Technical Assistance Report

Project Number: 38346
November 2005

Technical Assistance
India: Development of Road Agencies in the North Eastern States

Asian Development Bank

CURRENCY EQUIVALENTS
(as of 21 November 2005)

Currency Unit	–	rupee/s (Re/Rs)
Re1.00	=	$0.0219
$1.00	=	Rs45.72

ABBREVIATIONS

ADB	–	Asian Development Bank
BRO	–	Border Roads Organization
IIT	–	Indian Institutes of Technology
MDONER	–	Ministry of Development of the North Eastern Region
NER	–	north eastern region
NHII	–	National Highway Institute of India
PPTA	–	project preparatory technical assistance
PSC	–	project steering committee
PWD	–	public works department
TA	–	technical assistance

TECHNICAL ASSISTANCE CLASSIFICATION

Targeting Classification	–	General intervention
Sector	–	Transport and communications
Subsector	–	Roads and highways
Themes	–	Sustainable economic growth, governance
Subthemes	–	Fostering physical infrastructure development

NOTE

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

Vice President	L. Jin, Operations Group 1
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I. INTRODUCTION

1. At the time of processing the project preparatory technical assistance (PPTA) for the North Eastern State Roads Project,[1] the Government of India requested assistance to increase the capacity of the region's road authorities to better manage the ensuing loan project and improve the performance of the road network in the long run. To that end, the Asian Development Bank (ADB) included an advisory TA[2] in the 2004–2006 country strategy and program update. The Fact-Finding Mission and the Consultation Mission visited India during 28 March–8 April 2005, and 31 August–1 September 2005, respectively, and reached an understanding with the Government on the goals, objectives, outputs, implementation arrangements, financing plan, and terms of reference. The TA design and monitoring framework is attached as Appendix 1.

II. ISSUES

2. **Significance of the Road Sector.** The north eastern region (NER) of India, which comprises eight states[3] spanning 262,000 square kilometers (km^2), about 8% of India's total land area and home to about 4% of the nation's population, is unique in many ways. It shares borders with five countries,[4] but its formal travel and trade are largely domestic. The region's state capitals are experiencing very fast urban growth, primarily due to migration from infrastructure-deficient rural areas. State population densities range from about 40 persons per km^2 in Mizoram to 339 in Assam. The region's economy is primarily agrarian. NER produces over 75% of Indian tea, with Assam contributing more than 50%. The existing industrial base revolves around oil and gas, wood, and food products.

3. The Government has initiated several transport-related activities that would increase the efficiency of freight and passenger flow, and improve the region's economy and living standards of the people. Among the activities are: (i) bilateral discussions on issues such as transit traffic through Bangladesh, (ii) simplification of border formalities for traffic between Nepal and Bangladesh via India, (iii) a move to build land communications connecting India and Myanmar, and (iv) opening of a land route between India and the People's Republic of China through Sikkim. However, development is mired by the low quality of existing transport infrastructure, unreliable services, restriction on transit traffic through Bangladesh, and the largely hilly and rolling terrain. The region's surface connections with the rest of India is constrained by the low-capacity road and rail links through the 22 km wide strip of land between Bhutan and Bangladesh. Over 90% of inter- and intra-regional trade and personal travel depend on the present road network, which is sparse and comprises mostly substandard single-lane roads. Paved road network density is about 27 km per 100 km^2 compared with the national average of about 61 km per 100 km^2 of land total area. Except in Assam, railways and scheduled air services are limited, and Kalkota, the closest international gateway, is over 1,500 km away from most state capitals of the region.

4. In principle, the public works department (PWD) of each of the eight states in the NER holds the primary responsibility for policy development, design, procurement, construction, maintenance, and management of the state's road network.[5] However, some key

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[1] ADB. 2004. *Technical Assistance to India for preparing the North Eastern State Roads Project*. Manila (TA 4378, approved on 23 August 2004, for $800,000).
[2] The TA first appeared in *ADB Business Opportunities* (internet edition) on 9 June 2005.
[3] Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura.
[4] Bangladesh, Bhutan, People's Republic of China (Tibet), Myanmar, and Nepal.
[5] Except in Meghalaya and Sikkim, PWDs are also responsible for public buildings.

responsibilities, which have direct impacts on road sector performance, are shared with other state agencies such as the planning departments,[6] finance departments, transport departments, police departments, and revenue departments.

