



Technical Assistance Report

Project Number: 43161
Regional—Policy and Advisory Technical Assistance (R—PATA)
December 2009

Regional Economics of Climate Change in South Asia Part II: Adaptation and Impact Assessment (Cofinanced by the Government of the United Kingdom)

ABBREVIATIONS

ADB	–	Asian Development Bank
CPST	–	climate change policy simulation tool
DFID	–	Department for International Development of the United Kingdom
DMC	–	developing member country
TA	–	technical assistance

TECHNICAL ASSISTANCE CLASSIFICATION

Type	–	Regional—policy advisory technical assistance (R—PATA)
Targeting Classification	–	General intervention
Sector (subsectors)	–	Multisector (agriculture and rural sector development, water-based natural resources management, energy efficiency and conservation)
Themes (subthemes)	–	Environmental sustainability (global and regional transboundary concerns), regional cooperation and integration (other regional public goods), capacity development (client relations, network, and partnership development)
Climate Change	–	Climate change adaptation
Location impact	–	Rural (high), urban (medium), national (high), regional (high)
Partnership	–	Cofinanced by the Government of the United Kingdom

NOTE

In this report, "\$" refers to US dollars

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I. INTRODUCTION

1. The Asian Development Bank (ADB) is supporting regional initiatives that help its developing member countries (DMCs) adapt to climate change impacts through regional Climate Change Implementation Plans. The plan for South Asia¹ supports an economic analysis to evaluate the costs and benefits of climate change and adaptation and to build DMCs' capacities to reduce the adverse impacts of climate change. This regional policy and advisory technical assistance (TA), with cofinancing from the Government of the United Kingdom through the Department for International Development (DFID), will support the second part of the study on Regional Economics of Climate Change in South Asia.² The first part of this study focuses on the potential of cleaner technologies, based on an analysis of the marginal abatement cost. Preliminary agreements were reached on the impact, outcome, implementation arrangements, cost estimates, financing plan, and consultants' terms of reference.³ The TA design and monitoring framework is in Appendix 1.⁴

II. ISSUES

2. Climate change impacts are increasingly visible in Asia and the Pacific, with South Asia being the most vulnerable region.⁵ The impact of climate change can already be seen in the greater variability of the monsoon, increased frequency of tropical cyclone, and faster melting of the Himalayan glaciers, which could affect half a billion people in the Hindu Kush–Himalaya region.⁶ It is estimated that the total area of the Himalayan glaciers are likely to shrink from the present 500,000 square kilometers to 100,000 square kilometers by 2035.⁷ Moreover, the monsoon in South Asia will become stronger, with up to 20% more rain falling in India and Bangladesh by 2050.⁸ Furthermore, sea level rise in Asia is likely to be about 40 centimeters by the end of the 21st century, which will increase the annual number of people flooded in coastal populations from 13 million to 94 million.⁹

3. If current trends continue until 2050, the yields of irrigated crops in South Asia are projected to decrease significantly—maize by 17%, wheat by 12%, and rice by 10%—as a result of climate change-induced water stress.¹⁰ An increase in occurrence of extreme weather events including heat waves and intense precipitation events are also projected with a resultant decrease in agriculture production. Future climate change-induced shifts in ocean currents, the sea level, sea-water temperature, salinity, wind speed and direction, strength of upwelling, and predator response are all likely to alter fish-breeding habitats as well as their food supply,

¹ ADB. 2008. *Climate Change Implementation Plan: South Asia (2009–2011)*. Manila.

² ADB. 2006. *Technical Assistance for Development Partnership for South Asia: Regional Economics of Climate Change in South Asia Part 1: Cleaner Technologies and Options*. Manila. (TA 6337-REG).

³ The technical assistance first appeared in the ADB Business opportunity on 6 October 2009.

⁴ The TA covers Bangladesh, Bhutan, Maldives, Nepal, and Sri Lanka. India's participation is being explored possibly through regional collaboration in scientific research and technology development.

⁵ Intergovernmental Panel on Climate Change. 2007. *Climate Change 2007: Synthesis Report*. Geneva.

⁶ Stern, N. 2007. *The Economics of Climate Change: The Stern Review*. Cambridge, United Kingdom: Cambridge University Press, p. 692.

