the needs for mitigation technologies identified in TNAs by sector.

⁴⁴ Information here and further is based on the Sixth compilation and synthesis of initial national communications from Parties not included in Annex I to the Convention (FCCC/SBI/2005/18). Additional 12 initial national communications submitted since then are still to be examined by the Consultative Group of Experts.

⁴⁵ FCCC/SBI/2005/18/Add.3. From Europe, only Georgia, and from Middle East, only Jordan, submitted project proposals.

Figure VI-17. Regional and sectoral distribution of mitigation project proposals

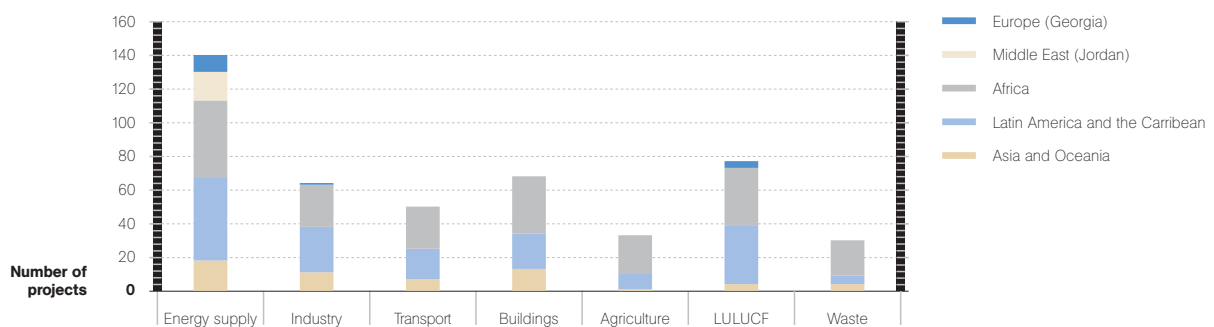
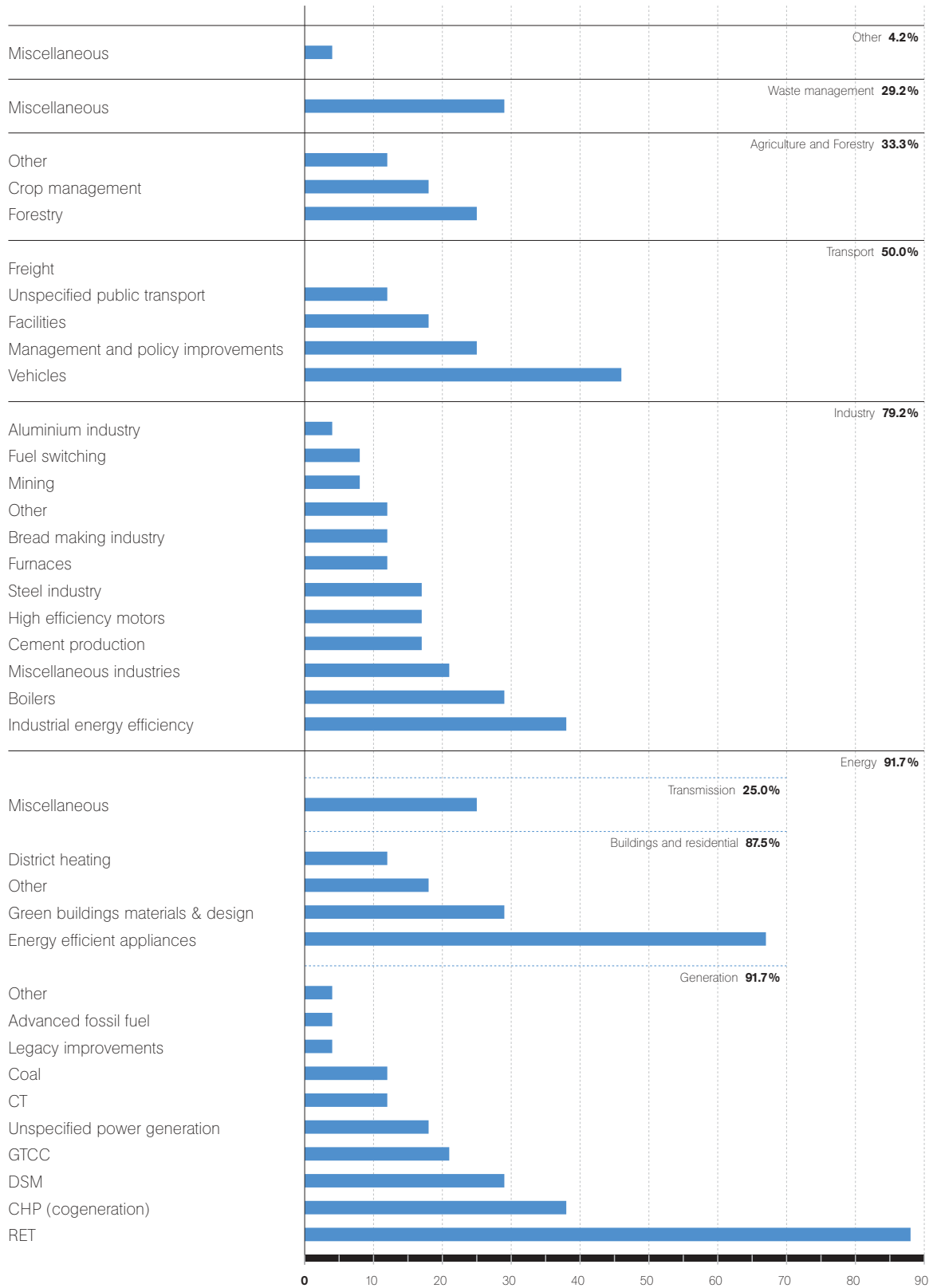