5. The poor condition of more than half of NER's road network, low accomplishment rates of road maintenance activities, high costs, underutilized workforce and equipment, low cost-recovery from road users in relation to the damage caused to infrastructure, and inconsistent enforcement of road traffic laws are partly attributable to the multiagency regulatory framework. They are symptomatic of inadequate investment planning, weak financial management, under-skilled and undertrained workforce, and lack of accountability. Inadequate investment is also part cause of the low asset value, but lack of tools and skills for informed decision making is what has prevented asset value from being enhanced in proportion to the level of investment.

6. PWDs in the NER are overstaffed compared with those in other states in India. The number of employees range from 18 per 100 km in Arunachal Pradesh (involved in construction) to 100 per 100 km in Tripura. According to the World Bank, the corresponding figure in other parts of India range from 10 to 20, with some states having as low as 3. Hiring of new employees has been frozen in many NERs states for over a decade. While that has reduced the total workforce, productivity has not increased due to the agencies' inability to maintain the needed skill diversity and expose employees to emerging techniques such as advanced contracting methods and project management. PWD staff recognizes the need to increase asset value and productivity, and are eager to employ the best practices in road asset management and state-of-the-art project management tools, but present opportunities to learn and adopt them are limited and costly.

7. A central Government-funded infrastructure development program aimed at upgrading about 3,000 km of roads is already in the pipeline, and several key state and urban roads are expected to be improved with external funding in the next 5 years, thereby increasing the region's road stock. However, major policy, legislative, technological, and operational changes will be required to eliminate some of the root causes of poor road quality, connectivity, and asset performance. Some changes will take time and will be costly to implement. Others such as technological and operational changes can be introduced relatively rapidly and inexpensively. One technological change, which has proven effective in both developing and developed countries, is a shift to computer-aided asset management systems, which allow road network data on pavement condition, traffic volumes, accident records, construction and maintenance activities to be used in conjunction with policies, and technical and economic criteria to generate solutions to selected problems. That, together with systematic project management, can help significantly reduce suboptimal investment decisions, project implementation delays, and cost-overruns.

8. **Funding Agency Activities and Lessons Learned.** The World Bank has been actively supporting India's road sector development, and has been a strong advocate of road agency reforms that permit better asset management. It has repeatedly emphasized that information flow must be advanced if asset management is to improve. In previous state road development projects in southern Indian states, the World Bank prepared institutional development plans, according to which some states corporatized the PWDs and commenced large-scale outsourcing of works of all types. The agency proposes to advance the concept of commercialization of PWDs in the forthcoming state road development projects in Punjab and

[6] State planning boards in some states.

Assam. No direct external assistance at present for computerizing road asset management in the NER is reported.

9. ADB continues to finance state road improvements that strengthen rural-urban connections and link poor rural producers to markets in towns, cities, and ports. It is also enabling state road agencies to enhance their capacity to better manage the networks. Two ongoing state road projects in Madhya Pradesh and Chhattisghar have shown that advance planning and better management of projects are critical for making the right investments and sustaining the value of the investments.

10. The road asset management system financed by ADB in Papua New Guinea[7] is now used to plan and program all road works. Its use recognizes the efficiency gains from computerization and willingness of road agencies to employ technology to increase productivity. The present TA is designed to ensure sustainability–which is at risk in Papua New Guinea due to the transfer of trained staff to other positions–by training trainers. Additionally, updating and upkeep of the system will be ensured through the trainers. Wider application of the system will be promoted through support under ADB's ensuing north eastern state roads loan project.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

11. The TA will facilitate long-term preservation of road assets in the NER. The capacity of NER's PWDs will be increased to allow: (i) computer-based road asset management tools and (ii) state-of-the-art project management techniques to be widely employed, thereby improving the quality of the roads and increasing the productivity of labor and capital during and after the ensuing loan project is implemented.