⁷ World Wildlife Fund. 2005. *An Overview of Glaciers, Glacier Retreat, and Subsequent Impacts in Nepal, India and China*. Kathmandu: World Wildlife Fund Nepal Programme (p. 79).

⁸ International Organization for Migration. 2008. *Migration and Climate Change*. IOM Migration Research Series. No. 31. Geneva (p.16).

⁹ Intergovernmental Panel on Climate Change. 2007. *Synthesis Report of the 4th Assessment Report*. Geneva.

¹⁰ ADB. *Addressing Climate Change in the Asia and Pacific Region—Building Climate Resilience in the Agriculture Sector*. Manila (draft).

impacting fish abundance in Asian waters.¹¹ As glaciers melt, river runoff will initially increase in winter or spring but eventually will decrease as a result of loss of ice resources. Consequences for downstream agriculture, which relies on this water for irrigation, will be likely unfavorable in most South Asian countries.¹²

4. In the future, public health, biodiversity, agricultural production and food security, access to drinking water, migration and even regional geo-political stability are likely to be affected. Climate change is also likely to impact various economies, including (i) the public budget, which is needed for climate change adaptation (e.g., flood control, afforestation and reforestation, climate proofing infrastructure, and pollution control) including the development of disaster risk management plans; (ii) terms of trade (e.g., impact on hydropower exports, falling agricultural yields, reduced labor productivity, and faster natural resources depletion); and (iii) welfare of population (i.e., price increases, flooding, pollution, and health impacts).

5. Bangladesh, Bhutan, India, and the Maldives are making efforts to cope with climate change and have prepared the national adaptation program of action in 2005, 2007, 2008, and 2006, respectively. Nepal is in the process of developing such a program. A climate change cell was also established in Bangladesh in 2004, while Sri Lanka created a specific climate change secretariat within the Ministry of the Environment and Natural Resources dealing with both adaptation and mitigation issues (footnote 1). However, capabilities and capacities need to be enhanced to address emerging issues and to mobilize financing, especially for the development of disaster risk management plans.

6. Strategy 2020 emphasizes three distinct but complementary development agendas for ADB—inclusive economic growth, environmentally sustainable growth including addressing the impact of climate change, and regional integration.¹³ Its South Asia regional cooperation strategy and program, 2006–2008, also supported regional environmental cooperation through knowledge-based research and information sharing as well as through capacity-building activities. Thus, ADB has been providing assistance to South Asian DMCs to adapt and reduce their vulnerability to impacts of climate change through mainstreaming adaptation issues into investment planning; developing national adaptation capacity; and coordinating and strengthening international responses for adaptation, emphasizing poverty reduction, private sector participation, and regional cooperation.¹⁴ For example, a TA in Nepal is assisting government agencies responsible for environmental management in raising awareness, building new and strengthening existing capacities and skills, and mainstreaming environmental and climate change considerations into the national development agenda.¹⁵ Another TA in Sri Lanka aims to increase resilience to climate change impacts in support of sustainable economic

¹¹ Intergovernmental Panel on Climate Change. 2001. *Climate Change 2001: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press.

¹² Intergovernmental Panel on Climate Change. 2007. *Synthesis Report of the 4th Assessment Report*. Geneva.

¹³ ADB. 2008. *Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank, 2008–2020*. Manila.

¹⁴ Support for South Asian DMCs includes (i) ADB. 2009. *Technical Assistance to the People's Republic of Bangladesh for Supporting Implementation of the Bangladesh Climate Change Strategy and Action Plan*. Manila (TA 7273-BAN); (ii) ADB. 2009. *Technical Assistance to the Democratic Socialist Republic of Sri Lanka for Strengthening Capacity for Climate Change Adaptation*. Manila (TA 7326-SRI); (iii) ADB. 2009. *Technical Assistance to Nepal for Strengthening Capacity for Managing Climate Change and the Environment*. Manila (TA 7173-NEP); (iv) ADB. Technical Assistance to India for Support for India's National Action Plan on Climate Change. Manila (TA 43169-IND); and (v) ADB. Technical Assistance to the Kingdom of Bhutan for Capacity Building of the National Environment Commission in Climate Change. Manila (TA 43021-BHU).