Figure VI-18. Mitigation sectors, sub-sectors and technologies commonly identified by Parties in technology needs assessments



Source: FCCC/SBSTA/2006/INF.1.
Abbreviations: CHP = combined heat and power; CT = combustion turbine; DSM = demand side management; RET = renewable energy technology; GTCC = gas turbine combined cycle.

6.1.1. SECTORAL ANALYSIS OF PRIORITY AREAS

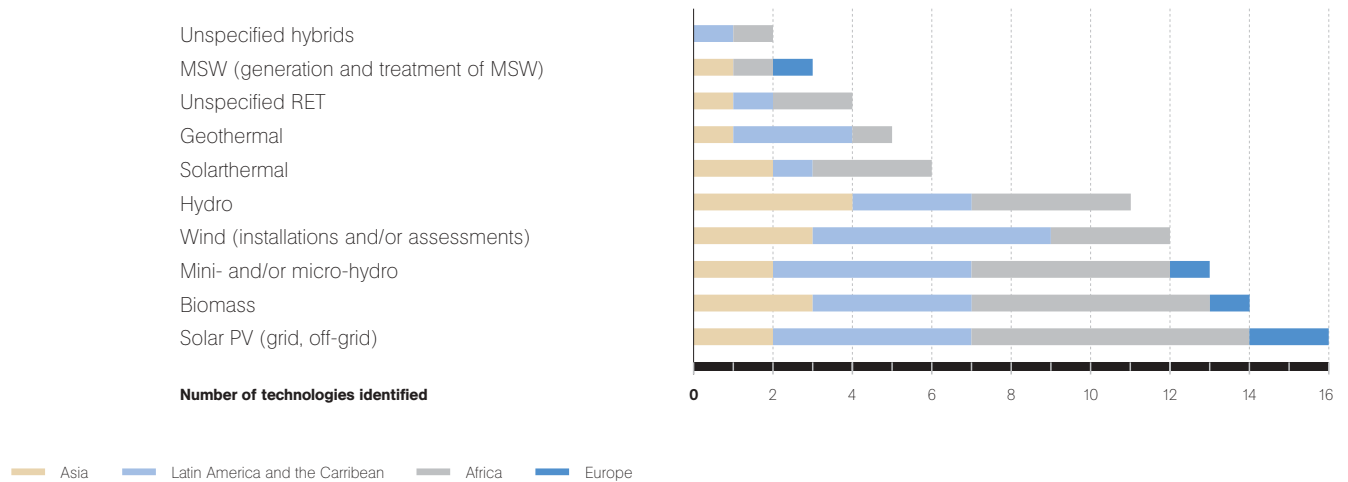
6.1.1.1. ENERGY SUPPLY

499. In INCs, nearly half of reporting Parties reported that they are implementing, or considering the implementation of small hydropower applications to increase their energy supply in order to meet their pressing needs for power, and considering alternative fuels in the transportation sector. Many Parties reported that they do have measures in place to encourage the use of cleaner alternative fuels.⁴⁶

500. Of the 140 mitigation project proposed by Parties in the energy sector, 103 involve switching to renewable sources of energy, 25 deal with the efficient conversion of fossil fuels to electricity and 11 suggest a switch to lower-carbon fossil fuels. This distribution of projects matches the technology needs most commonly identified in TNAs. Solar photovoltaic (grid and off-grid), wind farms, biomass, and micro- and mini-hydro plants were the most frequently mentioned renewable energy technology needs. **FIGURE VI-19** provides an overview of commonly identified renewable energy technology needs.

⁴⁶ FCCC/SBI/2005/18/Add.3

Figure VI-19. Needs for renewable energy technology commonly identified by non-Annex I Parties



Source: FCCC/SBSTA/2006/INF.1.

