



Technical Assistance Report

Project Number: 46397-001

Capacity Development Technical Assistance (CDTA)
December 2012

Kyrgyz Republic: Implementing the e-Procurement System

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 3 December 2012)

Currency unit	–	som (SOM)
SOM1.00	=	\$0.02116
\$1.00	=	SOM47.257800

ABBREVIATIONS

ADB	–	Asian Development Bank
IT	–	information technology
MOF	–	Ministry of Finance
PMU	–	project management unit
PPMAD	–	Public Procurement Methodology and Analysis Department
SDU	–	software development unit
TA	–	technical assistance

TECHNICAL ASSISTANCE CLASSIFICATION

Type	–	Capacity development technical assistance (CDTA)
Targeting classification	–	General intervention
Sector (subsectors)	–	Public sector management (public expenditure and fiscal management, information and communication technology, economic and public affairs management)
Themes (subthemes)	–	Governance (economic and financial governance, public administration [national and decentralized], anticorruption), capacity development (institutional development), economic growth (promoting economic efficiency and enabling business environment)
Location (impact)	–	National (high), urban (medium), rural (low)

NOTE

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

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I. INTRODUCTION

1. Improved public procurement systems add to increased trust and support for government operations. Technical assistance (TA) from the Asian Development Bank (ADB) for the Asia Pacific Procurement Partnership Initiative has demonstrated the importance of such enhancements.¹

2. The Government of the Kyrgyz Republic embarked upon implementing an e-procurement system as one of its key policy initiatives in 2012, and requested ADB TA support. In March 2012, ADB provided support to (i) conceptualize an e-procurement reform strategy, (ii) initiate the stakeholder consultation process, and (iii) provide technical advice on improving the e-procurement portal developed by the government.² In October 2012, ADB's fact-finding mission reached an understanding with the government on the objectives, scope, cost estimates, financing, and implementation arrangements for the TA. The design and monitoring framework is in Appendix 1.³

II. ISSUES

3. In the Kyrgyz Republic, public procurement accounts for about 6% of gross domestic product. Public procurement spending for 2011 was SOM16 billion (\$340 million),⁴ of which 33% was spent by budget entities, 17% by local government entities, and the remaining 50% by state-owned enterprises with more than 50% of state share. Public procurement accounted for about 20% of the budget for 2011. Thus, savings resulting from increased efficiency in public procurement operations would be significant. The joint procurement assessment of ADB and the World Bank reported a serious need for procurement reform to improve efficiency and transparency and specific measures to prevent and detect fraud and corruption.⁵

4. Governments that have implemented e-procurement have reported the following key measurable benefits: transactional efficiency in tendering, increased competition, and enhanced user satisfaction. In addition to the measurable benefits, e-procurement enhances transparency and reduces fraud and corruption in public procurement. When transactions are handled electronically by all procuring entities using the unified e-procurement system, national analytical reports can be generated with minimal effort.

5. Suppliers will be able to learn about public procurement opportunities from a single centralized source of information and also transact (i.e. submit their bids and invoices electronically) with multiple procuring entities using the e-procurement system. E-procurement will also enable the creation of a national database of suppliers and the automatic generation of supplier performance reports. Furthermore, e-procurement will build capacity among government officials and suppliers in using information and communication technology infrastructure for handling procurement transactions.

¹ ADB. 2009. *Technical Assistance for the Asia Pacific Procurement Partnership Initiative*. Manila (TA 7437-REG, \$1.3 million).

² The Kyrgyz Resident Mission, supported by the Central Operations Services Office, fielded an international consultant for 3 person-months to assist the government in preparing an e-procurement reform strategy and implementation plan.

³ The TA first appeared in the business opportunities section of ADB's website on 29 October 2012.

⁴ Government of the Kyrgyz Republic, Ministry of Finance. 2012. *Public Procurement Report 2011*. Bishkek (prepared by the Public Procurement Methodology and Analysis Department).