B. Methodology and Key Activities

12. ADB will recruit a firm of international consultants working with domestic experts to provide the TA. The consultants will use the findings of the PPTA consultants and consult with PWDs in NER to understand the present methods of (i) road asset management, and (ii) project management. Based on that understanding and a review of management systems such as those used by PWDs in Gujarat, Karanataka, and Maharashtra the consultants will design and install a computerized asset management system. The system will be field-tested (calibrated) on the road network of Meghalaya in conjunction with the state PWD. The consultants will also determine the level and type of training needed, and conduct training workshops and organize national or international technical tours to demonstrate system applications, and provide hands-on experience to selected PWD staff from each NER state. A separate set of in-state training workshops on project management will also be conducted for PWD staff. That training component will include, but will not be limited to, contracting out, contract administration, dispute resolution, quality control, use of project management software, technical tours, and compliance monitoring, especially for ADB-financed projects. The sites and content of the technical tours will be discussed and finalized during the tripartite review meeting, to be held within 6 months of TA commencement, to allow a complete assessment of the existing level of know-how, experience, and the computer system to be implemented.

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[7] ADB. 1998. *Technical Assistance to Papua New Guinea for the Road Asset Management System*. Manila (TA 3004, approved on 3 April 1998 for $1,000,000).

13. The consultants will produce a computerized database and decision support system (validated and verified in Meghalaya) that could be adapted by any PWD in the NER. The TA will support training for at least one PWD engineer from each NER state in the use of the computerized system for managing assets and system upkeep, and one engineer in project management. At least two trainers will be fully equipped to continue training more PWD staff in asset and project management. In developing the asset management system, the consultants will (i) review the PPTA consultants' report; (ii) review well-proven asset management systems in India and abroad to determine technical and other merits and demerits of each; (iii) prepare an inception report outlining the pros and cons of alternative systems, recommend a system to be adopted, together with its specifications and costs, and tests and training to be provided; (iv) in consultation with the Ministry of Development of the North Eastern Region (MDONER), together with Meghalaya PWD, and ADB, select, implement, and field-test the system; (v) prepare explanatory and training documentation; (vi) organize technical tours and conduct training workshops; and (vii) train two trainers. In the case of project management training, the consultants will prepare training manuals, organize and conduct workshops, and train two trainers to provide follow-up training. At the end of this TA, the consultants will prepare a final report describing the asset management system, and the training provided on asset management and project management. The report will describe the strengths and weaknesses of the selected management systems, enumerate resources needed for maintaining and upgrading the systems, describe the level of understanding of the trained persons, include tests used for evaluating training effectiveness, and list proposals for continuing training and upkeep of the systems.

C. Cost and Financing

14. The total cost of the TA is estimated to be $1.125 million equivalent, of which $422,100 is the foreign exchange cost and $702,900 equivalent is the local currency cost. The Government has requested ADB to finance $900,000 equivalent, covering the entire foreign exchange cost and $477,900 equivalent of the local currency cost. The TA will be financed on a grant basis by ADB's TA funding program. The Government will finance the balance of the local currency cost, equivalent to $225,000, through the provision of office space, data, and counterpart staff. Details of the costs and financing plan are in Appendix 2.

D. Implementation Arrangements

15. MDONER will serve as the Executing Agency. It will appoint a project director to be responsible for administering the TA, including supervising the work of the consultants, liaising between the consultant team and relevant agencies, and coordinating with ADB. MDONER will require the PWDs to nominate staff to serve as counterparts to the consultants in areas such as (i) pavement management, and (ii) construction supervision. To facilitate technology and knowledge transfer, counterpart staff of at least four persons from PWDs will work full-time alongside the TA consultants who will establish a field office in Shillong.

16. The TA will require 29 person-months (11 international and 18 domestic) of consulting services from an international consulting firm to be engaged by ADB using the quality- and cost-based selection method according to ADB's *Guidelines on the Use of Consultants*, and other arrangements acceptable to ADB for the selection and engagement of domestic consultants. The international consultants will include specialists with at least 15 years of experience in each of the following areas (person-months are in parentheses): (i) transportation engineering/team leadership (6), (ii) road construction/project management (3), and (iii) training program development and workshop facilitation (2). The domestic consultants (each to provide 6 person-

months of input) will include specialists with at least 10 years of experience in each of the following areas: (i) highway and bridge engineering, (ii) information technology and database management, and (iii) training and education. Outline terms of reference for the consultants are in Appendix 3.