6.1.1.2. INDUSTRY

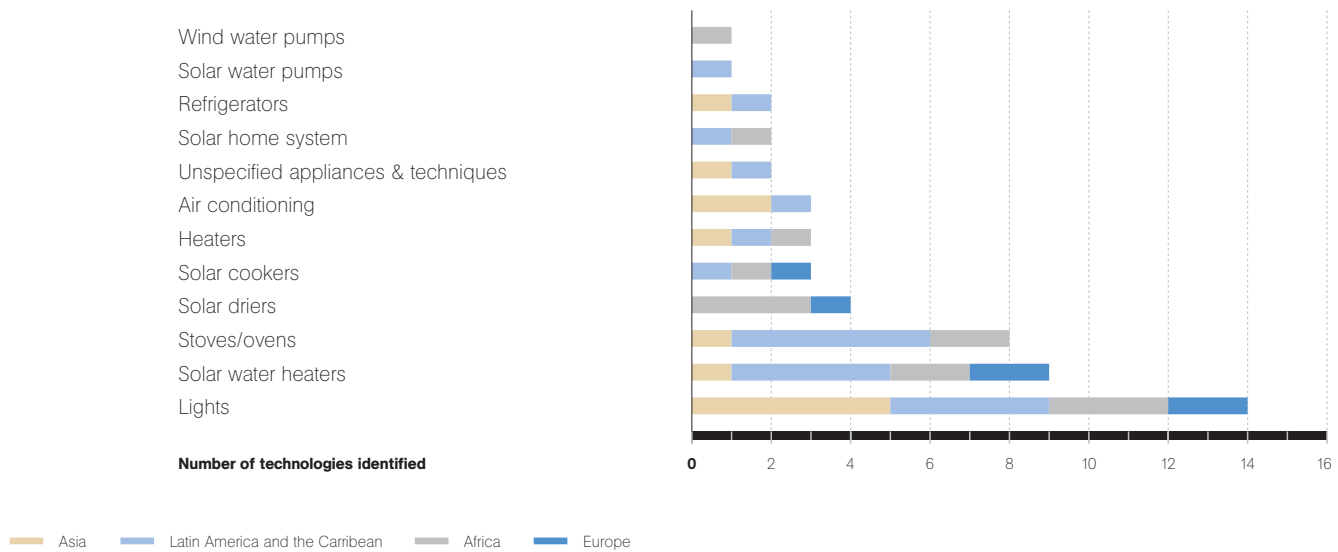
501. Priority areas identified in INCs and TNAs in the industrial sector were in the cement and steel production industries. Mitigation options considered by Parties include the modernization of industrial processes and equipment, and the promotion of energy efficient technologies. Examples of specific measures proposed are the introduction of efficient fuel for boilers and the introduction of efficient coal-fired boilers, electrical motors and lighting in industrial buildings.

502. Sixty-five mitigation projects proposed by Parties in their INCs fall in the industry category. Twenty nine involve the introduction of new technologies and processes (e.g., technology in the cement industry) and 18 target non-energy-related process improvements to reduce GHG emissions.

6.1.1.3. RESIDENTIAL AND COMMERCIAL SECTOR

503. In INCs Parties identified the following mitigation measures in the residential and commercial sector: improving efficiency of cooking stoves; promoting more efficient household appliances; enhancing efficiency of lighting; increasing efficiency in the building sector; promoting solar energy for water heating in the residential sector; and implementing demand-side management programmes. Half of the mitigation projects in this category are proposed by African countries, mostly targeting improved cooking stoves and more efficient lighting. **FIGURE VI-20** below provides details on needs for energy efficient technology in the buildings and residential sector.

Figure VI-20. Needs for energy efficient technology in the buildings and residential sectors commonly identified by non-Annex I Parties



Source: FCCC/SBSTA/2006/INF.1.

6.1.1.4. TRANSPORTATION

504. In INCs nearly two thirds of the Parties identified mitigation measures in the transportation sector that focussed on technologies, such as the introduction of electric or compressed natural gas vehicles and hybrid vehicles, and the implementation of vehicle emission standards, and measures focused on mode switching and other behaviors affecting transportation. Almost half of the Parties reported that they are considering alternative fuels in the transportation sector, with the greatest interest coming from Latin America. Thirty four of the 50 mitigation project proposed by parties in the transportation sector include the promotion of public transport and the use of bicycles.

6.1.1.5. WASTE SECTOR

505. In INCs most mitigation measures identified focussed on solid waste. Measures focuses on the reduction of waste generation at the source and on the promotion of integrated waste management, waste recycling and composting. Mitigation measures dealing with waste water focused on the recycling and treatment of municipal waste water, and on the recovery of methane from waste-water treatment as biogas. Most mitigation project proposals in the waste sector (14 out of 32) focus on methane recovery from solid-waste disposal and methane reduction from waste water.

6.1.1.6. AGRICULTURE AND LULUCF

506. Frequently identified mitigation measures in the agriculture sector in INCs relate to changes in cattle management practices, rice cultivation and the use of fertilizers. Fourteen mitigation project out of 33 proposed in the agriculture sector involve improvement in the management of ruminant livestock and six involve improvement in rice production practices.

507. Mitigation measures mentioned in the INCs for the LULUCF sub-sector include the promotion of forest conservation and restoration, afforestation and reforestation activities; improvement of forest management practices and the promotion of sustainable forest development; the promotion of conservation and substitution of fuel wood; and the promotion and development of agroforestry.

