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Report No: 20596

IMPLEMENTATION COMPLETION REPORT
(COFN-03950; CPL-37130; CPL-37140; CPL-37150)

ON THREE

LOANS

IN THE AMOUNT OF US\$ 220 MILLION

TO THE

STATES OF MARANHÃO, PIAUÍ AND TOCANTINS - BRAZIL

FOR A

STATE HIGHWAY MANAGMENT II PROJECT

June 23, 2000

**Finance, Private Sector & Infrastructure
Latin America and the Caribbean Region**

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CURRENCY EQUIVALENTS

(Exchange Rate Effective July of each year)

Currency Unit = Real R\$
R\$ 1.0 = US\$ 0.56
US\$ 1.0 = R\$ 1.80

1994 US\$ 1 = R\$ 0.90
1995 US\$ 1 = R\$ 0.92
1996 US\$ 1 = R\$ 1.00
1997 US\$ 1 = R\$ 1.07
1998 US\$ 1 = R\$ 1.15
1999 US\$ 1 = R\$ 1.80

FISCAL YEAR

January 1 December 31

ABBREVIATIONS AND ACRONYMS

ADT	Average Daily Traffic
CAI	Core Accountability Implementation Completion Report
CAS	Country Assistance Strategy
CD	Country Director
DER	Departamento de Estradas de Rodagem (Highway Department)
DER-MA	Departamento de Estradas de Rodagem do Estado do Maranhão Highway Department of the State of Maranhão
DER-PI	Departamento de Estradas de Rodagem do Estado do Piauí Highway Department of the State of Piauí
DERTINS	Departamento de Estradas de Rodagem do Estado do Tocantins Highway Department of the State of Tocantins
DNER	Departamento Nacional de Estradas de Rodagem National Highway Department
HDM	Highway Design and Maintenance Standards Model
IERR	Internal Economic Rate of Return
ICR	Implementation Completion Report
IRI	International Roughness Index
MTR	Mid-term Review
NBF	Not Bank Financed
NPV	Net Present Value
PCD	Project Concept Document
SAR	Staff Appraisal Report
SEINF	Secretaria de Infra-Estrutura (do Estado do Tocantins) Infrastructure Secretariat of the State of Tocantins
TL	Team Leader
TT	Task Team

Vice President:	David de Ferranti
Country Manager/Director:	Gobind T. Nankani
Sector Manager/Director:	Jeffrey Gutman
Task Team Leader/Task Manager:	Jacques Cellier

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**BRAZIL
STATE HIGHWAY MANAGEMENT II PROJECT**

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<i>Project ID:</i> P006555	<i>Project Name:</i> STATE HIGHWAY MANAGEMENT II
<i>Team Leader:</i> Jacques L. Cellier	<i>TL Unit:</i> LCSFT
<i>ICR Type:</i> Core ICR	<i>Report Date:</i> June 20, 2000

1. Project Data

Name: STATE HIGHWAY MANAGEMENT II

L/C/TF Number: COFN-03950;
CPL-37130;
CPL-37140;
CPL-37150

Country/Department: BRAZIL

Region: Latin America and
Caribbean Region

Sector/subsector: TH - Highways

KEY DATES

	<i>Original</i>	<i>Revised/Actual</i>
<i>PCD:</i> 03/03/92	<i>Effective:</i> 06/28/94	05/05/94
<i>Appraisal:</i> 05/17/93	<i>MTR:</i> 12/30/96	05/25/97
<i>Approval:</i> 03/15/94	<i>Closing:</i> 12/31/99	12/31/99

Borrower/Implementing Agency: STATE GOVERNMENTS/STATE ROADS DEPARTMENTS IN PIAUI,
TOCANTINS AND MARANHAO

Other Partners: Eximbank of Japan (Tocantins)

STAFF	Current	At Appraisal
<i>Vice President:</i>	David De Ferranti	Hussain, Shahid Yusuf
<i>Country Manager:</i>	Gobind T. Nankani	Steckan, Rainer
<i>Sector Manager:</i>	Jeffrey S. Gutman	Asif Faiz
<i>Team Leader at ICR:</i>	Jacques L. Cellier	Jacques L. Cellier
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2. Principal Performance Ratings

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HL=Highly Likely, L=Likely, UN=Unlikely, HUN=Highly Unlikely, HU=Highly Unsatisfactory, H=High, SU=Substantial, M=Modest, N=Negligible)

Outcome: S

Sustainability: L

Institutional Development Impact: SU

Bank Performance: S

Borrower Performance: S

QAG (if available)

ICR

Quality at Entry: S

Project at Risk at Any Time: No

3. Assessment of Development Objective and Design, and of Quality at Entry

3.1 Original Objective:

The project aimed to check further deterioration of the state road networks in Maranhão, Piauí, and Tocantins and improve their serviceability. To this effect, it would specifically: (a) ensure adequate priority and funding for the maintenance, rehabilitation and upgrading components of the state road programs; (b) implement appropriate road maintenance, rehabilitation and upgrading strategies and programs and improve the management of maintenance activities; and (c) develop and improve compliance with environmental standards for state roads. The project was also expected to help establish an institutional and technical framework for maintenance and upgrading of state roads nationwide. The ultimate objective was to contribute to the resumption of economic growth by reducing the cost of road transport on the state highway networks.