⁵ The draft report on the country procurement status review prepared by a joint assessment team of ADB and the World Bank was shared with the government in August 2012. The dissemination workshop was conducted in October 2012 in Bishkek.

6. The national development strategy of the Kyrgyz Republic emphasizes governance reform, in particular public sector reforms and anticorruption measures. Development and adoption of a nationwide e-procurement system is one of the key public sector management reform initiatives of the current government. In September 2012, the government approved the Public Procurement Development Strategy, 2012–2014,⁶ which reflects government commitment to and ownership of the reform.

7. Implementation of a unified end-to-end system is included in the procurement strategy, wherein all government agencies will use a single software system to handle their procurement activities from planning to payment. The first functionality of the e-procurement system (e-publication) has been implemented, using the government's internal resources and in-house expertise. The TA will build on the reform achievements and provide inputs to overcome the deficiency in goods and services required for implementing the fully functional e-procurement system.

III. THE TECHNICAL ASSISTANCE

8. The TA will help the government develop and roll out the e-procurement system. The TA will support establishment of a management system, the making of rules, system analysis, building hardware and software platforms, building capacity of all stakeholders, phased testing and installation, and monitoring during the trial period.

A. Impact and Outcome

9. The impact will be increased efficiency and trust in public sector spending. Transparency and efficiency gains created by a unified e-procurement platform will contribute to better governance in public sector management. The outcome will be improved transparency and efficiency of the public procurement system. Successful implementation of e-procurement will increase market confidence in the public procurement system. A 50% increase in the average number of bidders participating in public procurement is expected. A 30% reduction in procurement transaction costs and time taken by the procuring entities, and improved ability to generate real-time and analytical reports on procurement spending by the central government, are the real benefits of the efficiency of the public procurement system.

B. Methodology and Key Activities

10. The TA will have three outputs: (i) a phased development and rollout of the e-procurement system by the Ministry of Finance (MOF) for procuring entities, (ii) enhanced technical skills of the MOF for development and implementation of the e-procurement system, and (iii) improved awareness and capacity of end users of the e-procurement system.

11. In achieving the outputs and outcome, two key risks are identified. First, the system design may not be fully effective in ensuring bidder participation across the country, as internet access is not yet comprehensive. Second, there may be delays and lags due to capacity problems in software maintenance and management, and government infrastructure for information technology (IT). Phased introduction of e-procurement, in-house capacity building activities, and the system sustainability model will mitigate these risks.

⁶ ADB assisted the government in developing the procurement strategy based on the recommendations of the country procurement status review.

12. **Phased implementation.** Shifting from manual procurement to e-procurement denotes a major change that will require significant efforts. Under the TA, the unified end-to-end system will be implemented in phases according to the roll-out plan in the following dimensions:

- (i) **Geography.** The use of the e-procurement system will be expanded to new procuring entities.
- (ii) **Functional components.** The use of e-tendering, pre- and post-tendering, and e-shopping functionality will be gradually expanded.
- (iii) **Time.** Expansion in using the e-procurement system is planned for every 6 months.

13. According to the MOF analysis, 85 procuring entities published 1,880 unlimited tenders in 2011. In the roll-out plan, procuring entities are prioritized by the number of tenders published, and agencies with a higher number of tenders will be the first to use the system. The TA will fill the gap in hardware and internet access of the government end users, especially in *oblasts* (provinces).

14. Key functional components of the e-procurement system and estimated dates for their readiness are as follows: (i) e-publication: June 2012 (completed by the government); (ii) e-tendering and e-auction: December 2013; (iii) pre- and post-tendering workflows: June 2014; and (iv) e-shopping: December 2014. The full-fledged system will be rolled out to all procuring entities (more than 75 will use all functional components) within 3 years.

15. **Government ownership and sustainability.** It is assumed that the government remains committed to e-procurement implementation. A single e-procurement software system will be used as government shared infrastructure. The TA will (i) augment the government's ongoing initiative, where required, to empower the government in implementing the full-fledged e-procurement system; and (ii) strengthen government in-house capabilities to maintain the system.

