



Technical Assistance Report

Project Number: 41126
November 2008

Nepal: Strengthening Capacity for Macroeconomic Analysis

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 13 October 2008)

Currency Unit	–	Nepalese rupee/s (NRe/NRs)
NRe1.00	=	\$0.013
\$1.00	=	NRs77.90

ABBREVIATIONS

ANA	–	annual national accounts
CBS	–	Central Bureau of Statistics
CNSP	–	Consolidated National Statistical Plan
DSGE	–	dynamic stochastic general equilibrium
EA	–	Executing Agency
GDP	–	gross domestic product
IMF	–	International Monetary Fund
MOF	–	Ministry of Finance
NPC	–	National Planning Commission
NRB	–	Nepal Rastra Bank
QNA	–	quarterly national accounts
TA	–	technical assistance

TECHNICAL ASSISTANCE CLASSIFICATION

Targeting Classification	–	General intervention
Sector	–	Law, economic management, and public policy
Subsector	–	Economic management
Themes	–	Governance, capacity development
Subthemes	–	Financial and economic governance, institutional development

NOTES

- (i) The fiscal year (FY) of the Government ends on 16 July. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2008 ends on 15 July 2008.
- (ii) In this report, "\$" refers to US dollars.

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I. INTRODUCTION

1. The country strategy and program (2005–2009)¹ of the Asian Development Bank (ADB) for Nepal identifies the need to help build the Government's capacity for improved public policy analysis and formulation, and more effective poverty monitoring. At the Government's request, the technical assistance (TA) was included in ADB's country program for 2008. ADB undertook a Fact-Finding Mission during 7–25 July 2008 to gather inputs from relevant government agencies and other stakeholders concerned for designing the TA. The Mission reached an understanding with the Government on the TA's objectives, scope, costs and financing plan, implementation arrangements, and counterpart support. The design and monitoring framework is in Appendix 1.²

II. ISSUES

2. Institutional capacity for economic policy analysis in Nepal is weak due to a lack of appropriate policy analysis tools and an underdeveloped statistical system, among other factors. Public policy formulation is often not based on a sound analytical foundation. The need for sound economic policy analysis has become more critical in view of stagnating economic growth. There is a need for better understanding of the evolving structure of Nepal's economy, its increasing complexity, and the interactions between different sectors of the economy. Economic policy analysis has also been constrained by the inadequate coverage and low quality of national statistics.

3. In this context, ADB supported the Government in developing a macroeconomic model in 2005—Nepal Macroeconomic Model (NMEM)—as part of TA for Strengthening Institutional Capacity for Public Debt Management³ to strengthen institutional capacity for public debt sustainability analysis and management. The NMEM is based on the Keynesian income–expenditure approach in which gross domestic product (GDP) is determined endogenously. Apart from being used by the Government for debt sustainability analyses, Nepal Rasta Bank (NRB)—the central bank of Nepal—has also been using the NMEM for economic forecasting.

4. However, the NMEM's utility has become limited due to some major developments in recent years. First, the structure of Nepal's economy has changed significantly. Agriculture's contribution to GDP has declined from 48% in the early 1990s to 33% in recent years, whereas the services sector's contribution has grown to about 51% from 34%. Industry's share of GDP has remained largely unchanged at about 16%. The national accounts also underestimate certain incomes, such as migrant workers' remittances, which have grown sharply since 2004. Second, there have been some major revisions of key macroeconomic data standards since the NMEM was developed, including the national accounts, fiscal account, and the balance of payments. In view of these changes, the Government sees the need for NMEM to be updated and enhanced for analytical work and macroeconomic forecasting, and has requested ADB's support in this regard.

5. The NMEM, originally developed for supporting debt sustainability analysis, has certain limitations for the evaluation of policies that affect various sections of the economy in different ways. The approach of dynamic stochastic general equilibrium (DSGE) modeling has emerged as an appropriate tool for policy analysis and conceptual support for decision making by policy

¹ ADB. 2004. *Country Strategy and Program, Nepal 2005–2009*. Manila.

² The TA first appeared in the business opportunities section of ADB's website on 28 August 2008.