3.2 Revised Objective:

The project objectives and description were not revised during implementation, but two of the three loans (Maranhão and Piauí) were amended in 1995 (see section 3.4).

3.3 Original Components:

Originally the project consisted of three similar subprojects in the borrower states, each supported by a separate Bank loan. Each subproject included the following components: **(A) a policy and institutional development program** to: (a) prepare and annually update the state's pluriannual and annual road expenditure and funding programs, in accordance with policies and economic criteria satisfactory to the Bank, thereby strengthening the state road agency's planning system; (b) develop and monitor efficient maintenance, rehabilitation and upgrading strategies and programs, and strengthen the agency's contract and project management systems; and (c) develop appropriate capability in the Government to implement and enforce environmental standards and guidelines for state roads; and **(B) a rehabilitation and maintenance program** consisting of rehabilitation, resurfacing and periodic and routine maintenance components of the State's 1994-98 road program; and **(C) an upgrading program** consisting of the highest-priority upgrading and paving components of the State's 1994-98 road program. The three subprojects combined would have a total scope of 1,500 km for rehabilitation and resurfacing, 18,500 km for periodic and routine maintenance, and 2,650 km for upgrading and paving.

The original total cost of the project was estimated at about US\$602.8 million equivalent, including US\$563.4 million for road works, US\$2.3 million for laboratory and office equipment and software, and US\$37.1 million equivalent for engineering, technical assistance and staff training. The costs of the individual subprojects were as follows: Maranhão, US\$209.5 million; Piauí US\$140.9 million; and Tocantins, US\$252.4 million. The project would be financed from the proposed three Bank loans totaling US\$220 million (or 36% of the project cost) and from the respective State's own resources for US\$382.8 million (or 64% of the project cost). The three loans would help finance road rehabilitation, resurfacing, and upgrading works, engineering, technical assistance and training of staff. Routine and periodic maintenance would be fully funded from state resources.

3.4 Revised Components:

In November 1995, the Bank agreed to revise the scope of the physical components of the two subprojects in Maranhão and Piauí, and to amend the two loans accordingly. This decision was taken after it became clear that, as a result of Brazil's "Plano Real" stabilization program, the two states no longer had the financial capacity to carry out their subprojects in accordance with the agreed implementation targets. The amendments involved: (a) a reduction of the scope of the two subprojects, reducing the road upgrading and rehabilitation investment targets but maintaining the maintenance targets; (b) an increase of the disbursement percentages for civil works from 50% to 75%, and for consultants and training from 50% to 100% of local expenditures; (c) the cancellation of an amount of US\$18 million equivalent from each loan (originally US\$79 million for Maranhão and US\$54 million for Piauí); and (d) action programs with specified benchmarks and remedies, to be completed before the mid-term review of the project scheduled for the end of 1996.

The targets for rehabilitation and upgrading were reduced as follows: in Maranhão the upgrading and paving component was reduced from 750 km to 605 km and the targets for rehabilitation remained unchanged at 650 km;

in Piauí, the target for rehabilitation was reduced from 600 km to 535 km and the target for paving was reduced from 900 km to 350 km. As a result, the estimated costs of the two subprojects decreased as follows: Maranhão from US\$209.5 million to US\$123.2, and Piauí from US\$140.9 million to US\$72.2 million. The loan amounts were reduced from US\$79 million to US\$61 million in Maranhão, and from US\$54 million to US\$36 million in Piauí. No significant adjustments were made to the other performance indicators and targets. The implementation schedule was extended for six months, albeit without changing the original closing date.

The State of Tocantins, with the concurrence of the Federal Government, negotiated a loan of US\$48 million equivalent with the Export-Import Bank of Japan in 1996, in order to help finance the remaining part of the subproject and to alleviate counterpart fund requirements. Although the Tocantins subproject was not formally revised, the JEXIM loan, which was signed in March 1997, enabled the state to undertake additional upgrading works and to exceed the negotiated target of 1,000 km by about 20%. The resulting project outputs are shown in section 4.2.

3.5 Quality at Entry:

The quality at entry of the project has been given a satisfactory rating because the project objective was in line with the government priority to implement a broad administrative decentralization in the road sector and to promote greater participation of the states in the management of the highway system. Consistent with the decentralization objective, the project as designed would help prepare the three states to accept and carry out the transfer of operation and maintenance responsibilities of a portion of the federal network, and assist them in the implementation of their own road maintenance and rehabilitation mandates, using adequate policies and planning tools. Even though the risk of insufficient provision of budgetary resources by the states was indeed recognized at appraisal, it is only after the implementation of the stabilization program that it became clear that the states of Maranhão and Piauí would not be able to provide all the necessary funds.