¹⁵ ADB. 2008. *Technical Assistance to Nepal for Strengthening Capacity for Managing Climate Change and the Environment*. Manila (TA 7173-NEP).

development and environmental conservation, which will result in improved environmental management and better organization of concerned stakeholders to address climate change.¹⁶

III. THE TECHNICAL ASSISTANCE

7. The TA will (i) contribute to regional policy dialogue on economic costs and benefits of unilateral and regional actions on climate change adaptation, (ii) review existing climate policies and measures at the country and regional levels, (iii) identify policy gaps and constraints in implementing appropriate adaptation measures, (iv) conduct economic assessment of the costs and benefits of unilateral and regional adaptation actions, and (v) suggest adaptation measures based on low-carbon strategies in participating DMCs. It will cover five DMCs—Bangladesh, Bhutan, Maldives, Nepal, and Sri Lanka—and possibly India.

8. This TA will coordinate with other ongoing and planned climate change initiatives in the participating DMCs and build upon existing studies. It will cover the whole region, as no such study has yet been conducted. Although there were studies in India, and to some extent in Bangladesh, Nepal, and Sri Lanka, limited studies were conducted in Bhutan and the Maldives.

9. This TA will also develop a climate policy simulation tool (CPST) that will create key economic indicators to show the economic consequences of different packages of climate policies and to conduct quantitative and qualitative assessment of different climate policy packages. This tool will help policy makers select concrete and appropriate economic policies that will adapt and respond to different climate policy scenarios for each participating DMC.

A. Impact and Outcome

10. The expected impact is to enhance resilience to climate change risks in South Asia. Expected outcomes include improved understanding of the economics of climate change to enable policy makers in the region to adopt necessary actions for climate change adaptation.

B. Methodology and Key Activities

11. This TA will comprise four outputs with corresponding activities, as follows.

- (i) **Country and regional assessments.** The TA will (a) assess current climate change policies and adaptation measures at the country and regional levels; (b) identify policy gaps, vulnerable areas and sectors, and segments of population; (c) estimate sector-specific damages, socioeconomic impacts, and poverty impacts; (d) analyze the implications of climate change for poverty reduction and sustainable development efforts; (e) review laws, agreements, or regulations implemented, adopted, proposed, or under preparation that address climate change adaptation; and (f) review regional, national, or local initiatives that address climate change issues. It will cover and build from work carried out by governments, academics, nongovernment organizations, and development partners working on climate change. The scoping will help identify research, research gaps, and needs for further research. The result of this activity will form part of an interim report.

¹⁶ ADB. 2009. *Technical Assistance to the Democratic Socialist Republic of Sri Lanka for Strengthening Capacity for Climate Change Adaptation*. Manila (TA 43173-SRI).

- (ii) **Analyses of climate change sector impacts.** Analyses of future climate change impacts on major sectors including agriculture, forest, water, and marine and coastal resources (including fisheries), health, and energy at the regional and country levels will be conducted based on the outputs from the models under Intergovernmental Panel on Climate Change climate scenarios. The analyses will be made by applying an integrated assessment model. The impact assessment and climate adaptation policies and measures will be included in an interim report.
- (iii) **Climate policy simulation.** A CPST will be developed and used to generate key economic indicators to show the economic consequences of different packages of climate policies and to conduct quantitative and qualitative assessment of different climate policy packages. The CPST,¹⁷ a consolidated model, is comprised of three components: (a) adaptation and impact assessment, (b) low-carbon options, and (c) a climate policy package. The CPST will help policy makers to select climate-related policies with concrete economic consequences of climate policy choices and to strengthen the policy analysis related to the economics of climate change.
- (iv) **Dissemination.** The results of the TA will be disseminated through publication of articles in external journals, books, and media; postings on the ADB website; and presentation at conferences and workshops. The final report will include the combined results of part I and part II of the study.

C. Cost and Financing

12. The total cost of the TA is estimated to be \$1,200,000 equivalent, of which \$500,000 equivalent will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-IV), and the remaining \$700,000 equivalent will be financed on a grant basis by the Government of the United Kingdom.¹⁸ Possible funding from other sources is also being explored. The cost estimates and financing plan are in Appendix 2.