508. Eighty-six mitigation projects are proposed by parties in their INC in the LULUCF sector. Thirty of these aim at the reduction of deforestation and assistance with regeneration, 12 of these target fuel conservation and substitution (all in African countries). Fifty-six project proposed target reforestation or afforestation of lands, with 28 focusing on the development of production forestry or agroforestry (mostly in Latin American countries).

509. The technology needs related to these sectors identified in TNAs included better land processing techniques, forest fire monitoring and prevention, mechanization of timber processing and logging, valuation of forest waste (for biomass energy) and tree planting. As for avoided deforestation, Parties highlighted needs for capacity building and technology transfer to implement adequately their policies, and measures to reduce emissions from deforestation.⁴⁷

6.2. PRIORITIES AREAS FOR ADAPTATION

510. Overall, Parties emphasized the need for a holistic approach to adaptation planning, as many adaptation measures can simultaneously address vulnerabilities in several sectors. Parties also noted that adaptation measures are country specific. Among the sources of information reviewed, only NAPAs contain financial estimations of needs. These estimates are indicative only. Parties used different methodologies to calculate costs of NAPA priority activities. Of the 17 NAPAs submitted by June 2007, 16 contain cost estimates of NAPA projects amounting to a total of USD 292 million (see [FIGURE VI-21](#)).⁴⁸ As of June 2007, eight NAPA activities have been formulated as PIFs and submitted to the Least Developed Countries Fund (LDCF) (and its co-financing) and the total funding expected from the GEF is USD 21.56 million.

511. [FIGURE VI-22](#) shows the costs of NAPA priority activities by sector. Actual project proposals submitted for GEF funding may comprise priority activities across several sectors.

512. With regard to technology needs for adaptation, agriculture, fisheries and coastal zones were identified as priority sectors by most Parties, according to the INCs and TNAs. [FIGURE VI-23](#) lists the technologies for adaptation which were prioritized in TNAs.

⁴⁷ Submissions from Parties. FCCC/SBSTA/2007/MISC.2 and Add.1.

⁴⁸ This does not include Niger, which did not provide an estimation of project costs.

Figure VI-21. Cost of priority activities identified in national adaptation programmes of action, by country (in millions of United States dollars)