4. Achievement of Objective and Outputs

4.1 Outcome/achievement of objective:

The main objective of the project, which was to check further deterioration of the states' road networks and improve their serviceability, was achieved. At completion, nearly one third of the paved networks in the three states had been rehabilitated or resurfaced. In addition, about 15% of the unpaved networks have been upgraded and paved. These achievements combined with the efforts made by the States on routine maintenance, helped to significantly improve the condition of the states' highway networks. The overall proportion of paved roads in poor condition at appraisal in 1993 was in the order of 31% (1,250 km over a total of 3,970 km). With the project, the proportion of roads in poor condition, i.e. with a roughness above 5 IRI, fell to about 13% at mid-term (1995-96) and ultimately to about 10% at completion (778 km over a new total of about 7,600 km of paved roads). In parallel, the proportion of roads in good to excellent condition increased from 29% in 1993 to 47% in 1996, and to 62% in 1999. Likewise, the condition of the unpaved networks was substantially improved: at appraisal, 80% of that network showed a roughness of less than about 12 to 15 IRI. At closing, 80% of the unpaved networks showed much improved conditions with a roughness of less than 8 to 9 IRI.

The ultimate objective of the project, which was to contribute to the resumption of economic growth by reducing the cost of transport on the state road networks, also seems to have been achieved. No indicators were defined to monitor and evaluate such impact. But reports indicate that the potential for agricultural expansion in the three states, particularly southern Maranhão, southeastern Piauí, and Tocantins, which was identified in the SAR (Annex 2) substantially materialized as a result of the road improvements made under the project. There has been large private investments in these areas. The production of soybeans, corn and rice increased rapidly. The expansion of agriculture also seems to have induced a rapid growth of the service sector in the region.

4.2 Outputs by components:

a. Policy and Institutional Development Component.

The three state governments and their highway agencies have achieved several important institutional objectives:

- the highway agencies have developed and implemented efficient pavement management systems supported by road databases on network condition and traffic, and have developed optimized highway expenditure programs using the Highway Design and Maintenance Standards Model (HDM);
- the highway agencies have established improved computerized systems for contract management, project accounting and monitoring, and, in the case of Piauí, an entire computer network with various administrative applications and management information systems, and trained their staff to operate these systems;
- the routine maintenance activities have been contracted out on the entire network in the State of Maranhão from 1996-1998, but a broad reorganization of the entire administration of the state disrupted the program in early 1999. In Piauí and Tocantins, the agencies have been outsourcing some services, but overall there is still much room for improvement in the way maintenance activities are carried out, with a greater participation of the private sector, possibly through long-term performance-based contracts;
- the three highway agencies have developed and are implementing satisfactory environmental standards and guidelines for state roads, which have been prepared and disseminated with technical assistance and training services financed under the project; in particular, the Secretariat of Infrastructure in Tocantins has built an environmental division with four experienced specialists who effectively manage the environmental aspects of all the state's infrastructure programs;
- in Tocantins, the Planning and Environment Secretariat has, under the project, strengthened its Environment Division and its State Environmental Agency (Naturatins), and prepared an atlas and an agro-ecological zoning of the state which are now used as a basis for the preparation of the government plans and programs, and for environmental monitoring. In Maranhão, the state environmental agency was strengthened to carry out a socio-economic evaluation and land use mapping of the southern region of the state, and to prepare for regular monitoring of the environmental and socio-economic impacts of this and other projects. Also, environmental protection areas have been established under the project in Piauí and Tocantins.
- the government of Tocantins established the state highway department DERTINS as a separate agency within the jurisdiction of the Infrastructure Secretariat in order to allow for increased management autonomy and operational efficiency in maintaining the road network;
- the staff of the road agencies in all three states has been downsized through voluntary separation programs below the agreed targets: 1,347 permanent staff are presently employed versus an agreed target of 2,150 in the three agencies; and
- training programs have been implemented in the three states to support the above institutional objectives, but the training targets were only partially met, by approximately 65%.

b. Rehabilitation and Maintenance Component.

The appraisal targets were to rehabilitate or resurface about 1,550 km of paved roads, and to maintain the paved and unpaved networks in the three states. The rehabilitation and resurfacing targets were slightly reduced to 1,485 km in aggregate as a result of the restructuring of the subprojects in Piauí and Maranhão, but the routine maintenance targets remained unchanged. At completion, a total of about 1,443 km of paved sections had been rehabilitated or resurfaced, representing 93% of the appraisal target. The following table also shows these results by state. The routine maintenance targets have, by and large, been met or exceeded. Annex 1 shows the results by state for each indicator.