D. Implementation Arrangements

13. The TA will be implemented over 24 months, from January 2010 to December 2011. ADB will be the executing agency. The South Asia Department will implement the TA in close coordination with Regional and Sustainable Development Department and DFID.

14. The management of the TA will follow a two-tiered structure. A study team, comprising national climate experts from the participating DMCs and international consultants, will be formed to carry out the activities and will be led by an international consultant. A steering committee composed of senior government officials from participating DMCs (i.e., Bangladesh's Ministry of Environment and Forest; Bhutan's National Environment Commission; Maldives's Ministry of Housing, Transport and Environment; Nepal's Ministry of Environment, Science and

¹⁷ The CPST will cost \$600,000. Component (A) adaptation and impact assessment will be funded under this TA, in the amount of \$200,000. Components (B) low-carbon options, and (C) climate policy package will be funded under the proposed regional research and development TA for Economics of Climate Change and Low Carbon Growth Strategies in Northeast Asia and will cost \$400,000. The development of the CPST will be a joint initiative of both TA projects.

¹⁸ Financed by the Government of the United Kingdom through the Department for International Development (DFID), and administered by ADB.

Technology; Sri Lanka's Ministry of Environment and Natural Resources; and possibly India's Ministry of Environment and Forests) and representatives from ADB and DFID will set the methodological and strategic directions, and guide the implementation of the TA to ensure full participation and ownership by the participating DMCs. No activities under this TA will be commenced or financed in the territory of a DMC until a written no-objection has been obtained from the government of the country concerned.

15. The TA will require 34 person-months of international and 24 person-months of national consulting services. It will use a combination of both individual consultants and a firm to fulfill the requirements. A firm will be recruited using quality- and cost-based selection with a simplified technical proposal.¹⁹ All consultants will be engaged by ADB in accordance with its Guidelines on the Use of Consultants (2007, as amended from time to time). The proceeds of the TA will be disbursed in accordance with ADB's *Technical Assistance Disbursement Handbook*.²⁰ The consultants' terms of reference are in Appendix 3.

IV. THE PRESIDENT'S DECISION

16. The President, acting under the authority delegated by the Board, has approved (i) ADB administering a portion of technical assistance not exceeding the equivalent of \$700,000 to be financed on a grant basis by the Government of the United Kingdom, and (ii) ADB providing the balance not exceeding the equivalent of \$500,000 on a grant basis for Regional Economics of Climate Change in South Asia Part II: Adaptation and Impact Assessment, and hereby reports this action to the Board.

¹⁹ The CPST will be comprised of three contract packages; component on adaptation and impact assessment engaged under this TA, and the remaining components engaged under the proposed regional research and development TA for Economics of Climate Change and Low Carbon Growth Strategies in Northeast Asia.

²⁰ ADB. 2008. *Technical Assistance Disbursement Handbook*. Manila.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and/or Indicators	Data Sources and/or Reporting Mechanisms	Assumptions and Risks
<p>Impact</p> <p>Enhanced resilience to climate change risks in South Asia</p>	<p>Incorporation of climate change adaptation aspects across sector departments in planning procedures by 2020</p>	<p>National reports to UNFCCC</p> <p>Government statistics and websites</p> <p>Government national budget strategic programs for climate resilience and medium-term investment plans</p>	<p>Assumption</p> <p>Improved capacity within ministries of environment and other government agencies that will support national efforts to prioritize access to concessionary adaptation financing</p> <p>Risk</p> <p>Political instability</p>
<p>Outcome</p> <p>Improved understanding of the economics of climate change</p>	<p>Existing policies for climate change adaptation strengthened and new policies formulated by 2012</p> <p>Enhanced capabilities and capacities of DMCs to address issues related to climate change and in mobilizing financing for the development of disaster risk management plans by 2012</p>	<p>National reports to UNFCCC</p> <p>Government reports and policy documents</p>	<p>Assumption</p> <p>Government agencies work closely.</p> <p>Risks</p> <p>Timing in reaching internal consensus within each DMCs varies.</p> <p>Government policies and overall cooperation of participating DMCs could change.</p>
<p>Outputs</p> <p>1. Country and regional assessment reports</p> <p>2. Analysis of climate change impacts</p> <p>3. Climate policy simulation tool</p> <p>4. Dissemination of knowledge products</p>	<p>Country and regional assessments reports agreed, and endorsed by participating DMCs submitted by second quarter of 2010</p> <p>Comprehensive analysis of major sectors such as agriculture, forest, water, marine and coastal resources, health, and energy at the regional and country levels concluded by first quarter of 2011.</p> <p>Climate policy simulation tool developed and easily used by policy makers by second quarter of 2011</p> <p>Final report completed by November 2011, and results disseminated through publications,</p>	<p>Government reports and data</p> <p>Documents from relevant international and regional organizations</p> <p>International, regional, and national media</p> <p>Consultant reports</p>	<p>Assumptions</p> <p>Awareness regarding impacts of climate change will be enhanced.</p> <p>Policy options for achieving a low-carbon society are immediate need.</p> <p>Both TAs^a involved in the development of CPST deliver the component(s) in due course of time</p> <p>Risks</p> <p>Staff changes within key government structures weaken activities.</p> <p>Insufficient data for the different policy options</p>