16. Article 14 of the Public Procurement Law, 2004 refers to an authority on public procurement and defines its main functions. Government resolution confirms the MOF's role to act as the public procurement authority referred to in the law and establishes the Public Procurement Methodology and Analysis Department (PPMAD) under the MOF with a mandate to implement legal and institutional reforms. A dedicated project management unit (PMU) will be set up under the PPMAD to develop, introduce, and maintain the e-procurement system.

17. The TA will finance critical inputs required to develop the system and transition users from manual procurement to e-procurement. The handling of transactions using e-procurement will produce cost savings, which can be used for sustaining the TA outcome. The procurement strategy envisaged that the government will charge small fees for efficient handling of procurement transactions using the e-procurement system. These transaction fees could be used to sustain the e-procurement system, thus ensuring long-term viability of the reform. The government procedure on the use of e-procurement (to be approved in 2013) should specify the mechanism for ensuring the security and service quality of its operation.

18. **Software development.** Info-System, a state-owned enterprise under the MOF, is engaged to develop the preliminary e-procurement software. The government will commission Info-System to set up a dedicated software development unit (SDU) to develop the full-fledged end-to-end e-procurement software. The TA will finance additional open-source software and

server infrastructure including rack servers and virtualization software within the TA funds budgeted for equipment.

19. **Establishment of digital signature center.** The TA will support the creation of a digital signature center⁷ specifically to address digital signature requirements in the e-procurement system. Digital signatures will be enabled in the e-procurement software platform and used by government users and contractors to authenticate, verify integrity, and enable non-repudiation of electronic transactions. In addition, USB tokens will be used to store and access digital signature certificates from special hardware for 5 years. The digital signature center will be designed to handle the issuance of certificates for up to 10,000 users.⁸

20. **Call center software solution.** By launching the e-procurement system, Info-System intends to expand the capacity of the call center and help desk system it established in 2010. The TA will finance additional software and hardware modules, licenses, IP-phones, and connection to a digital data stream to enable the call center system to serve all users of the e-procurement system. A dedicated telephonic help desk supplemented by the call center will guide suppliers and government officials using the e-procurement system and receive grievances about e-procurement and public procurement in general.

21. **Capacity building and change management.** Capacity development activities for the PMU and SDU teams will include a study tour and two specialized training programs abroad.⁹ Systematic and dedicated training programs will be created in cooperation with the training center of the MOF to upgrade the skills of procurement specialists in using the e-procurement system and in overall public procurement. Hands-on e-procurement software training will be provided. Training programs and public awareness campaigns will be conducted specifically to educate suppliers about e-procurement and public procurement initiatives.

22. The TA will support IT infrastructure and internet connectivity of government offices on a gap-filling basis to enable end use of the e-procurement system. The PPMAD should complete a needs assessment and IT penetration survey in *oblasts* by January 2013. The survey will update the plan to roll out the e-procurement system and establish support centers in *oblasts*.

23. Under the TA, government end users will receive support in using the e-procurement system. Suppliers will also receive support from e-procurement support centers to ensure a smooth transition from manual procurement to e-procurement.

C. Cost and Financing

24. The TA is estimated to cost \$1,300,000, of which \$1,000,000 will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-IV). The government will provide counterpart support in the form of counterpart staff, office space for consultants, and other in-kind contributions.

⁷ Info-System has obtained prior approval from the State Committee on National Security on the scheme for creating a digital signature center. A government decree will be issued accordingly in line with its creation. Info-System will operate the digital signature center.

⁸ The government will create suitable legal provisions such that certificates issued by the digital signature center and documents signed using such certificates with the root certificate of the digital signature center will be deemed legally valid. The TA will finance hardware equipment and USB tokens to support the establishment of the digital signature center.

⁹ The location for the study tour and suitable international training programs will be identified during the TA implementation.