³ ADB. 2002. *Technical Assistance to the Kingdom of Nepal for Strengthening Institutional Capacity for Public Debt Management*. Manila (TA 4017-NEP, approved on 6 December 2002 and completed in December 2005).

makers. Compared with traditional macroeconomic models, DSGE models have the advantage of stating explicitly the microeconomic issues that give rise to macroeconomic dynamics. DSGE models are used to organize thinking, measure the importance of different phenomena, and provide policy prescriptions. They could be used for quantitative data analysis, especially short- and medium-term forecasting, and projections of macroeconomic aggregates under different scenarios. A DSGE model would not only allow overcoming the limitations of the NMEM, but also provide a tool for research and analysis of macroeconomic aggregates, and derive policy implications. It will establish a valid mechanism for policy makers to base policies on sound quantitative analysis. However, being a complex and sophisticated tool, it requires both internal consistency in relation to the underlying assumptions of the rational decision-making agents and external consistency in relation to other subfields of economics. The capacity of policy-making institutions will need to be strengthened substantially to generate effective policy analysis through these tools. Key user agencies' capacity will also need to be strengthened for updating and modifying the model when necessary.

6. Given the importance of reliable and timely macroeconomic data for policy analysis and formulation, development planning, and effective monitoring and evaluation, ADB has also been assisting in improving Nepal's statistical system, including a comprehensive diagnostic study on Nepal's statistical system under TA for Statistical Capacity Building in the Asia and Pacific Region⁴ in 2007. The TA assessed Nepal's state of statistics development, reviewed ADB's assistance for statistics development, and identified the country's ongoing needs. The review concluded that Nepal's statistical system is still weak at generating adequate statistics that meet analytical and policy needs, and that the weaknesses are largely due to ineffective supporting legislation and institutional setup, data gaps, and inadequate levels of human resource and technology development. A weak institutional and legal framework was identified as contributing to the ineffectiveness of the National Statistics Act, inadequate legal status of the apex policy-making statistical body—the National Statistical Council (NSC)—a lack of autonomy of the national statistics office—the Central Bureau of Statistics (CBS)—and weak statistics units in line ministries and departments. In addition, many data gaps still exist in the statistical system.

7. Against this backdrop, the diagnostic study proposed a long-term action plan for improving Nepal's statistical system by strengthening the legal and institutional framework; meeting data gaps in socioeconomic statistics; improving the quality and coverage of the present statistical outputs; and upgrading information technology, infrastructure, and human resource development and training. To improve the legal and institutional framework, the action plan stressed the urgent need to implement the Consolidated National Statistical Plan (CNSP) without further delay.⁵ The TA also identified other key short- to medium-term priorities among the needs identified by the long-term action plan. These included support for conducting an economic census and establishing a system of follow-up surveys of enterprises; and continuing to improve the national accounts statistics by sustaining the recent initiatives on institutional sector accounts and developing quarterly national accounts (QNA), including improvement of agricultural statistics.

⁴ ADB. 2006. *Technical Assistance for Statistical Capacity Building in the Asia and Pacific Region*. Manila (TA 6333-REG, approved on 31 July).

⁵ The CNSP, prepared with ADB assistance under ADB. 2000. *Technical Assistance to the Kingdom of Nepal for Strengthening the National Statistical System*. Manila (TA 3451-NEP, approved on 1 June and closed in 2004), proposed revision of the Statistical Act 1958 to reflect emerging changes, raising the status and autonomy of CBS to a ministry level, establishment of a system of designated statistics, and revamping the NSC into a more functional body. Implementation of the CNSP has been delayed mainly due to frequent changes of government and budget constraints. However, there has been some recent progress, including prioritization of the scope of the CNSP and finalization of the draft amendment to the Statistical Act, which is currently under the Legal Reform Commission's review.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

8. The TA will enhance the Government's capacity for economic policy formulation based on reliable macroeconomic data and sound policy analysis. This will be achieved by helping to further improve the national statistical system and develop and use macroeconomic models for policy simulations, macroeconomic forecasting, and economic planning. The national statistics system will be improved by supporting legal and institutional reforms; helping to compile QNA; and building institutional capacity for continued improvement of the national accounts, which have been updated based on the 1993 System of National Accounts beginning in FY2008 and taking FY2001 as the base year. The macroeconomic models will help policy makers in devising suitable policies for medium-term growth and preparing development plans.

9. The outputs of the TA will be: (i) implementation of the CNSP to strengthen the national statistical system; (ii) a system for compiling QNA and GDP estimates for FY2007–FY2010; (iii) updated and upgraded NMEM based on the revised macroeconomic data standards in recent years and structural changes in the economy; (iv) a DSGE-type model for Nepal; and (v) strengthened capacity of key institutions—including, among others, NRB, the National Planning Commission (NPC), Ministry of Finance (MOF), and CBS—for macroeconomic data collection, compilation, and analysis and forecasting.