17. The TA will be implemented over 8 months starting in April 2006. MDONER will form a project steering committee (PSC), which will be chaired by the director of MDONER or his/her nominee, and include representatives from relevant agencies including NEC and BRO. PSC members will participate in the inception, interim, and final tripartite meetings; evaluate the technical outputs of the consultants; and provide guidance as needed.

18. Project and asset management software, and hardware comprising personal computers, color laser printers, one plotter, global positioning systems as well as digital video/still cameras, and appropriate accessories will be procured by the international consultants according to ADB's *Guidelines for Procurement.* At the end of the Project, all hardware and software together with spares and other accessories procured under the TA will be handed over to MDONER.

19. To facilitate timely implementation and successful completion of the TA, MDONER will provide the following: (i) documentation necessary for international consultants to obtain visas, customs clearances, etc., to enable them to perform the tasks specified in the terms of reference; (ii) copies of technical reports, drawings as well as general information such as maps and databases that will add value to the TA; (iii) counterpart staff to work with the consultants; and (iv) office space in Shillong with appropriate furnishings, fixtures, fittings, and communication lines. MDONER will assist the participants in technical tours to secure official travel documentation and authorizations from the relevant agencies in India and abroad, in case foreign tour sites are chosen.

IV. THE PRESIDENT'S DECISION

20. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of $900,000 on a grant basis to the Government of India for Development of Road Agencies in the North Eastern States, and hereby reports this action to the Board.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
Impact Preservation of road assets	• Increase in asset value • Increase in economic return on road investment • Percent of annual change in number of projects completed on time • Percent of annual change in length of roads in the network rated to be in good condition	PPTA report and PWDs baseline, periodic, and post-implementation data to ADB during ensuing loan project	
Outcome Increased asset and project management capacity of PWDs in the north eastern region of India	• Number of PWDs agreeing to adopt the asset and project management systems at the end of the TA	Tripartite meetings, PPTA report, and data submitted to ADB	**Assumptions** • PWDs maintain and update the system according to specifications. • Annual road sector funding increases or remains at present levels. **Risk** • PWD investment and preservation programs are not approved by state planning authorities.
Outputs 1. Computerized asset management system 2. PWD staff trained in use and upkeep of computer system 3. PWD staff trained in advanced project management	• Successfully field-tested and accepted by Meghalaya PWD • Number of staff from each state successfully completing training workshops • Two trainers successfully completing training program	Review missions and project steering committee evaluations	**Assumptions** • Meghalaya PWD will closely interact with TA consultants. • MDONER and PSC will provide timely comments and guidance.

Activities with Milestones	Inputs
1.1 Review of asset and project management software systems and ranking alternate systems within 3 months of TA commencement 2.1 Selection, implementation, and testing of systems and testing beginning within 2 months of inception meeting 3.1 Training PWD staff in asset and project management 4.1 Preparation of inception report within 6 weeks of mobilization, draft final report within 7 months of mobilization, and final report within 8 months of mobilization	• TA financing of $900,000 on a grant basis, funded by ADB's TA funding program • Government's in-kind contribution of $225,000 • 11 person-months of international and 18 person-months of domestic consulting services

ADB = Asian Development Bank, MDONER = Ministry of Development of North Eastern States, PPTA = project preparatory technical assistance, PSC = project steering committee, PWD = public works department, TA = technical assistance.