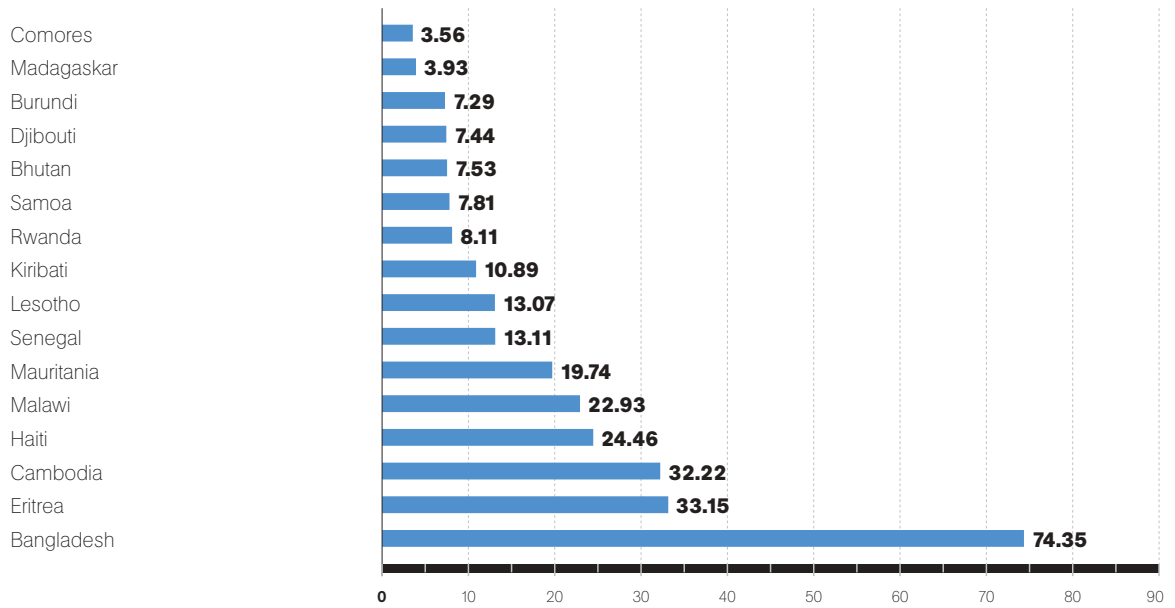
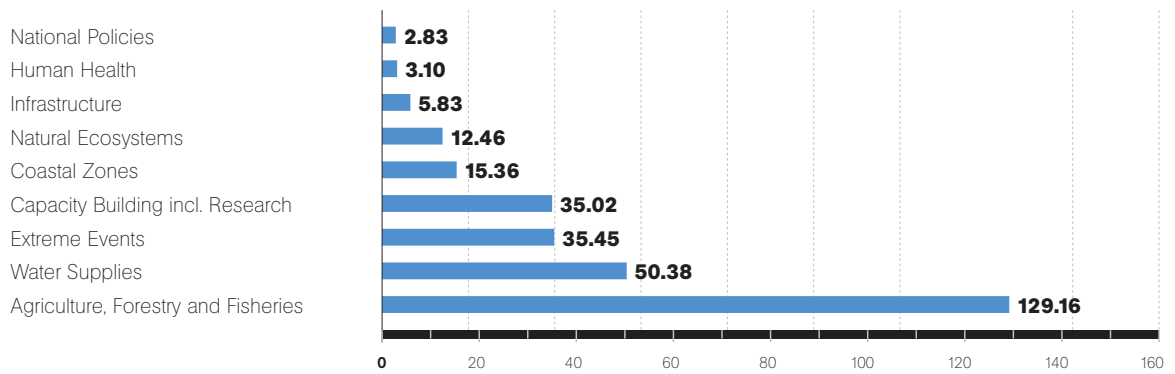
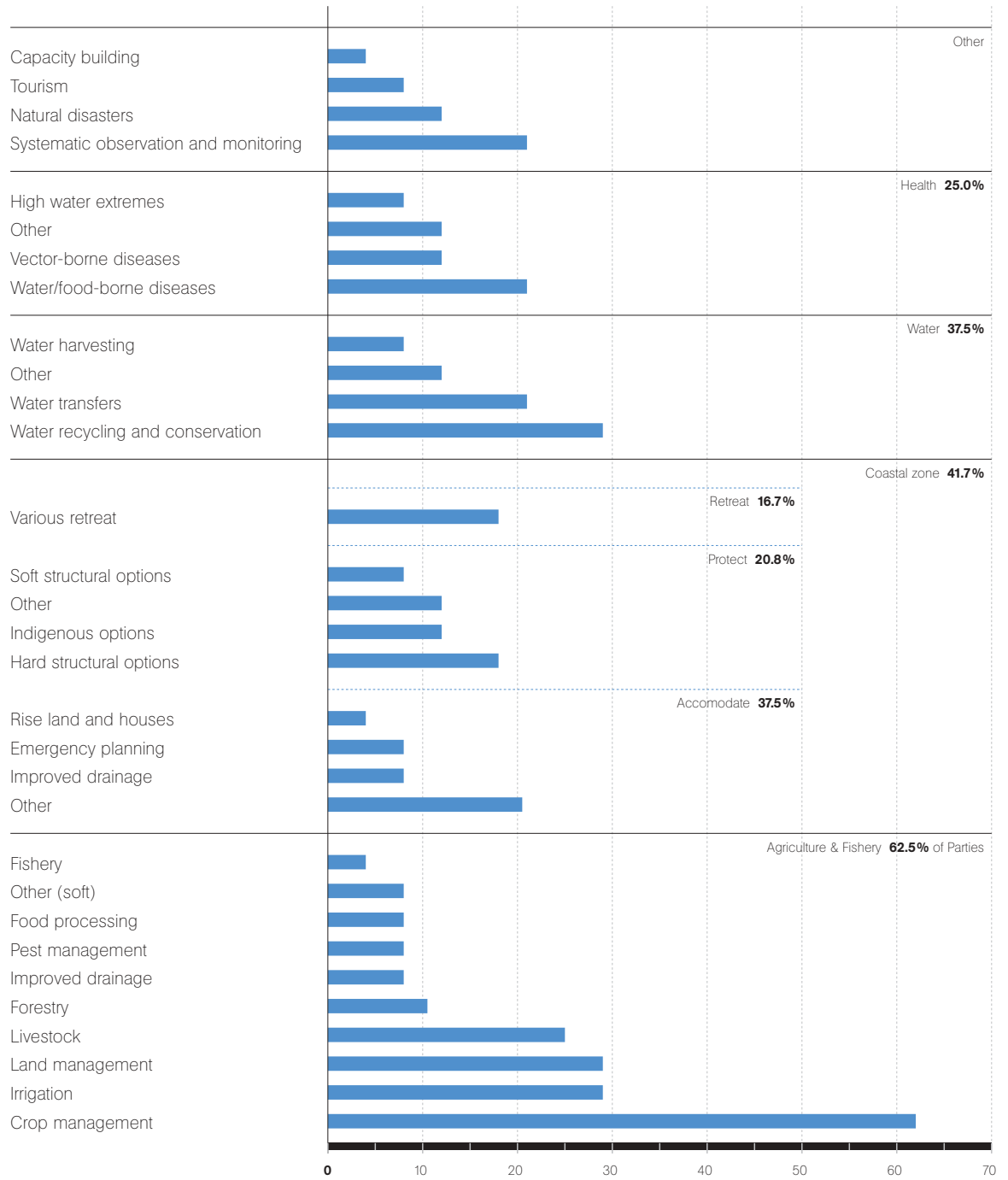


Figure VI-22. Costs of priority activities identified in national adaptation programmes of action, by sector (in millions of United States dollars)



Note: National policies include enabling activities other than capacity building such as integration of adaptation into national policies.

Figure VI-23. Adaptation sectors, sub-sectors and technologies commonly identified by Parties in technology needs assessments



Source: FCCC/SBSTA/2006/INF.1.