D. Implementation Arrangements

25. The MOF will be the executing agency and will lead the TA implementation. It will establish a dedicated PMU and SDU to implement the TA with full ownership and smooth integration with pre- and post-TA activities. A working group with representatives from procuring entities, supplier communities, and civil society organizations constituted by the government will provide guidance to the MOF in implementing the e-procurement system. Office space, furniture, counterpart staff salaries, and other support costs required for project management and software development teams will be provided by the government.

26. The following individual national consultants will be hired for a total of 468 person-months: technical and operations director (30 person-months), two business analysts (30 person-months each), trainer (30 person-months), six field assistants (21 person-months each), accounts and administration specialist (30 person-months), module lead and senior developer (30 person-months), three developers (24 person-months each), testing lead (30 person-months), document writer (30 person-months), and application and operating system administrator (30 person-months). An individual international consultant (6 person-months) will be hired on an intermittent basis for 3 years to review and monitor the TA status and to provide technical advice on the implementation of e-procurement. Terms of reference for the individual consultants are in Appendix 3. An international firm for third-party software audit will be hired through the consultants' qualifications selection method.¹⁰ Consultants will be hired by ADB in accordance with its Guidelines on the Use of Consultants (2010, as amended from time to time). IT system infrastructure equipment and hardware will be procured through the Shopping method according to ADB's Procurement Guidelines (2010, as amended from time to time). The equipment procured will be used for the implementation of the e-procurement system and will be handed over to the executing agency upon TA completion. Disbursements under the TA will be made according to ADB's *Technical Assistance Disbursement Handbook* (2010, as amended from time to time). The TA will be implemented over 36 months, from January 2013 to December 2015.

27. TA progress will be assessed according to the performance targets and indicators in the design and monitoring framework (Appendix 1). A baseline study will be conducted at the outset to benchmark performance in the manual procurement system, and the same study will be repeated after implementation to evaluate the impact of the e-procurement system.

28. Lessons from implementing the TA will be documented during the midterm and completion reviews, disclosed on ADB's website, and presented in regional workshops and procurement forums organized among ADB developing member countries.

IV. THE PRESIDENT'S DECISION

29. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$1,000,000 on a grant basis to the Government of the Kyrgyz Republic for Implementing the e-Procurement System, and hereby reports this action to the Board.

¹⁰ Security audit of software is a specialized activity, typically done by the information systems practice of large multinational firms. Given the specialized nature of this engagement, and considering that the cost allocated for the same is \$74,500, adoption of the consultants' qualifications selection method is proposed.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and Indicators with Baselines^a	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact Efficiency and trust in public sector spending increased	Public perception on trust (i.e. less corruption) in government procurement improved by 50% by end of 2017 ^a 20% increase in government projects implemented according to the approved annual budget and procurement plan by end of 2017 ^a	MOF's baseline study of manual system in 2012, and survey report on e-procurement system in 2018 E-procurement system-generated reports on bids and results issued by the MOF on quarterly basis	Assumption The government remains committed to e-procurement implementation in public sector management
Outcome Transparency and efficiency of the public procurement system improved	50% increase in average number of bidders by end of 2015 ^a 30% reduction in the time taken for average procurement transaction by end of 2015 ^a	MOF's baseline study of manual system in 2012, and survey report on e-procurement system in early 2016 Report by TA PMU, MOF's survey report about e-procurement system among stakeholders in early 2016	Assumption One e-procurement software system will be used as shared infrastructure by all government agencies Risk The system design may not be fully effective in ensuring participation of bidders across the country, as internet coverage is not 100%
Outputs 1. MOF establishes a phased rollout for the e-procurement system	Software functional components completed by 2014 MOF and procuring entities equipped with IT system infrastructure equipment, hardware, and internet connectivity by 2014 More than 75 procuring entities use e-procurement system by 2015	Report by TA PMU, third-party report on software audit Report by TA PMU Report by TA PMU	Risk Delays and lags in implementation because of capacity problems in software maintenance and management, and government IT infrastructure
2. Technical skills of the MOF for developing, implementing, and using e-procurement system enhanced	Two training programs conducted abroad for SDU staff assessed by the MOF as effective in design and deployment of all functional components of e-procurement software by 2015	Report by TA PMU; training feedback reports	