Rehabilitation Targets and Outputs by State

State	1993 Appraisal Targets (km)	1996 Revised Targets (km)	Final Outputs (km)	Final Outputs (as a % of targets)	
				Appraisal	Revised
Maranhao	650	650	568	87%	87%
Piaui	600	535	661	110%	124%
Tocantins	300	300	214	71%	71%
Total	1550	1485	1443	93%	97%

c. Upgrading Component.

The appraisal targets were to upgrade or pave a total of about 2,650 km of gravel or earth sections in the three states. The upgrading and paving targets were substantially reduced in Piaui and, to a lesser extent in Maranhao as part of the project restructuring in these two states; the revised aggregated target was 1,955 km. At completion, a total of about 2,018 km of earth or gravel roads were upgraded or paved, which represents about 76% of appraisal target and 103% of the revised target. The following table shows these results by state.

Upgrading Targets and Outputs by State

State	1993 Appraisal Targets (km)	1996 Revised Targets (km)	Final Outputs (km)	Final Outputs (as a % of targets)	
				Appraisal	Revised
Maranhao	750	605	611	81%	101%
Piaui	900	350	219	24%	63%
Tocantins	1000	1000	1188	119%	119%
Total	2650	1955	2018	76%	103%

Since the project objective and main outputs have been substantially achieved, the project outcome is rated as satisfactory

4.3 Net Present Value/Economic rate of return:

The economic analysis carried out at appraisal on a sample of 1,165 km of roads (28% of the total length to be rehabilitated and upgraded), indicated that the rehabilitation and paving components of the project (representing 56% of total base cost) had an estimated overall Internal Economic Rate of Return (IERR) of 30% and an estimated Net Present Value (NPV) of US\$146 million. Ex-post analyses were performed on the same sample of subprojects following the appraisal methodology based on the HDM3 Model (Annex 14 of SAR). The ex-post IERR was estimated at 43% and the ex-post NPV at about US\$ 117 million equivalent. The ex-post economic return of the project is therefore very satisfactory.

4.4 Financial rate of return:

Not Applicable

4.5 Institutional development impact:

The establishment of pavement management systems, including the use of the HDM model for analysing expenditure programs under budget constraints, and the joint reviews of the state highway expenditure programs, have substantially strengthened the state highway agencies' capacity to prepare and monitor efficient programs on the basis of technical and economic rather than political criteria, and to obtain improved funding for maintenance. The project had directly contributed to the contracting out of the maintenance of the entire road network in

Maranhao, resulting, together with the rehabilitation and resurfacing component, into a very satisfactory condition of the network. Although the contract maintenance program has been disrupted with the above-mentioned reorganization of the state administration and the termination of the DER, it is expected that the program will be restarted in the near future. The project contributed to improving various management and administrative systems in the three highway agencies, and in particular in Piaui where an entire computer network and various technical and administrative systems were established and had a clear impact on staff motivation and effectiveness. The project was instrumental in developing and implementing appropriate environmental safeguards under the state road programs, and more broadly in developing effective environmental planning and monitoring instruments, such as the agro-ecological zoning of the entire state of Tocantins and the strengthening of the state environmental agencies. By providing training opportunities which were generally not available, the project also contributed to the development and motivation of the staff of the states' highway and environmental agencies. For these reasons, the institutional impact of the project has been rated as substantial.

5. Major Factors Affecting Implementation and Outcome

5.1 Factors outside the control of government or implementing agency:

The following two factors outside the control of the state governments adversely affected the implementation of the project:

- the implementation in 1994 of Brazil's new stabilization program called the "Plano Real" seriously affected the states' finances, in particular by preventing state governments from taking advantage of inflation to balance their accounts. This situation led to the restructuring of the project in the two states of Piaui and Maranhao, as previously indicated.
- the existing conflicts between Brazil's procurement law and the Bank's procurement and consultant guidelines led to numerous questions on the part of state administrations and their auditors such as Tribunal de Contas, which resulted in implementation delays in the early phases of the project. However, in the end all accepted the view that the Brazilian law authorizes the executing agencies of Bank-financed projects to follow the Bank's guidelines.

5.2 Factors generally subject to government control:

The provision by the governments of Maranhão and Piauí of counterpart funds to the project has not been timely, and this has affected project performance throughout the implementation period, albeit to a lesser degree in Maranhão after the restructuring of the project.

The broad reorganization of the entire administration of the state in January 1999 negatively affected the project outcome in Maranhão. As part of the reorganization, the state highway agency was eliminated. Its central functions and staff were transferred to a newly created Infrastructure Secretariat (GEINFRA), and its decentralized district functions and staff transferred to 18 newly-created Regional Secretariats. The project coordinator was changed and little transition occurred with the previous coordinator. As a result, the project was practically stalled for one year, until closing in December 1999. The maintenance contracts were not renewed, and the network surveys were not contracted as scheduled.