6.2.1. SECTORAL ANALYSIS

6.2.1.1. AGRICULTURE, FORESTRY AND FISHERIES

513. In agriculture, needs reported by countries in INCs and TNAs relate to crop management (with a clear emphasis on developing and using tolerant/resistant crop varieties), land management and soil and water conservation.

514. In their INC, for the forestry and terrestrial ecosystems sector Parties in their INCs referred to the need for: protection of forest areas, through targeting forests under stress; forest expansion and the preservation of genetic resources and biological diversity; and promoting sustainable forest management. Parties also suggested the need for measures to combat mud torrents, forest fires, pests and diseases.

515. In the fisheries sector, Parties called for improved understanding of climate change effects on the pelagic fishery resources.

516. Technologies identified by countries in TNAs included early warning systems for forest fires, afforestation and reforestation and development of fast-growing species to adapt to new conditions.

517. The cost of NAPA projects in this sector amounts to USD 122 million. Priority activities included developing resistant crop and livestock varieties, promoting diversification of activities for rural communities, advancing food security (seed and food banks), community-based forest management and afforestation projects, improving veterinary services as well as promoting agricultural techniques and irrigation methods to fight salinity in coastal countries. As for fisheries, developing the culture of salt tolerant fish and fish conservation were considered as adaptation options. NAPA projects to protect ecosystems included establishing conservation programmes for terrestrial and marine ecosystems, coral reef restoration and sustainable use of natural resources.

6.2.1.2. WATER SUPPLY

518. This sector was prioritized in all regions and in all sources examined. Adaptation measures identified in INCs include: increasing water supply; promoting water conservation; water demand management; establishing flood and drought monitoring, forecast, control and protection systems; improving watershed management; ensuring long-term integrated water management with land use, cropping pattern, and zoning and improving

water monitoring. At the Asian adaptation workshop, representative from Azerbaijan estimated the cost of construction of new water reservoirs and the increase in efficiency of existing ones at USD 305 million.⁴⁹

519. Technologies identified in TNAs included those related to water transfers, water recycling and conservation, water harvesting and water management (mostly research and monitoring).

520. Projects reported in NAPAs included protecting the water supply infrastructure, improving management of surface water, constructing storage facilities, water-harvesting, improving watershed management as well as improving water monitoring system and raising community awareness on sustainable use of water resources. Coastal LDCs also submitted projects aimed at slowing down salinization of water stemming from sea-level rise. The indicative total cost of priority activities is about USD 59 million.

6.2.1.3. COASTAL ZONES

521. Measures to protect coastal areas reported in INCs include preventing soil erosion, limiting the development of coastal areas, building coastal infrastructure, restoring beach vegetation, and waste management. This sector was a priority for small island developing states (SIDS) and countries with long coastlines and low-lying areas.

522. For coral reef protection Parties identified the creation of protected areas, sustainable harvesting and fishing practices as necessary measures.

523. As an example of indicative costs, the representative from Sierra Leone reported at the African adaptation workshop that that country would need USD 590 million for the protection of its coastal areas (the cost involves only the design and construction of a seawall and does not include the cost of maintenance). The representative also noted that the cost of protection may be far more than the cost of relocation of the population in the long-term.⁵⁰

524. The NAPA priority activities included integrated management of coastal zones, the construction and upgrading of coastal defences and causeways, and mangrove planting. The total cost of the NAPA projects is estimated at USD 13 million.

6.2.1.4. EXTREME EVENTS

525. Adaptation priorities related to extreme events were highlighted by SIDS and countries with long coastlines and low-lying areas. Insurance as an adaptation policy was prioritized by SIDS, especially for coastal communities and the tourism sector.

526. The main strategies reported in INCs are disaster management, efficient warning systems, and enhancing adaptive capacity through various measures in education and communication. Asian countries emphasized the need for adaptation planning in mountainous regions which are particularly vulnerable to extreme events such as Glacial Lake Outburst Floods. Adaptation measures included an inventory of glacial lakes, hydrological monitoring and forecasting.

527. As an indicative estimate of costs, mainstreaming disaster risk reduction and disaster management in the Pacific region would require USD 3.8 million according to the presentation by the Pacific Islands Forum at the SIDS adaptation expert meeting.⁵¹

528. NAPAs prioritized the installation of early warning systems, measures for flood prevention (e.g., construction of flood dykes) and coping with droughts as well as strengthening of community disaster preparedness and response capacity. The cost of these activities is about USD 29 million.

6.2.1.5. HUMAN HEALTH

529. In INCs Parties reported on general options for adaptation such as the improvement of living standards, increase in the awareness about hygiene, and strategies to control disease vectors. Specific health sector measures included vaccination and chemical prevention measures, and monitoring of risk groups, especially in exposed areas.

530. Technology needs for adaptation included disease monitoring, disease prevention/treatment options, access to health services and health alert information systems.