Design Summary	Performance Targets and Indicators with Baselines ^a	Data Sources and Reporting Mechanisms	Assumptions and Risks
	<p>One study tour conducted for TA PMU and SDU staff by 2014</p> <p>Two training centers established in the MOF and Osh <i>oblast</i> fully operational by 2014</p> <p>E-procurement system user training conducted for 3,000 government end users and suppliers by 2015</p>	<p>Report by TA PMU; training feedback reports</p> <p>Report by TA PMU; training feedback reports</p> <p>Report by TA PMU; training feedback reports</p>	
3. Awareness and capacity of end users of e-procurement system improved	E-procurement awareness campaign and support to end users assessed by the MOF as effective in creating a positive image of the new system among stakeholders by 2015	Report by TA PMU, online stakeholders survey report by the MOF	
Activities with Milestones <ol style="list-style-type: none"> 1. MOF operates a full interactive e-procurement system for procuring entities <ol style="list-style-type: none"> 1.1 Selection of the international consultant for e-procurement implementation support and troubleshooting by January 2013 1.2 Development of baseline survey, establishment of the software and hardware needs and client requirements, and validated detailed road map (bidders and buyers) by Q2 2013 1.3 Procurement and installation of server-side infrastructure by Q3 2013 1.4 Procurement of server-side software support by Q3 2013 1.5 Development and testing of the software for the unified e-procurement system by Q4 2013 1.6 Development of “unlimited” tender option of e-tendering module by Q4 2013 1.7 Implementation of “unlimited” tender option of e-tendering module in five pilot departments by Q2 2014 1.8 Selection of third-party software audit agency by Q2 2014 1.9 Enabling request for quotation and limited tendering options in e-tendering module by Q4 2014 1.10 Twenty new procuring entities and all the ministries to be using the e-procurement system by Q4 2014 1.11 Development of pre- and post-tendering functional components and deployment of the same on a trial basis in two procuring entities by Q4 2014 1.12 Initialization of transaction charge system for usage of e-procurement system Q4 2014 1.13 Selection of principal bank for implementation of e-payment and e-receipt of bid security and transaction fees by Q4 2014 1.14 Development and deployment of e-shopping functionality on a 		Inputs <p>ADB: Technical Assistance Special Fund (TASF-IV) \$ 1,000,000</p> <p>The government will provide counterpart support in the form of counterpart staff, office space for consultants, and other in-kind contributions.</p>	

Activities with Milestones	Inputs
<p>trial basis in five procuring entities by Q2 2015</p> <p>1.15 Development and deployment of two-stage tendering and QCBS functionality by Q2 2015</p> <p>1.16 Thirty new procuring entities and all the <i>oblasts</i> using the e-procurement system by Q2 2015</p> <p>1.17 Integration of e-procurement system with third-party software (i.e., budgeting and treasury systems) by Q4 2015</p> <p>2. Technical skills for development and implementation of e-procurement system enhanced</p> <p>2.1 Selection of consultants for the TA PMU and the SDU by Q1 2013</p> <p>2.2 Capacity and training needs assessment by Q2 2013</p> <p>2.3 Setting up the training center in the MOF by Q3 2013</p> <p>2.4 One study tour by the TA PMU and SDU to learn about e-procurement implementation experiences by Q3 2013</p> <p>2.5 Two training programs abroad to build the skills set of the SDU by Q4 2013</p> <p>2.6 Setting up the training center in Osh by Q1 2014</p> <p>2.7 Training for 3,000 government users and suppliers by Q4 2015</p> <p>3. Awareness and capacity of end users of e-procurement system improved</p> <p>3.1 Conducting baseline study on manual procurement by Q2 2013</p> <p>3.2 Awareness creation through workshops and seminars Q2 2013–Q1 2015</p> <p>3.3 Setting up and operating the call center and telephonic help desk Q3 2013–Q4 2015</p> <p>3.4 Provision of support Q1 2014–Q4 2015</p> <p>3.5 Conducting stakeholder survey about e-procurement system by Q3 2015</p>	