B. Methodology and Key Activities

10. The proposed TA will have two components: (i) improving the national statistical system, and (ii) upgrading the NMEM and developing a DSGE-type macroeconomic model.

11. Component A will be based on the recommendations of TA for Statistical Capacity Building in the Asia and Pacific Region. Under this component, the Government will implement the CNSP by taking necessary actions for enactment of a new statistical act (a draft of which has already been prepared), followed by the restructuring and upgrading of CBS, strengthening of NSC, and establishment of a designated statistical system. The TA will provide necessary training to familiarize government agencies concerned with the new legislation and institutional structures. In support of the Government's continued efforts to further improve the national accounts, the TA will assist in compiling QNA and estimating quarterly GDP series at both current and constant prices based on the production (industry) approach. The TA will also examine the feasibility of compiling quarterly GDP estimates based on the expenditure approach. Primarily, compilation of the QNA will be based on existing administrative records. In this regard, the TA will, in coordination with the International Monetary Fund (IMF), support CBS and other related agencies in implementing IMF's recommendations⁶ for developing a system of QNA based on existing administrative records. The TA will also support certain priority surveys and studies, including a horticulture survey, to help fill data gaps for compiling the QNA. Data collected through existing sources and new surveys will be compiled into a QNA series covering FY2007–FY2010, which will be analyzed to ensure consistency with the annual national accounts (ANA). Based on these activities, a system of QNA data collection, compilation, and analysis will be established for estimating quarterly GDP series in the future. To ensure sustainability of the QNA system, the TA will provide on-the-job training for CBS staff on QNA

⁶ At the request of the Government, IMF has been providing technical advice to CBS for developing QNA since 2005. IMF's Real Sector Statistics Mission in July 2006 reviewed the quarterly indicators and planned quarterly surveys, and made specific recommendations for QNA development. IMF's recommendations focus on collecting data from administrative sources and compiling and analyzing data series that are already available.

data collection and compilation, organize workshops and seminars to orient the staff of other line ministries and departments responsible for supplying data, design necessary surveys and train them on data collection and analysis, and support an apprenticeship program with a well-established regional statistical organization to enhance the skills of CBS staff in compiling QNA.

12. Under the macroeconomic modeling component (component B), the TA will support updating and enhancing the NMEM to cater to the needs of NPC and MOF for macroeconomic analysis, growth projections, and development planning. The model will also be enhanced by including the monetary variables and their linkages for use by NRB for analysis of monetary aspects of the economy. Additionally, the TA will support development of a DSGE-type macroeconomic model with adequate specifications with respect to production, consumption, trade, and price mechanisms among other factors. The TA will support collecting and organizing data for developing a DSGE-type model suitable for the evolving structure of the Nepalese economy. As NPC and MOF are important government agencies using macroeconomic models for medium-term growth projections and planning, mechanisms will be developed to ensure their effective participation in model development and capacity building.

13. The TA will also help develop a calibration methodology for making the models user-friendly. Model-consistent data links, reporting systems, and user manuals for both models will be developed during the implementation period. Both models will be designed to facilitate and support policy simulation and analysis for making pragmatic policy recommendations and decisions. Training will be provided for agencies and other concerned stakeholders to strengthen their technical capacity for analytical and computation skills for macroeconomic modeling. In particular, training will enable them to run the models, analyze policy implications, and modify the models as needed to ensure sustainability of the TA objectives. To facilitate and maximize the use of these models, the TA will establish an information technology-based system for easy and wider access to the models and develop user manuals for key institutions such as NPC, MOF, NRB, and others.

C. Cost and Financing

14. The total cost of the TA is estimated at \$825,000. ADB will provide \$675,000 on a grant basis from ADB's TA funding program. The main items to be funded by ADB are the services of international and domestic consultants, equipment, workshops and seminars, and surveys. The Government will contribute \$150,000 equivalent to provide office accommodation, counterpart staff support, facilities for seminars and meetings, and other administrative expenses. Details of the cost estimates and financing plan are in Appendix 2.