Cost Estimate and Financing Plan

($'000)

Item	Foreign Exchange	Local Currency	Total Cost
A. Asian Development Bank Financing (ADB)[a]			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants	243.0	0.0	243.00
ii. Domestic Consultants	0.0	157.5	157.5
b. International and Local Travel	18.0	15.0	33.0
c. Reports and Communications	0.0	2.0	2.0
2. Training, Seminars, and Equipment			
a. Technical Tours	35.0	105.0	140.0
b. Training Workshops	0.0	15.0	15.0
c. Computers and Software	100.0	90.0	190.0
3. Surveys	0.0	25.0	25.0
4. Representatives for Contract Negotiations	0.0	7.0	7.0
5. Miscellaneous Administration and Support Costs	0.0	17.0	17.0
6. Contingencies	26.1	44.4	70.5
Subtotal (A)	**422.1**	**477.9**	**900.0**
B. Government Financing			
1. Utilities, Office Space, and Furniture	0.0	55.0	55.0
2. Counterpart	0.0	90.0	90.0
3. Data Collection	0.0	80.0	80.0
Subtotal (B)	0.0	**225.0**	**225.0**
Total	**422.1**	**702.9**	**1,125.0**

[a] Financed by ADB's technical assistance funding program.
Source: ADB estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTING SERVICES

A. Scope of Services

1. The technical assistance (TA) will cover the following: (i) design, implementation, and field testing of a computerized road asset management system for use by public works departments (PWDs) in the eight states in the North Eastern Region (NER) of India, and provision of related end-user training; and (ii) design, implementation, and field testing of a computerized road project management tool and provision of training for PWD staff in best practices in road project management. The TA will require 29 person-months of consulting services (11 international and 18 domestic) from an international consulting firm to be engaged by the Asian Development Bank (ADB) using the quality- and cost-based selection method according to ADB's *Guidelines on the Use of Consultants*, and other arrangements acceptable to ADB for engaging domestic consultants. The international consultants will include one specialist with at least 15 years of experience in each of the following areas (person-months in parentheses): (i) transportation engineering/team leadership (6), (ii) road construction/project management (3), and (iii) training program development and workshop facilitation (2). The domestic consultants (each to provide 6 person-months of input) will include one specialist with at least 10 years of experience in one or more of the following areas: (i) highway and bridge engineering, (ii) information technology and database management, and (iii) training and education.

B. Terms of Reference

2. It will be necessary that the consultants perform at the very least the following:

1. Computerized Asset Management System

(i) Review reports prepared by the consultant for TA 4378-IND,[1] and consult with the Ministry of Development of the North Eastern Region (MDONER), selected PWDs in the NER and other parts of India, and educational and training institutes in India such as the National Highway Institute of India (NHII), and Indian Institute of Technology (IIT) to determine (a) basic asset management practices and (b) tools used, and their pros and cons.

(ii) Review and establish the pros and cons of proven (widely used) leading-edge asset management systems available in the open market, both national and international, and determine each one's suitability for the NER in relation to training needs, present skill levels of PWD staff, data needs, cost of procurement and maintenance, reliability, sophistication, and expandability/upgradability.

(iii) Prepare an inception report describing the findings, and outlining (a) main features, (b) technical specifications (including hardware and software needs), (c) cost, (d) implementation schedule of the recommended system, (e) basic requirements for successful adoption of the system by PWDs, (f) indicators for measuring impact of using computerized asset management, and (g) method to be used to train trainers to be discussed and approved by MODONER, project steering committee (PSC), and ADB during the Tripartite Inception Mission.

[1] TA 4378-IND: North Eastern State Roads Project.

(iv) Implement and field-test the system, test performance in relation to indicators developed in (iii), and prepare a brief interim report describing the implementation process, difficulties–if any–encountered during implementation, corrective action taken, proposed training, schedule for training workshops, proposal for technical tours (including sites and content), and workshop topics and technical tour evaluation criteria to be discussed at the interim tripartite meeting.

(v) Facilitate technical tours by making all logistical arrangements and coordination with hosts, and conduct in-state workshops. The workshop topics should be designed to provide hands-on exposure to the asset management system. Subsequently, evaluate responses and prepare a draft final report describing the implementation of the system and staff reactions, for discussion during the final tripartite meeting.

(vi) Based on comments received from MDONER, PSC, and ADB, revise and submit the final report to the appropriate parties.

2. Project Management

(i) Review reports prepared by the consultant for TA 4378-IND (footnote 1), and consult with MDONER, selected PWDs in the NER and other parts of India, and educational and training institutes in India such as NHII and IITs, to determine (a) project management practices, and (b) tools used and their pros and cons.