ADB = Asian Development Bank, MOF = Ministry of Finance, PMU = project management unit, Q = quarter, QCBS = quality- and cost-based selection, SDU = software development unit, TA = technical assistance, TASF = Technical Assistance Special Fund.

^a Baseline value of these indicators will be identified during the baseline study of the manual system to be conducted by the MOF at the beginning of the TA (para. 27).

Source: Asian Development Bank.

Rie Hiraoka
Country Director, KYRM

Klaus Gerhaeusser
Director General, CWRD

COST ESTIMATES AND FINANCING PLAN (\$'000)

Item	Amount
Asian Development Bank^a	
1. Consultants	
a. Remuneration and per diem	
i. International consultants ^b	165.0
ii. National consultants	422.0
b. International and local travel	25.0
c. Reports and communications	15.0
2. Equipment ^c	198.0
3. Training, seminars, and conferences ^d	
a. Facilitators	15.0
b. Training program	53.0
4. Surveys ^e	8.0
5. Miscellaneous administration and support costs ^f	54.0
6. Contingencies	45.0
Total	1,000.0

Note: The technical assistance (TA) is estimated to cost \$1,300,000, of which contributions from the Asian Development Bank are presented in the table above. The government will provide counterpart support in the form of counterpart staff, office spaces for consultants, and other in-kind contributions. The value of government contribution is estimated to account for 23.1% of the total TA cost.

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

^b Includes the estimated cost of \$74,500 for third-party software audit.

^c Includes the estimated costs of the following procurement packages: server infrastructure (\$98,500), server software (\$1,500), call center software (\$14,000), digital signature center equipment (\$30,000), training infrastructure (\$23,000), and infrastructure and equipment required by end users of the e-procurement system (\$31,000).

^d Includes the costs of workshops and study tour for TA project management and software development team, specialized training for software development team, cost for provision of internet in training rooms, trainers' fee, and cost of providing food for trainees.

^e Includes the costs of a baseline study of manual system and end user survey.

^f Includes the costs of office supplies, advertisement, translation services, furniture, and internet.

Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

A. Individual National Consultants

1. **Technical and operations director** (30 person-months). The director will
 - (i) define the functional requirements for implementing e-procurement functional modules;
 - (ii) work closely with developers in translating the requirements into system design, process flows, and software application screenshots;
 - (iii) be responsible for timely development of the functional modules of e-procurement software as envisaged in the roll-out plan;
 - (iv) assign work to business analysts and ensure full utilization of their time;
 - (v) develop and maintain a good working relationship with procuring entities;
 - (vi) actively contribute to designing the e-procurement system;
 - (vii) ensure timely resolution of bugs reported;
 - (viii) conduct root cause analysis for bugs reported;
 - (ix) take measures to enhance usability of software;
 - (x) develop a security policy, and back up and retrieval policies;
 - (xi) conduct disaster-recovery drills on a periodic basis to verify data is backed up correctly;
 - (xii) periodically evaluate system performance and take preventive measures to address a possible breakdown in system performance;
 - (xiii) take measures to involve new procuring entities as envisaged in the roll-out plan;
 - (xiv) be responsible for development of the design process for the different e-procurement functional modules;
 - (xv) brief the head of the project management unit (PMU) on the issues and challenges related to e-procurement software;
 - (xvi) review the content of the training program and materials;
 - (xvii) ensure the readiness of the training setup and address issues related to the training room in a timely manner;
 - (xviii) be responsible for set up and maintenance of the system infrastructure (with regard to the help desk, support, training, information technology [IT] infrastructure and network connectivity) required for implementation of e-procurement system;
 - (xix) evaluate and approve the logic required for provision of IT infrastructure and internet connectivity to government offices;
 - (xx) ensure overall readiness of government users before a procurement entity is designated to go live in the e-procurement platform;
 - (xxi) handle grievances raised by government users and contractors;
 - (xxii) manage all aspects of e-procurement-related operations including user administration, training, support, grievance handling, help desk, provision of IT infrastructure and network connectivity, and receipt and refund of bid deposits;
 - (xxiii) develop and maintain reports on all key aspects of e-procurement-related operations;
 - (xxiv) develop the systems and procedures for user administration and software error reporting; and
 - (xxv) provide support to the PMU head in preparing management plans and reports for the TA activities.