Design Summary	Performance Targets and/or Indicators	Data Sources and/or Reporting Mechanisms	Assumptions and Risks
	postings on ADB website, and presentations at local and international climate change conferences and workshops.		
Activities with Milestones <ol style="list-style-type: none"> 1. Country and regional assessments (April 2010) <ol style="list-style-type: none"> 1.1. Consult with participating countries 1.2. Engage consultants 1.3. Establish the steering committee and advisory panel 1.4. Map existing regional and country level analysis on climate change 1.5. Conduct first regional consultation meeting 1.6. Conduct national expert workshops 1.7. Prepare inception report 2. Analysis of climate change sector impacts (March 2011) <ol style="list-style-type: none"> 2.1. Regional modeling of climate change by an integrated assessment model 2.2. Regional and country level analysis on the impact of climate change 2.3. Conduct cost benefit analysis of climate adaptation cases 2.4. Consolidate, prepare, and submit interim report 3. Climate policy simulation (March 2011) <ol style="list-style-type: none"> 3.1. Develop climate policy simulation tool 3.2. Analyze different climate policy packages and their economic implications 3.3. Consolidate and analyze climate policies at country and regional levels 3.4. Conduct second regional consultation meeting to discuss climate policy options 3.5. Formulate policy recommendations 4. Dissemination (November 2011) <ol style="list-style-type: none"> 4.1. Prepare and submit final report 4.2. Publish final report 4.3. Disseminate at regional meetings and other international climate change fora 			Inputs <p>ADB: \$500,000</p> <p>Government of the United Kingdom: \$700,000</p>

ADB = Asian Development Bank, CPST = climate change policy simulation tool, DMC = developing member country, TA = technical assistance, UNFCCC = United Nations Framework Convention on Climate Change.

^a Regional research and development TA for Economics of Climate Change and Low Carbon Growth Strategies in Northeast Asia and this TA.

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Total Cost
A. Asian Development Bank Financing^a	
1. Consultants	
a. Remuneration and per diem	
i. International consultants	283.00
ii. National consultants	22.00
b. International and local travel	40.00
2. Reports and communications ^b	30.00
3. Consultations and workshops	55.00
4. Software and equipment ^c	10.00
5. Miscellaneous administration and support costs	10.00
6. Contingencies	50.00
Subtotal (A)	500.00
B. Government of the United Kingdom^d	
1. Consultants	
a. Remuneration and per diem	
i. International consultants	447.00
ii. National consultants	54.00
b. International and local travel	50.00
2. Reports and communications ^e	10.00
3. Consultations and workshops	60.00
4. Software and equipment ^f	10.00
5. Contingencies	69.00
Subtotal (B)	700.00
Total	1,200.00

^a Financed by the Technical Assistance Special Fund (TASF-IV) of the Asian Development Bank (ADB).

^b Includes publication costs.

^c Includes computer, software license, and telecommunications equipment for the development of the climate policy simulation tool to be turned over to ADB upon completion of the technical assistance.

^d Financed through Department for International Development of the United Kingdom, which is being administered by ADB. The total amount includes \$200,000 to be used to develop the adaptation and impact assessment component of the climate policy simulation tool allocated to international consultants, and ADB's administration fee, audit cost, bank charges, and provision for foreign exchange fluctuations (if any), to the extent that these items are not covered by the Government of the United Kingdom.