(ii) Review and establish the pros and cons of proven (widely used) modern project management practices and tools (software such as Microsoft Project and Primavera) available in the open market, both national and international, and determine the suitability of each for the NER in relation to training needs, skill levels of PWD staff, data needs, cost of procurement and maintenance, reliability, sophistication, and expandability/upgradability.

(iii) Prepare an inception report describing the findings and outlining (a) main features of the present and proposed methods of project management, technical specifications of hardware and software needed, cost, implementation schedule of the recommended system, basic requirements for successful adoption of the system by PWDs, indicators for measuring the impact of using advanced project management techniques, and method to be used to train trainers; and (b) revisions to project management techniques, to be discussed and approved by MDONER, PSC, and ADB during the Tripartite Inception Mission.

(iv) Implement and field-test the system, test performance in relation to indicators developed in (iii), and prepare a brief interim report describing the implementation process, difficulties–if any–encountered during implementation, corrective action taken, proposed training, schedule for training workshops, proposal for technical tours (including sites and content), and workshop and technical tour evaluation criteria to be discussed at the interim tripartite meeting.

(v) Facilitate technical tours by making all logistical arrangements and coordination with hosts, conduct workshops and evaluate responses, and prepare a draft final

report describing the effectiveness of the training program, for discussion during the final tripartite meeting.

(vi) Based on comments received from MDONER, PSC, and ADB, revise and submit the final report to the appropriate parties.

C. Implementation Arrangements

3. MDONER will be the Executing Agency for this TA. In consultation with MDONER, each PWD will appoint two counterpart staff (one to work on the asset management system and the other on project management). MDONER will also appoint a project director who will be responsible for general supervision and coordination of TA activities, including monitoring of progress, resolving any problems that may arise during implementation, arranging meetings and liaising with other local and central government agencies with regard to data collection, and ensuring that foreign consultants receive their visa and other authorizations needed to enter and work in India.

4. The TA will be implemented over 8 months, starting around 1 April 2006. MDONER will form a PSC, which will be chaired by the director of MDONER or his/her nominee, and include representatives from relevant agencies such as North Eastern Council (NEC), state PWDs; Ministry of Shipping; Road Transport and Highways; Border Roads Organization; etc. PSC members will participate in the inception, interim, and final tripartite meetings; evaluate the technical outputs of the consultants; and provide guidance as needed.

5. To facilitate timely implementation and successful completion of the TA, MDONER will provide the following: (i) documentation to help international consultants obtain visas, customs clearances, etc., to enable them to perform the tasks specified in the terms of reference; (ii) copies of technical reports, drawings as well as general information such as maps, databases that will add value to the TA; (iii) counterpart staff to work with the consultants; and (iv) office space with all utilities (water, power, heating, etc.) in Shillong with appropriate furnishings (desks, chairs, cabinets, shelves, etc.), including access (lines) to international telecommunication, and internet/data transfer. The consultants will pay the cost of telecommunication and internet/data services.

6. The site and content of the technical tours will be discussed and finalized during the tripartite review meeting, to be held within about 5 months from the fielding of consultants, to allow a complete assessment of the existing level of know-how, experience, and the computer system to be implemented. In case foreign tour sites are chosen, MDONER will assist the participants to obtain travel documentation and authorization from the relevant agencies in India and abroad. The international consultants will be responsible for planning the logistics and contents of the tours.

D. Reporting Requirements

7. The consultants will submit the following reports only in the English language within the indicated time frame starting from the date of mobilization: (i) an inception report within 6 weeks, (ii) interim reports within 12 weeks, (iii) draft final report within 28 weeks, and (iv) final report within 32 weeks. ADB, the Government of India, and MDONER will review and comment on the draft final report within 4 weeks of receipt. Two hard copies of each report as well as electronic copies (in compact discs) will be submitted to MDONER, Ministry of Finance, Department of

Economic Affairs (DEA), NEC, and each PWD in the NER. ADB requires the same, but eight copies of the draft final report.

8. All reports should be concise and edited by a professional. The following sections are mandatory: (i) table of contents (ii) executive summary, (iii) conclusion and recommendations, and (iv) references/bibliography in an internationally accepted format. Sources of quotes, data, etc. included in the reports should be duly cited in the references section or as footnotes to the text.