5.3 Factors generally subject to implementing agency control:

The disappointing performance of some of the consulting firms or agencies contracted to assist the states' highway agencies also affected both implementation performance and outcome. The development of pavement management systems and the preparation of pluriannual road expenditure programs were delayed as a result of the consultants' inability to propose adequate systems adapted to the needs and capabilities of these highway administrations. Their implementation was affected by the DERs' lack of involvement in the development process and failure to provide full-time competent counterpart staff. The transfer of knowledge and technology from the technical assistance

team was, at times, below expectations, and there was room for improvement in the use of consultants. The geoprocessing work, land use mapping, and socio-economic analysis of the southern region of Maranhao, which were to be carried out by the State University of Maranhao, was subsequently contracted to private consultants since the University has been unable to deliver most agreed products.

5.4 Costs and financing:

The actual/latest total cost of the project is US\$510.9 million equivalent, which is 15% below the appraisal estimate of US\$602.8 million equivalent. The difference is essentially due to the restructuring of the project. The actual cost is also 14% higher than the revised cost of US\$447.8 million estimated at project restructuring, but this revised estimate did not take into account the increased scope of the Tocantins subproject which was made possible through cofinancing from JEXIM, nor the last section of BR-230 in Maranhao, which was to be partly funded from Federal transfers. The Bank loans contributed to 83% of the appraisal estimate, while the Government contributed to 74%. Project cost details are given in Annexes 2a (Project Costs by Component), 2b (Project Costs by Procurement Arrangements) and 2c (Project Financing by Component).

6. Sustainability

6.1 Rationale for sustainability rating:

Project sustainability is rated likely overall. However, while it is likely in Tocantins and Piauí, it is uncertain in Maranhão. In Tocantins, the planning, management and particularly the environmental management capacities developed under the project have been firmly established within the state administration, which, because of the recent creation of the state, is formed by a majority of young, fast-learning professionals. Also, a follow-up rural infrastructure project is being prepared, which, if approved by the Bank, would contribute to the sustainability of the completed project. In Piauí, although the state administration's planning and management capacities are very weak overall, the new planning tools, the computerized management and administrative systems, the technical standards and the environmental norms introduced by the project have clearly renewed the highway administration and motivated the staff. The priority given to maintenance and rehabilitation over new construction now has broad support from decision makers. In Maranhao, many of the institutional achievements of the project seem, at this time, to have been lost with the administrative reorganization initiated in early 1999 and the termination of the highway agency. However, the rehabilitation and contract maintenance components of the projects, which have been very successful in improving the condition of the entire road network, have had a broad demonstration effect which is expected to lead to a resumption of the policies and programs advocated by the project in the near future.

6.2 Transition arrangement to regular operations:

In order to ensure the sustainability of the projects' investments and institutional achievements, several actions or transition arrangements to regular operations are needed:

1. necessary funds must be transferred in a timely manner to the highway agencies for the maintenance and rehabilitation of the states' road networks, which must be given priority over new construction projects;
2. adequate design and maintenance standards and methodology should continue to be used to prepare economically sound road expenditure programs based on updated road network condition and traffic surveys and appropriate technico- economic analyses using the HDM or similar models;
3. procurement of works must be based on transparent and competitive bidding;
4. adequate staff training and development programs should continue to be provided to highway agency staff;
5. the maintenance of the road network should increasingly be contracted out, preferably through performance-based contracts, and the network condition should be regularly monitored; and
6. the environmental and socio-economic impacts of the project should be regularly monitored on the basis of the

criteria and methodologies developed under the project.

The project can be monitored and evaluated in the future using the performance indicators shown in Annex 1 and the monitoring systems in place in the three states.

7. Bank and Borrower Performance

Bank

7.1 Lending:

The Bank's performance during identification, preparation and appraisal was satisfactory on the whole. Its involvement in the project was consistent with the government's strategy on decentralization and supportive of the country objective to resume economic growth, including the provision of efficient and reliable transport services to targeted sectors of the economy as well as the promotion of the private sector operations in transport. The appraisal team had a good skill mix of a highway engineer, a transport economist, an environmental specialist and an organizational consultant. Project design was simple and consistent with the agencies' implementation capacity overall. Risks were adequately recognized and performance indicators appropriately defined.

7.2 Supervision:

The Bank's supervision performance was satisfactory, albeit with some shortcomings. On average, the project was supervised twice a year and implementation progress and ratings adequately reported. On recognizing the state's financial difficulties in 1994-95, the Bank approved the needed restructuring of the project and this was instrumental in bringing about the successful achievement of project objectives. In order to strengthen its supervision of the highway projects and its support to executing agencies, the Bank hired a full-time Transport Operations Officer in the Brasilia office. However, field supervision efforts have sometimes been insufficient to ensure an effective control of the quality of the designs and works, particularly in Piauí where the highway agency needed effective technical support.

7.3 Overall Bank performance:

Overall, Bank performance was satisfactory.