^e Includes publication costs.

^f Includes computer, software license, and telecommunications equipment for the development of the climate policy simulation tool to be turned over to ADB upon completion of the technical assistance.

Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. Under this technical assistance (TA), international and national consultants will be recruited to (i) conduct country and regional assessments on climate policy and adaptation measures; (ii) conduct sector analyses of climate change, based on the outputs from the models under Intergovernmental Panel on Climate Change climate scenarios; and (iii) develop a climate policy simulation tool that will show the economic consequences of different climate policy packages, and enable policy makers to select appropriate climate-related policies.

2. The TA will require a total of 58 person-months of consultant inputs: 34 person-months of international and 24 person-months of national. The terms of reference for each consultant are as follows.

A. Lead Consultant (international, 5 person-months, intermittent)

3. The lead consultant will have extensive knowledge and experience in climate change issues, preferably in South Asia, and a working knowledge of adaptation and impact analysis of climate change and scenario building. A minimum of 10 years of work experience in climate change-related fields is required. The consultant will

- (i) under the direction of the Asian Development Bank project team leader, manage and supervise the climate change modeling specialist, climate change economic and policy analyst, climate change sector specialists, national climate change experts, and research analyst and project coordinator, as well as all activities under the TA;
- (ii) undertake the scoping, mapping, assembly, and review of existing regional and country-level climate studies, including work carried out by governments, international institutions, academic institutions, and nongovernment organizations;
- (iii) prepare and finalize an inception report;
- (iv) organize and lead regional consultations, national expert workshops, and other meetings, consultations, and workshops as part of the TA;
- (v) develop climate policy scenarios and options under each climate change scenario in coordination with the participating developing member countries (DMCs);
- (vi) formulate policy directions and recommendations based on a cost-benefit analysis;
- (vii) prepare interim and final reports that include the summary outcome of the consultations and analysis of model outputs, and manage the subsequent dissemination of the outputs; and
- (viii) perform other tasks relevant to this TA as assigned by the project team leader.

B. Climate Change Modeling Specialist (international, 6 person-months, intermittent)

4. The climate change modeling specialist will have extensive knowledge and experience in climate change modeling. He or she will have a minimum of 8 years of work experience in climate change modeling. The consultant will

- (i) assemble and review pertinent energy- and nonenergy-related information and other basic economic data for the participating DMCs to be used for energy and nonenergy model structures;

- (ii) provide a climate change impact model with full documentation, including the assumptions made, basis for the assumptions, data requirements, and data formats;
- (iii) identify the level of adaptive capacity within the participating DMCs based on current ability to manage extreme weather events and existing climate variability at the macro and micro levels;
- (iv) analyze the impact based on a well-established regional climate impact model, investigating specific effects on different sectors;
- (v) prepare a formal report on the analysis of an energy and nonenergy model under different climate change scenarios, and present it during regional consultations, as necessary; and
- (vi) perform other tasks relevant to this TA as assigned by the project team leader and lead consultant.

C. Climate Change Economic and Policy Analyst (international, 8 person-months, intermittent)

5. The climate change economic and policy analyst will be engaged to develop the policy simulation tool, which will be conducted jointly with other departments in the Asian Development Bank. The consultant will have extensive knowledge and expertise in climate change issues, policy, risk analysis and scenario development, as well as in the valuation of costs and benefits of climate change. A minimum of 5 years of work experience in economics is required. The consultant will

- (i) assemble and review existing regional and in-country climate change policies from the participating DMCs, and identify policy gaps;
- (ii) using the climate change adaptation scenarios developed by the modeling climate change specialist, estimate the cost and benefits of the different climate change scenarios;
- (iii) provide insights and recommendations for future country and regional policy development in adaptation, co-benefits of adaptation, and other national objectives;
- (iv) develop key economic indicators to show the economic consequences of different packages of climate policies;
- (v) conduct quantitative and qualitative assessment of different climate change policy packages using the climate change policy simulation tool;
- (vi) develop and make available a user-friendly version of the climate change policy simulation tool, which can be easily handled by policy makers;
- (vii) prepare a formal report on the policy simulation tool, and present it during the regional consultations as may be necessary;
- (viii) coordinate with associated Asian Development Bank TA activities; and
- (ix) perform other tasks relevant to this TA as may be assigned by the project team leader and the lead consultant.