2. **Business analysts** (two analysts, 60 person-months). The analysts will
 - (i) interact with procuring entities to understand their organizational structure, reporting hierarchy, workflow, and procurement-related delegation of powers;
 - (ii) collect and analyze the forms used in the manual procurement system in an effort to develop the data fields and screens to be used in e-procurement;
 - (iii) prepare an “as is” process document as a prerequisite for involving a procuring entity in the e-procurement system;
 - (iv) demonstrate the e-procurement system to end users by specifically declaring the in-built assumptions in the software and specifically obtain their feedback on the software;
 - (v) thoroughly evaluate the e-procurement software and recommend functional and usability enhancements; and
 - (vi) provide other assistance for public awareness and capacity building in e-procurement as required.
3. **Trainer** (30 person-months). The trainer will
 - (i) develop an intuitive understanding of the e-procurement software;
 - (ii) liaise with the MOF training center and prepare detailed presentation and work assignments required to train government users and suppliers;
 - (iii) verify the readiness of the technical infrastructure required for the training;
 - (iv) prepare a comprehensive training program for e-procurement including online and specialized courses and update the program with new modules and improvements;
 - (v) conduct training for e-procurement trainers, field assistants, and help desk staff;
 - (vi) facilitate the end user trainings and provide individual attention to trainees and help them complete their work assignments;
 - (vii) obtain feedback from the trainees about the effectiveness of the training program and seek suggestions for improvement of the software; and
 - (viii) provide other assistance for e-procurement public awareness and capacity building as required.
4. **Field assistants** (six assistants, 126 person-months). The assistants will
 - (i) develop an intuitive understanding of the e-procurement software;
 - (ii) travel to the office of the procuring entity seeking support and provide hands-on training in using the e-procurement software;
 - (iii) make government officers use e-procurement software for handling real procurement transactions under active guidance and close monitoring; and
 - (iv) provide other assistance for e-procurement public awareness and capacity building as required.
5. **Accounts and administration specialist** (30 person-months). The specialist will
 - (i) provide overall financial and administration support to the PMU;
 - (ii) support the PMU head in coordinating the TA activities and record keeping;
 - (iii) manage accounting of the funds assigned for the e-procurement;
 - (iv) make projections of the expenses required for the e-procurement;
 - (v) process invoices for expenses incurred relating to the e-procurement;
 - (vi) establish the accounting system required to handle receipt and refund of bid security deposits (i.e., post-implementation of e-payment functionality);
 - (vii) undertake accounting of all electronic transactions handled in the e-procurement system; and
 - (viii) provide other administrative and logistical support to the PMU as required.