Borrower

7.4 Preparation:

Fully committed to the project objectives, the Borrowers participated actively in the preparation of the project. Government staff prepared all the technical and financial aspects of the project, while economic, environmental and institutional aspects were discussed and defined in close participation with the Bank.

7.5 Government implementation performance:

Government implementation performance was satisfactory overall. All three state administrations were committed to the project and assigned experienced managers to coordinate its implementation. Less satisfactory was the provision of counterpart funds, particularly in Piauí where the fiscal situation was the most difficult.

7.6 Implementing Agency:

Implementing agencies' performance was satisfactory. However, in all three states the technical assistance could have had better results if more experienced counterpart staff

had been assigned to work full time with the consultants.

7.7 Overall Borrower performance:

The overall performance of the Borrowers was satisfactory.

8. Lessons Learned

1. This project has shown that the implementation of an optimized network rehabilitation and maintenance strategy can effectively bring an entire road network back into satisfactory condition over a period of a few years and at a reasonable cost;
2. For networks or portions of networks with low traffic, as was the case in all three states, surface condition targets could be set lower i.e. with roughness thresholds above 5 , possibly up to 6 or 7 IRI;
3. With modern geo-processing and imaging techniques, a comprehensive atlas and geographic information system to effectively support environmental and land management at the level of an entire state of the size of Tocantins can be created in about one year at a very reasonable cost (about R\$1.0 million);
4. The results of the technical assistance components depend more on the technical experience and inter-personal skills of the specialists assigned to the specific tasks than on the experience records of the contracted consulting firms, which are at times deficient in controlling the quality of their services;
5. Proactive supervision and restructuring of the project as soon as critical assumptions have changed (in this case the funding capacities of the states following the establishment of Brazil's stabilization program) are essential to achieve the development objective;
6. The increase of the Bank's share for civil works from 50% to 75% drastically improved the attractiveness of the loans. The Bank could consider offering better cost-sharing arrangements, particularly in the poorest states of Brazil;
7. The grouping of two or more similar subprojects under one "umbrella" project can lead to some savings at the project processing stage. But since there are few economies of scale in supervision, each subproject should be adequately funded to allow for effective supervision, including field visits of the works;
8. Since the grouping of such projects into one project also renders the preparation of PSRs and ICRs difficult and their average ratings somewhat meaningless, each subproject should preferably be treated as a separate project.

9. Partner Comments

(a) Borrower/implementing agency:

Comments from the Piauí State Highway Department

The principal objective of the project was to provide, during the 1994-1999 period, the necessary technical and financial support to reduce the deterioration of the state highway network and at the same time, to improve the road network condition. This would also contribute to the development of the state economy through a reduction in transport costs on the state highway network. Another program objective was to assist in the consolidation of the State of Piauí's institutional and technical structures with regard to the maintenance, rehabilitation and improvement of the road network. Another valuable contribution of the program was to raise the consciousness regarding the need to integrate environmental concerns during project design and execution of highway works.

The project showed that the implementation of a highway network maintenance and rehabilitation strategy could effectively return a network to satisfactory condition in a period of a few years and at a reasonable cost.

One of the problems that most affected the execution of the civil works between 1994 and 1999 was the

unavailability of counterpart funds.

At the end of 1995 it was established that the state of Piauí did not have the financial capacity to execute the project, due to the implementation in 1994 of the new economic stabilization plan "Plano Real". Because the Bank agreed to reformulate the project, reducing the need for counterpart funds, the reformulation had a positive as well as a substantial impact on the achievement of the project results and objectives.

Facing the difficult financial situation, but aiming to assure the sustainability of the program, the state took steps to balance the budget through various mechanisms such as: reduction of high salaries, reduction of operational expenses and centralized control of capital expenses, reduction of the state bureaucracy, support for fiscal reform, rescheduling of the debt together with other Northeastern states, and the decision to raise the percentage of the ICMS tax for fuels and lubricants from 17% to 25%, through the State Law No. 4892 enacted on December 5, 1996. With these and other actions managed by a new economic team (formed in January 2000), the state managed to comply with the commitment undertaken during the last Bank mission, where the government was committed to settle all arrears until the end of April.

These factors associated with the intensification of highway maintenance by the private sector, under maintenance contract, will contribute to ensure that the current performance level of the state in this area will be maintained during the next period. DER/PI is giving continuity to outsourcing the execution of routine maintenance services for the state highways.

The knowledge obtained by the technicians of DER-PI during the elaboration of studies, tasks, works and services realized in the context of the program, contributed towards DER-PI's improved organization to perform its functions. In addition, DER has given continuity to improving the capacity of its technical staff, and their efficiency in managing their work. For example, DER is currently financing the participation of a technical staff in an Environmental Sciences post graduate course for 10 months at the Federal University of Piauí.