D. Implementation Arrangements

15. **Institutional Arrangement.** CBS will be the Executing Agency (EA) for component A of the TA and NRB for component B. Both components of the TA will be implemented in close coordination with other relevant Government agencies, including MOF, NPC, and other line ministries and departments.

16. A steering committee will be formed—chaired by the relevant NPC member and comprising representatives of MOF, the NPC secretariat, NRB, CBS, and other relevant line ministries and departments as necessary—to provide overall policy guidance for implementation of the TA, monitor progress, and take necessary actions to facilitate implementation of the TA. Separate technical committees will provide guidance at the technical and operational level. The technical committee for component A will be chaired by the director general of CBS, while the

technical committee for component B will be chaired by the executive director of the Research Department of NRB. The technical committees will comprise representatives of MOF, NPC, and other agencies as appropriate. The steering committee and the technical committee for component A will also function as coordinating bodies for facilitating the supply of necessary administrative data from government ministries and departments concerned with compilation of QNA.⁷ The technical committee for component B will coordinate with other macroeconomic modeling activities, including the proposed United Nations Development Programme supported macroeconomic modeling for monitoring the Millennium Development Goals.

17. Both EAs (CBS and NRB) will appoint focal persons who will be responsible for overall supervision and coordination of the implementation of their respective TA components. The focal persons will oversee the day-to-day implementation of the TA activities, maintain close coordination with all relevant stakeholders, and manage the consultants' inputs.

18. **Consulting Services.** A total of 10 person-months of international and 21-person months of national consulting services will be provided under the TA. Individual consultants will be selected in accordance with ADB's *Guidelines on the Use of Consultants* (2007, as amended from time to time). The outline of the terms of reference for the consulting services is in Appendix 3. Equipment will be procured in accordance with ADB's *Procurement Guidelines* (2007, as amended from time to time), and will be handed over to the Government on the completion of the TA. ADB will recruit the consultants, and disbursements under the TA will be conducted in accordance with ADB's *Technical Assistance Disbursement Handbook* (2008, amended from time to time).

19. The lead consultants will submit inception reports—including a detailed work program for the TA to the steering committee, respective focal units, and ADB—within 30 days of commencement of the TA. Quarterly progress reports and mid-term reports will be submitted to the EAs and ADB separately. Draft final reports (1 month prior to completion of the TA) and final reports (after completion of the TA) will be submitted to the respective focal units and ADB.

20. The TA will be implemented over 24 months from November 2008 to October 2010. Separate tripartite meetings among the respective EAs, TA consultants, and ADB will be held at least twice per year, or more frequently as required, and chaired by the heads of the respective technical committees, to review implementation progress of the TA components, address any implementation issues, and provide guidance to the TA consultants. The steering committee will meet at the beginning of the TA and every 4 months thereafter to guide TA activities and resolve any policy and implementation issues.

IV. THE PRESIDENT'S DECISION

21. The President, acting under the authority delegated by the Board, has approved the provision of the technical assistance not exceeding the equivalent of \$675,000 on a grant basis to the Government of Nepal for Strengthening Capacity for Macroeconomic Analysis, and hereby reports this action to the Board.