531. Priority actions reported in NAPAs included the development of health infrastructures, increasing immunization against common diseases, various measures to combat the spread of malaria (e.g., by disseminating bed nets) as well as training of and raising awareness among medical personnel. The total cost of NAPA projects on public health is among the lowest across sectors (USD 3.15 million).

6.2.1.6. INFRASTRUCTURE

532. In their INCs Parties gave special attention to protecting tourism infrastructure as well as the enhancing resilience of urban infrastructure to the impacts of climate change including floods and cyclones. Adaptation options listed in NAPA projects also included development of communications and telecommunications infrastructure and road protection. These activities would cost about USD 5.8 million.

6.3. CAPACITY-BUILDING NEEDS

533. Capacity-building needs cut across all sectors in climate change mitigation and adaptation.

534. On the mitigation side, many Parties reported insufficient human and institutional capabilities and financial resources to prepare mitigation project proposals for funding, including the identification and development of CDM projects. Many Parties mentioned the need for better institutional arrangements to facilitate data collection and analysis, and all indicated the need for further capacity-building and human resource development to prepare national communications. Parties also indicated the need to improve the capabilities of national climate change coordinators and national institutions to manage climate change programmes. Some Parties expressed the need to improve research and systematic observation through capacity building in scientific research.

535. In adaptation, many Parties identified the need for capacity building in human resources development, institutions, methodologies, technology and equipment, and information and networking. Participants of the regional adaptation workshops and expert meeting recognised the need for strengthening environmental and sectoral institutions (in particular, existing regional centres and hydro meteorological networks), establishing regional centres of excellence, and training for stakeholders to aid the development of specialized tools for planning and implementing adaptation activities. Parties also reported insufficient human and institutional

⁴⁹ Presentation by Azerbaijan at the Asian adaptation workshop: <http://unfccc.int/files/adaptation/adverse_effects_and_response_measures_art_48/application/pdf/verdiyev_water.pdf>.

⁵⁰ Presentation by Sierra Leone at the African adaptation workshop: <http://unfccc.int/files/adaptation/adverse_effects_and_response_measures_art_48/application/pdf/200609_sierra_leone_coast_paper.pdf>.

⁵¹ Presentation by Dr. Padma Lal: <http://unfccc.int/files/adaptation/adverse_effects_and_response_measures_art_48/application/pdf/200702_pifs_-_ms_padma_lal.pdf>.

capabilities, and financial resources, to formulate and prepare adaptation project proposals for funding. Some Parties expressed the need to improve research and systematic observation through capacity building in scientific research, particularly in modeling. Overall, participants of the regional adaptation workshops and expert meeting called for a long-term programmatic and comprehensive approach in external support activities to capacity-building.

536. LDCs submitted several NAPA priority activity proposals in capacity building to address immediate adaptation needs. Those projects included upgrading meteorological services, exploring options for insurance to cope with enhanced climatic disasters, research on drought, flood and saline tolerant varieties of crops, as well as raising awareness and disseminating information to vulnerable communities for emergency preparedness. The indicative total cost of priority activities amounts to USD 35.5 million.

6.4. BARRIERS TO TECHNOLOGY TRANSFER

537. Technology transfer plays an important role in addressing climate change. The biggest barrier to technology transfer identified in TNAs and INCs was the lack of financial resources. High investment costs, subsidies and tariffs were also considered important economic/market barriers. Other barriers included insufficient information and awareness as well as those related to policy. The measures identified by Parties to address existing barriers to technology transfer were most commonly placed in the following categories: regulatory and policy options, information and awareness building, and economic and market measures. A detailed summary is provided in FIGURES VI-24 and VI-25.

6.5. IMPACT OF THE IMPLEMENTATION OF RESPONSE MEASURES

538. Information from Parties on measures necessary to address risks from the impact of response measures is very limited. They include outcomes of the expert meetings⁵² on response measures and economic diversification⁵³, and submissions by Parties under the agenda item 3 “Analysis of mitigation potentials and ranges of emission reduction objectives of Annex I Parties of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol”⁵⁴. Four INCs (from Saudi Arabia, Islamic Republic of Iran, South Africa and Singapore) also contain some information on this issue.

539. Two main strategies have been identified under the Convention: insurance and risk management, and economic diversification. The first is believed to serve for short-term goals whereas the second is considered as a long-term solution. Parties recognize a knowledge gap for both options.

540. Participants in the expert meeting⁵⁵ on response measures also acknowledged the role of technology transfer. Proposed technological measures include developing low-cost carbon capture and sequestration technologies, promoting renewable energy, development of GHG-friendly energy technologies and implementing energy efficiency measures.

541. During the expert meeting on response measures, the following financial risk management approaches were identified: commodity price hedging; economic shock funds; commodity price insurance; alternative risk transfer; hedge funds; alternative risk financing; structured risk financing mechanisms; effective use of developed captive insurance, credit and political risk coverage; hybrid insurance products; and catastrophe bonds.

542. For economic diversification⁵⁶, areas in need of technical and financial support include development of the key infrastructure necessary for economic activity, promotion of FDI, labour-intensive exports (manufacturing and services), access to markets in developed countries, price and ownership reforms in the energy-related industry, capacity-building, and activities and projects that promote synergy between poverty reduction, adaptation and economic diversification.