In this context and taking into account that adequate models and pavement standards, such as HDM, should continue to be used to prepare and prioritize economically highway programs and expenditures based on the condition of the highway network and traffic, DER-PI recently sponsored the participation of two technical staff in the latest version of the Highway Design and Maintenance Standards Model - HDM-4 seminar promoted by DNER with support from the World Bank.

Despite the deficiencies, the program achieved the majority of its objectives and can be classified as satisfactory to DER-PI.

Due to the importance to the state of the Highway Development Program - PRODER I now concluded, and considering that there are still bottlenecks in the transport infrastructure, the government of the state of Piauí, through DER, intends to begin a second program. DER-PI understands that the continuation of a financed project would guarantee and consolidate the benefits from this project, as well as increase the probability of sustainability.

Following is the original Portuguese Text

O principal objetivo do Programa PRODER/BIRD foi fornecer ao Estado Piauí, durante o período de 1994 a 1999, o suporte técnico e financeiro necessário para verificar e reduzir a evolução da deterioração da rede rodoviária estadual e assim, melhorar as condições de sua utilização, contribuindo desta forma para incrementar o desenvolvimento econômico do Estado, através da redução do custo de transporte na rede rodoviária estadual. O programa teve como alvo contribuir para consolidar as estruturas institucionais e técnicas do Estado do Piauí voltadas para a manutenção, reabilitação e melhoramento de rodovias. Outra contribuição valiosa do Programa foi brotar a plena consciência da crescente necessidade de preservação e integração da rodovia com o meio ambiente, quando da elaboração de projetos e execução de obras rodoviárias.

O projeto mostrou que a implementação de uma estratégia de manutenção e reabilitação da rede rodoviária pode efetivamente trazer de volta uma rede de rodovias em condições satisfatórias em um período de poucos anos a

um custo razoável.

Um dos problemas que mais afetaram a execução das obras civis entre 1994 e 1999, foi efetivamente a indisponibilidade do provisionamento de fundos de contrapartida.

Diante desta constatação, no final de 1995, que o Estado do Piauí não teria capacidade financeira para executar seu projeto, devido a implementação em 1994 de um novo plano de estabilização dentro do Plano Real, o Banco concordou em reformular o projeto a fim de reduzir as necessidades de fundos de contrapartida, e dessa maneira teve um positivo e substancial impacto na realização dos resultados e objetivos do projeto.

Diante da difícil situação financeira mas com o objetivo de dar sustentabilidade ao programa, o Estado emanou esforços para equilibrar as receitas através de várias medidas, tais como: redução de altos salários, contenção de despesas operacionais e controle centralizado de despesas de capital, redução do uncionalismo estadual, apoio a reforma fiscal, reescalonamento da dívida juntamente com outros estados do Nordeste, bem como, com a decisão de elevar o percentual do imposto ICM sobre combustíveis e lubrificantes de 17% para 25%, através da Lei Estadual nº 4892 de 05 de dezembro de 1996. Isto posto, somando-se as ações gerenciadas por uma nova equipe econômica de governo (composta em jan/2000), o Estado conseguiu cumprir o compromisso assumido durante a última Missão do Banco, na qual o governo se comprometia a saldar todas as dívidas até o final de abril.

Esses fatores associados com a intensificação da manutenção rodoviária através do setor privado, por contrato de manutenção, contribuirão para que o atual nível de performance do Estado, nesta área, possa ser assegurado para o próximo período. O DER/PI está dando continuidade à terceirização da execução dos serviços de manutenção rotineira das rodovias estaduais.

Os conhecimentos obtidos pelos técnicos do DER-PI durante a elaboração dos estudos, trabalhos, obras e serviços realizados no contexto do Programa, contribuíram e contribuirão para que o DER/PI se torne um órgão melhor estruturado, para o exercício de suas funções. Consciente disto, o DER tem dado continuidade à capacitação de seus técnicos, no sentido de melhorar a eficiência de gerenciamento de seus trabalhos. Podemos exemplificar essa preocupação citando, que atualmente está financiando a participação de um técnico do órgão no Curso de Especialização em Ciências Ambientais, a nível de pós-graduação, com 10 meses de duração, ministrado pela Universidade Federal do Piauí.

Neste contexto e tendo em vista que adequados modelos e padrões de pavimento como os do HDM devem continuar a ser usado para preparar e priorizar economicamente programas e despesas com rodovias asfaltadas na condição da rede rodoviária e contagem de tráfego, o DER-PI, recentemente, patrocinou a participação de dois técnicos no Seminário sobre a última versão de Projeto e Manutenção de Rodovia Modelo HDM-4 promovido pelo DNER, com apoio do BIRD.

Apesar das deficiências constatadas, o Programa atingiu a maior parte dos seus objetivos e pode ser classificado como satisfatório para o DER-PI.

Devido a importância para o Estado do Programa de Desenvolvimento Rodoviário PRODER I, ora concluído, e tendo em vista que persistem carências em termos de infra-estrutura viária é que o Governo do Estado do Piauí, através do DER, pretende viabilizar um segundo programa. O DER-PI, entende que com o prosseguimento do projeto financiado, garantiria a consolidação dos benefícios deste projeto, bem como aumentaria a probabilidade de sustentação.