⁷ The interagency flow of such data is expected to improve in the longer term with the implementation of the CNSP.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and/or Indicators	Data Sources and/or Reporting Mechanisms	Assumptions and Risks
<p>Impact Economic policies based on an improved statistical system (national accounts) and sound quantitative macroeconomic analysis</p>	<p>Legal and institutional reforms (CNSP) implemented, and capacity developed for compiling quarterly national accounts (QNA)</p> <p>Capacity developed for growth projections, macroeconomic forecasting, and development planning</p>	<p>Review missions, progress reports, and timely publication of quarterly gross domestic product (GDP) estimates</p> <p>Quantitative tools are used for ex ante and ex post analysis of the Government policies</p>	<p>Assumptions Adequate human resources and interagency coordination for regular supply of necessary data for compilation of QNA</p> <p>The Government's commitment to adopt the analytical framework developed</p> <p>Risk Political instability affecting implementation of CNSP</p>
<p>Outcome Component A: A more conducive legal and institutional environment for improving the national statistical system</p> <p>A system of QNA- compilation established</p> <p>Component B: Macroeconomic tools developed for short- to medium-term macroeconomic forecasting and policy analysis</p>	<p>Promulgation of a new Statistical Act and institutional restructuring</p> <p>Trained Central Bureau of Statistics (CBS) staff capable of compiling QNA</p> <p>Short- to medium-term macroeconomic forecasting undertaken for policy analysis and formulation</p>	<p><i>Nepal Gazette</i>, review missions, and assessment of technical assistance (TA) progress reports of consultants</p> <p>Budget speech, interim policy announcements, and periodic development plans</p>	<p>Assumptions Government commitment to legal and institutional reforms for statistical development</p> <p>Availability of qualified government counterpart staff and their continuity</p> <p>Risk Lack of priority and institutional environment to sustain the quantitative and policy analysis process.</p>
<p>Output Component A: 1. Enactment of the new Statistical Act, more autonomous CBS, and more functional National Statistical Council (NSC) 2. Quarterly GDP estimates for FY2007–FY2010</p>	<p>Enactment of the new Statistical Act and institutional restructuring</p> <p>Publication of quarterly GDP series for FY2007–FY2009 and preliminary estimates for FY2010</p>	<p>Cabinet decisions, tripartite review meetings, and regular policy dialogue with Government</p> <p>Review of published reports by CBS</p>	<p>Assumption Availability of qualified counterpart CBS staff and their active participation in TA activities</p> <p>Risk Delays in processing the draft Statistical Act, approval by the legislature and Government actions to implement institutional restructuring</p>
<p>Component B: 1. Upgrade of the Nepal Macroeconomic Model (NMEM) 2. A Dynamic Stochastic General Equilibrium (DSGE)-type model developed for Nepal 3. User manual to undertake the</p>	<p>Updated NMEM based on the revised data standard</p> <p>A DSGE type macroeconomic model suited for Nepal</p>	<p>Continuous monitoring by the technical committee</p> <p>Continuous monitoring by the technical committee</p>	<p>Assumption Availability of qualified counterpart staff and their active participation in TA activities</p> <p>All stakeholders will be able to use the manuals to run the models.</p> <p>Risk</p>

Design Summary	Performance Targets and/or Indicators	Data Sources and/or Reporting Mechanisms	Assumptions and Risks
quantitative macroeconomic analysis and forecasting	Revised manual of NMEM and a user's manual for DSGE type model	Progress reports	Lack of timely and quality data
<p>Activities with Milestones</p> <p>Component A:</p> <p>1.1 Enact the new Statistical Act by July 2009</p> <p>1.2 Restructure CBS and NSC by December 2010</p> <p>1.3 Review administrative records from different ministries and departments according to the concept of designated statistics for compiling QNA by July 2009</p> <p>1.4 Conduct surveys, studies, and research for preparing QNA indicators and database by mid-2010</p> <p>1.5 Produce quarterly GDP estimates for FY2007–FY2009 and preliminary estimates for FY2010 by October 2010</p> <p>1.6 Provide on-the-job training to CBS staff and other relevant agencies, mostly during 2009</p> <p>1.7 Conduct seminars and workshops on CNSP and compilation of QNA throughout the TA period</p> <p>1.8 Apprenticeship program for the national accounts staff of CBS (early 2010)</p> <p>Component B:</p> <p>2.1 Review the NMEM and identify deficiencies and their causes by February 2009</p> <p>2.2 Conduct research and explore sources of data to upgrade the NMEM by March 2009</p> <p>2.3 Finalize the upgraded NMEM by May 2009</p> <p>2.4 Undertake research on developing a DSGE-type model for Nepal by June 2009</p> <p>2.5. Develop the DSGE-type model and the ensuing software by September 2009</p> <p>2.6 Develop a user manual, including calibration methodology, to undertake quantitative macroeconomic analysis using the DSGE model by December 2009</p> <p>2.7 Conduct seminars and workshops on the features of the two models and incorporate the feedback and finalize the model by February 2010</p> <p>2.8 Provide on-the-job training to three staff from each of the agencies— Nepal Rastra Bank, CBS, National Planning Commission, Ministry of Finance, and the Department of Economics, Tribhuvan University, and other relevant agencies—by March 2010. The staff will be selected in close coordination with the executing agency, steering committee, and the technical committee.</p>			<p>Inputs</p> <p>Asian Development Bank: \$675,000</p> <p>Government: \$150,000</p>