543. Saudi Arabia reported that it would require assistance from Annex I Parties in the areas of power generation, desalination of seawater, expansion of petrochemical industry, and education in order to diversify its economy.

⁵² Pre-sessional Expert Meeting on Response Measures, Montreal, Canada, 23–24 November, 2005; Pre-sessional Expert Meeting on Economic Diversification, Bonn, 16–17 May 2006. Reports available at: <http://unfccc.int/adaptation/adverse_effects_and_response_measures_art_48/items/2535.php>.

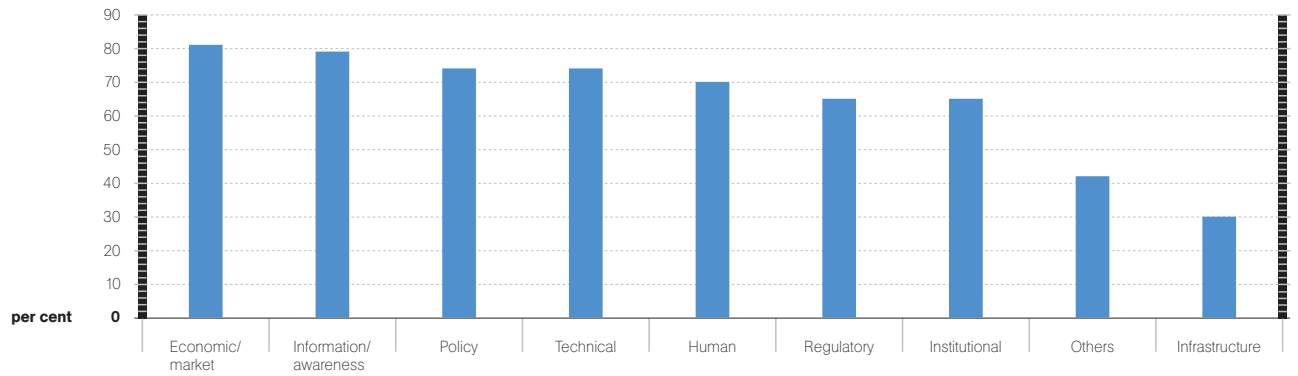
⁵³ Decision 1/CP.10 paragraph 16.

⁵⁴ FCCC/KP/AWG/2007/MISC.1.

⁵⁵ FCCC/SBI/2006/13.

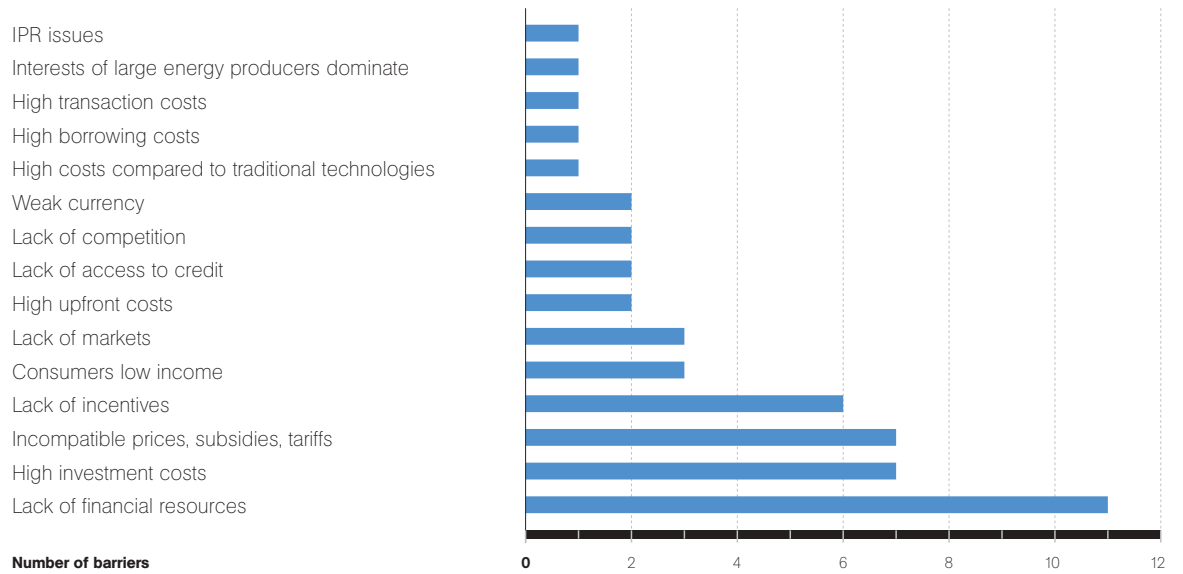
⁵⁶ FCCC/SBI/2006/18.

Figure VI-24. Barriers to technology transfer identified by Parties



Source: FCCC/SBSTA/2006/INF.1.

Figure VI-25. Economic and market barriers to technology transfer



Source: FCCC/SBSTA/2006/INF.1.