D. Climate Change Sector Specialists (international, six specialists, 2 person-months each, for a total of 12 person-months, intermittent)

6. At least six specialists will undertake sector analyses at the country and regional levels. Each specialist will have extensive knowledge on climate change for the assigned sector. A minimum of 5 years of work experience in a specific sector is required. The consultants will

- (i) review current and existing studies on sector climate change adaptation options and practices;

- (ii) review and analyze existing regional sector-specific policies and policy gaps;
- (iii) identify possible options and practices for reducing greenhouse gases in sectors as inputs to modeling abatement strategies for low-carbon economies;
- (iv) identify climate change impacts and possible adaptation options and practices in sectors as inputs to modeling and assessment of climate change impacts;
- (v) formulate sector-specific adaptation options;
- (vi) prepare and submit reports on the above items; and
- (vii) perform other tasks relevant to this TA as assigned by the project team leader and lead consultant.

E. National Climate Change Experts (national, six specialists, 3 person-months each, for a total of 18 person-months, intermittent)

7. At least six national climate experts will undertake country-level reviews, assessments, data gathering, and administrative support. The national experts will work closely with the lead consultant and other consultants. A minimum of 5 years of work experience in climate change fields is required. The consultants will

- (i) assemble and review existing country-level climate change studies, including work carried out by governments, international institutions, academic institutions, and nongovernment organizations;
- (ii) prepare country reports on country-level climate change, including historic and current trends, policy interventions made including sector policy interventions, and pending policy legislation and recommendations;
- (iii) in coordination with the lead consultant, organize and participate in the respective national experts' workshop and two regional consultation meetings;
- (iv) provide data necessary for input to the integrated assessment model;
- (v) assist in formulating country-specific climate policy packages;
- (vi) assist in the identification of the level of adaptive capacity within DMCs based on current ability to manage extreme weather events and existing climate variability;
- (vii) present the report, findings, and outputs during the national experts' workshops;
- (viii) provide other related country-level data and assistance to the team leader and lead consultant, as necessary;
- (ix) prepare the national workshop report; and
- (x) perform other tasks relevant to this TA as assigned by the project team leader and lead consultant.

F. Project Coordinator (international, 6 person-months, intermittent)

8. The project coordinator will be mainly responsible for the documentation of meeting highlights and reports for all the regional and national experts' meetings, and assist the lead consultant in coordinating with other consultants. A minimum of 5 years of work experience, with working knowledge on climate change is required. The consultant will

- (i) assist the lead consultant in preparing and organizing regional consultations and national workshops in coordination with the national climate change experts;
- (ii) participate in and document proceedings of all regional and national experts' workshops and meetings;
- (iii) compile and analyze all reports of the regional and national experts' workshop meetings;
- (iv) edit and check the quality of the reports produced in the regional and national meetings;

- (v) prepare and submit a formal report on the cumulative outcome of the regional meetings and national experts workshops; and
- (vi) perform other tasks relevant to this TA as assigned by the project team leader and lead consultant.

G. Research Analyst (national, 6 person-months, intermittent)

9. The research analyst will be under the direction and supervision of the team leader and lead consultant. A minimum of 5 years of work experience in relevant fields is required. The consultant will

- (i) assist the lead consultant in undertaking the scoping, mapping, assembly, and review of existing regional and country-level climate change studies, including work carried out by governments, international institutions, academic institutions, and nongovernment organizations;
- (ii) assist the project coordinator in preparing and organizing regional consultations and national workshops in coordination with other consultants;
- (iii) participate in the two regional consultations and national experts' workshops, and provide support and assistance to the study team in the documentation of the consultation highlights as required;
- (iv) provide inputs, and assist the lead consultant in preparing and finalizing the inception, interim, and final report;
- (v) gather data and conduct analysis, as directed by the team leader and the lead consultant, on the technical indicators necessary for the climate change impact and modeling; and
- (vi) perform other tasks relevant to this TA as may be assigned by the project team leader and the lead consultant.