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Component A	Component B	Total Cost
A. Asian Development Bank Financing^a			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants	93.2	142.3	235.5
ii. National Consultants	31.5	49.0	80.5
b. International Travel	10.0	5.0	15.0
c. Reports and Communications	0.8	5.0	5.8
2. Equipment ^b	20.0	20.0	40.0
3. Training, Seminars, and Conferences			
a. Workshops and Seminars	20.0	25.0	45.0
b. Apprenticeship Program	40.0	—	40.0
4. Surveys	152.1	—	152.1
5. Contingencies	36.8	24.3	61.1
Subtotal (A)	404.4	270.6	675.0
B. Government Financing			
1. Office Accommodation	20.0	20.0	40.0
2. Remuneration and Per Diem of Counterpart Staff	25.0	35.0	60.0
3. Administrative Support	10.0	20.0	30.0
4. Others	10.0	10.0	20.0
Subtotal (B)	65.0	85.0	150.0
Total	469.4	355.6	825.0

— = not available.

^a Financed by the Asian Development Bank's technical assistance funding program

^b Equipment includes purchase of computers, printers, software, and photocopy machines.

Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

A. Component A: Developing a System of Quarterly National Accounts

1. National Accounts Expert/Team Leader (international, 4 person-months)

1. The consultant should have appropriate qualifications and technical background with sufficient experience in the development of both annual national accounts (ANA) and quarterly national accounts (QNA) methodology and compilation practices. The consultant will carry out the following activities:

- (i) review the present ANA compilation and estimation methodology and practices;
- (ii) review the preparatory work and assessments initiated under technical assistance (TA) 4460⁸ and identify data gaps and other deficiencies for compilation of ANA and QNA;
- (iii) based on the above assessments, assist the Central Bureau of Statistics (CBS) in reviewing and exploring administrative data and their sources to develop indicators for QNA compilation;
- (iv) based on the outcome of the above assessments, assist CBS in designing and conducting necessary surveys and studies to fill important data gaps;
- (v) develop a framework for compiling QNA based on the production approach and suggest measures for improving the data collection system from existing sources and the methodology of QNA compilation;
- (vi) develop a methodology for aligning quarterly gross domestic product (GDP) estimates with annual estimates and conduct a consistency check on price indices and GDP deflators;
- (vii) review and prepare a feasibility report on the data requirements for quarterly GDP estimates based on the expenditure approach;
- (viii) provide on-the-job and separate training to CBS officials on the compilation of QNA;
- (ix) assist CBS in preparing a QNA compilation manual providing detailed explanations on data sources and methodology;
- (x) as a lead consultant, coordinate the inputs of other consultants under component A of the TA, and prepare and compile necessary periodic progress reports on TA activities; and
- (xi) submit a final report on TA activities to CBS and the Asian Development Bank (ADB) at the end of the contract.

2. National Accounts Expert (national, 5 person-months)

2. The national accounts expert should have appropriate background and experience in the overall compilation of national accounts. The consultant will work under the guidance of the international consultant and perform the following tasks:

- (i) assist the international consultant in assessing the status of national accounts statistics, identify data gaps, and propose an appropriate methodology for the compilation of ANA and QNA in Nepal;

⁸ ADB. 2004. *Technical Assistance to the Kingdom of Nepal for Strengthening National Accounts System*. Nepal (TA 4460-NEP, approved on 3 December for \$450,000).

- (ii) assist the international consultant in preparing a comprehensive QNA manual of methodology and data sources for Nepal to be used as a guidebook for the users and compilers of national accounts;
- (iii) assist CBS in providing on-the-job and formal training to CBS staff on the concepts and methodology of the compilation of QNA;
- (iv) assist CBS staffs in developing necessary frameworks for collection of data and indicators from different primary and secondary sources required for QNA compilation;
- (v) assist in developing a methodology for aligning quarterly GDP estimates with annual estimates and conduct a consistency check on price indices and GDP deflators;
- (vi) submit a report to CBS and the ADB at the end of the contract; and
- (vii) undertake other tasks as required by CBS and the steering committee.

3. Agriculture Statistician (national, 4 person-months)

3. The consultant must have appropriate qualifications, technical background, and work experience in the area of sampling survey in the agriculture sector. He will perform the following tasks:

- (i) assist in preparing survey designs, frame preparation, questionnaire designs, data processing, tabulation plans, and other tasks as required by CBS to fill the data gaps in national accounts, especially in vegetable and horticulture surveys;
- (ii) assist CBS in providing on-the-job training to the staff of CBS in planning and operating specific surveys;
- (iii) recommend appropriate methodologies for generating current statistics on vegetable production on a quarterly basis;
- (iv) prepare a survey report analyzing the results derived from the survey;
- (v) prepare a procedural history report of the survey to be used as a reference in the future;
- (vi) finalize the analytical report of the survey prepared by CBS staff;
- (vii) submit a completion report to CBS and ADB at the end of the contract; and
- (viii) undertake other tasks as required by the steering committee and CBS.