6. **Module lead and senior developer** (30 person-months). The developer will
 - (i) own the module delivery from both technical and functional requirement standpoints;
 - (ii) support the translation of functional requirements to technical requirements;
 - (iii) provide support for developers under the modules handled by the lead with regard to technical and software-related issues;
 - (iv) act as the single point of contact for the team for any functional support and translation pertaining to the modules handled;
 - (v) bridge the gap between the functional teams and the development team;
 - (vi) provide technical design for the functional requirements;
 - (vii) design, develop, and lead the delivery and assessment for a range of modules and manage projects related to own area of work;
 - (viii) carry out all necessary preparation, e.g., attend module meetings and write functional specifications and traceability matrix; and
 - (ix) respond to the functional requirement changes and explore their specific needs.
7. **Developers** (three developers, 72 person-months). The developers will
 - (i) develop code for the technical design provided by team leads and module lead;
 - (ii) define site objectives by analyzing user requirements, envisioning system features, and functionality;
 - (iii) design and develop user interfaces for internet applications by setting expectations and feature priorities throughout development life cycle, determine design methodologies and tool sets, complete programming using official languages and software products, and design and conduct tests;
 - (iv) recommend system solutions by comparing advantages and disadvantages of custom development;
 - (v) integrate applications by designing database architecture and server scripting; and study and establish connectivity with network systems, search engines, and information servers;
 - (vi) create multimedia applications using authoring tools;
 - (vii) complete applications development by coordinating requirements, schedules, and activities; contribute to team meetings; and troubleshoot development and production problems across multiple environments and operating platforms; and
 - (viii) support users by developing documentation and assistance tools.
8. **Testing lead** (30 person-months). The testing lead will
 - (i) understand software functionality and intended behavior of software and prepare software test cases accordingly;
 - (ii) verify software for conformance to test cases;
 - (iii) document errors and define the cause–effect scenario where the error can be replicated and also identify plausible reasons;
 - (iv) attempt to replicate errors reported by the help desk;
 - (v) suggest improvements for usability of software; and
 - (vi) perform quality assurance.
9. **Document writer** (30 person-months). The document writer will
 - (i) write the functional and technical documents by gathering information from various team members;
 - (ii) ensure timely check-in of source code in a central repository (e.g., team foundation server) and regularly backup source code;

- (iii) coordinate, prepare, and archive functional requirement specifications, software requirement specification, and architecture and design document as per international standards; and
- (iv) prepare user manuals for e-procurement software.

10. **Application and operating system administrator** (30 person-months). The administrator will

- (i) deploy the application;
- (ii) verify logs in the operating system and e-procurement application software;
- (iii) index the database in an effort to fine-tune database performance;
- (iv) evaluate database query performance;
- (v) back up the database and content on a regular basis;
- (vi) write and execute (including complex) database queries;
- (vii) monitor server performance and bring to the notice of team lead data on peak usage of central processing unit (CPU) and random access memory (RAM);
- (viii) deploy and manage server monitoring tools;
- (ix) manage the database and profile the database while performing load testing;
- (x) check and verify if latest virus definitions are downloaded and that the antivirus installation is up to date;
- (xi) check and verify if the latest updates and patches are installed in the server infrastructure;
- (xii) be responsible for keeping the server time synchronized with one of the global time servers; and
- (xiii) restore backed up data from time to time and verify the backed up data.

B. Individual International Consultant

11. **E-procurement expert** (6 person-months, intermittent). The expert will

- (i) prepare the questionnaire and indicators required for the baseline study;
- (ii) define the learning objectives and suitable destination and programs for study tour and training programs to be attended by PMU and software development unit team;
- (iii) assist the PMU in preparing terms of reference for selection of third-party software audit agency;
- (iv) evaluate progress made by the government in implementing e-procurement system with regard to the roll-out plan specified from time to time with regard to
 - (a) set up of TA PMU and software development unit,
 - (b) status of software development,
 - (c) use of e-procurement system by procuring entities,
 - (d) training of e-procurement system users,
 - (e) public awareness activities for e-procurement,
 - (f) provision of support, and
 - (g) effectiveness of help desk facility;
- (v) contribute to software design for registration of international suppliers;
- (vi) contribute to drafting rules for implementation of the e-procurement system;
- (vii) contribute to defining service requirements to monitor e-procurement system performance;
- (viii) study e-procurement software to verify whether the design conforms to the ideology of being unified and end to end; and
- (ix) provide technical advice sought by the government on e-procurement implementation.