B. Component B: Macroeconomic Modeling

4. The consultant will perform the following tasks:

1. Macroeconomic Modeling Specialist/Team Leader (international, 6 person-months)

- (i) update the Nepal Macroeconomic Model (NMEM) based on the new system of national accounting adopted by CBS and changes in the structure of the Nepalese economy;
- (ii) develop a new dynamic stochastic general equilibrium (DSGE) type model suitable for Nepal;
- (iii) develop software for updated NMEM and DSGE-type macro models;
- (iv) develop a user manual for both the NMEM and DSGE-type model that includes the calibration methodology;

- (v) devise a model consistent with the data linkages and reporting systems required for an efficient modeling exercise, and ensure the sustainability of efforts in the area of macroeconomic modeling in Nepal;
- (vi) undertake growth and macroeconomic projections for the Nepalese economy and compare the consistency of results from both the models;
- (vii) provide training to the staff of the agencies involved, and other agencies suggested by the steering committee and the technical committee, on features of the models and software to enable them to undertake the modeling exercise independently;
- (viii) work closely with the national consultants and provide guidance on their respective assignments and supervise their work;
- (ix) arrange the facilities for workshops, training, seminars, and dissemination of the findings;
- (x) undertake consultations with all stakeholders and incorporate feedback from developing the two models and other expected outputs of the TA;
- (xi) work closely with the Executing Agency (EA), the steering committee, technical committee, and other relevant stakeholders for developing the models;
- (xii) oversee overall TA implementation and prepare required reports;
- (xiii) coordinate the procurement of hardware and software needed for upgrading the software for NMEM and the new model with ADB, the EA, and the national information technology specialist; and
- (xiv) undertake other tasks as required by the steering committee and ADB.

2. Macroeconomic Modeling Specialist (national, 5 person-months)

5. The consultant will perform the following tasks:

- (i) review the previous macroeconomic modeling work in Nepal, identify gaps and provide suggestions for upgrading the NMEM and DSGE-type of model for Nepal;
- (ii) provide the data inputs on Nepal required by the team leader to upgrade the NMEM and develop a new DSGE-type model for Nepal;
- (iii) assist the team leader in undertaking the macroeconomic modeling and macroeconomic forecasting for the Nepalese economy;
- (iv) assist the team in designing models that are based on economic principles and methodology for macroeconomic modeling of the economy;
- (v) assist the international consultant in upgrading the NMEM and developing the DSGE model for Nepal;
- (vi) train staff in the EA on the features of the economy, and interpretation of the results;
- (vii) participate in the consultation process and incorporate feedback;
- (viii) work closely with the team leader, EA, steering committee, and technical committee, and provide required inputs; and
- (ix) undertake other tasks as required by the steering committee and ADB.

3. Econometrician (national, 5 person-months)

6. The consultant will perform the following tasks:

- (i) assist the team leader on data needs and calibration methods for upgrading the NMEM and developing a new DSGE-type macro model;

- (ii) assist the team leader in designing the models that are statistically sound and yield robust results;
- (iii) assist the team in designing models that use appropriate econometric principles and methodology for macroeconomic modeling of the economy;
- (iv) train EA staff on data requirements, inputs to the model, calibration methods, and running the models;
- (v) participate in the consultation process and incorporate feedback;
- (vi) work closely with the team leader, EA, steering committee, and technical committee; and provide required inputs; and
- (vii) undertake other tasks as required by the steering committee and ADB.

4. Information Technology Specialist (national, 2 person months)

7. The consultant will perform the following tasks:

- (i) check the specifications of the hardware and software that have been purchased and installed at the Nepal Rastra Bank (NRB) and their connectivity to the databases at NRB and CBS;
- (ii) install the new macroeconomic modeling software in the NRB and ensure that staff at NRB can install the software in case need arises;
- (iii) complete the database migration to the new modeling format;
- (iv) undertake data validation and train the staff of the NRB on database and system maintenance activities; and
- (v) undertake other tasks as required by the steering committee and ADB.