Comments from the Infrastructure Secretariat of the State of Tocantins

In response to your request regarding the Implementation Completion Report for Loan 3714-BR, between the State of Tocantins and the Bank, we have the following comments:

1) The report presents in a succinct and general form the various phases of the project, but this type of approach makes it difficult to analyze each project in depth;

2) The economic stabilization plan (Plano Real), as it is emphasized in the report, was a complicating factor for the states, including the state of Tocantins. Still, the maintenance of the original appraisal targets for our Project, including the fact that they were exceeded during execution, demonstrates that the Government of Tocantins assigned a high priority to the Project and was always committed to its execution.

Following is the original Portuguese Text

Conforme solicitação feita através de e-mail datado de 05/23/2000 e fax de 05/06/2000, referente a "Implementation Completion Report" sobre o fechamento do Contrato de Empréstimo nº 3714/BR, firmado entre o BIRD e o Estado do Tocantins, temos os seguintes comentários a fazer:

- i) O Relatório em referência abordou de uma maneira geral e sucinta todas as fases da implementação do Projeto, no entanto, este tipo de abordagem dificulta a análise pontual de cada Projeto;
- ii) Como bem colocado pelo Banco, realmente o plano de estabilização econômica (Plano Real), foi um fator complicante para os Estados, inclusive o Tocantins. Não obstante a manutenção das metas do "appraisal" para o nosso Projeto, inclusive a superação das mesmas quando da execução, demonstra que o Governo do Tocantins elegeu este Projeto como prioritário e esteve sempre comprometido com a sua execução.

(b) Cofinanciers:

(c) Other partners (NGOs/private sector):

10. Additional Information

Annex 1. Key Performance Indicators/Log Frame Matrix

Item	1994			1995			1996			Year 1997			1998			1999			Total		
	App.	Revd.	Achd.	App.	Revd.	Achd.	App.	Revd.	Achd.	App.	Revd.	Achd.	App.	Revd.	Achd.	App.	Revd.	Achd.	App.	Revd.	Achd.
Rehab. Km Executed.																					
Maranhao	200			150	200		150	150	416	100	150		50	150	76			76	650	650	568
Piaui	137	35	35	200		0	183	100	50	80	200	52		200	456			68	600	535	661
Tocantins	60		125	60		0	100		0	60		0	20		36			9	300	300	214
																			1550	1485	1443
Routine Mainten.																					
Patch *1000 cu.m																					
Maranhao	2	2	2.4	1.5	1.5	0.4	1	1	0.8	0.5	0.5	2.7	0.3	0.3	3.3			0.02	5	5	10
Piaui	1.2	1.2	0.6	1	1	0.4	1	0.8	0.6	0.5	0.5	0.65	0.3	0.3	0.6			0.3	4	4	3
Tocantins	1.1		0.5	1		0.14	0.9		0.35	0.8		1.18	0.7		1.5			0.96	5	5	5
																			14	14	17
Grading *1000km																					
Maranhao	5	5	1.8	6	6	0.3	7	7	0.6	7.5	7.5	1.5	8	8	3.3			0.17	34	34	10
Piaui	9.5	9.5	1.6	10	10	0.2	10.5	10.5	0.2	10.5	10.5	0.27	11	11	0			0	52	52	3
Tocantins	18		16	18		12.7	18		30	18		25	18		37			31	90	90	152
																			175	175	164
Regravel *1000 cu.m																					
Maranhao	300	300	400	340	340	70	380	380	150	400	400	271	400	400	750			27	1820	1820	1641
Piaui		400	1800		450	1680		470	1094		480	871		500	1371			500	2300	2300	7316
Tocantins	700		600	700		1212	700		1500	700		1099	700		2072			2172	3500	3500	8655
																			7620	7620	17612
Paving Executed, km																					
Maranhao	150	30	25	200	100	50	200	145	0	100	180	387	100	150	86			63	750	605	611
Piaui	118		0	185		0	257		0	170	200	93	170	150	126				900	350	219
Tocantins	200		51	300		243	200		274	200		427	100		193				1000	1000	1188
																			2650	1955	2018
No. trainee-week																					
Maranhao	140	140	0	260	260	273	200	200	54	200	200	18	200	200	0			2	1000	1000	345
Piaui	150	150	11	200	200	162	250	250	123	200	200	661	200	2300	31			14	1000	1000	1002
Tocantins	200		51	250		162	250		198	200		30	100		49			99	1000	1000	589
																			3000	3000	1936
No. of Staff																					
Maranhao	750	750		700	700		650	650	441	600	600	380	550	550	276			139	750	750	139
Piaui	1000	1000	903	900	900	863	800	800	643	700	700	613	600	600	583			551	1000	1000	583
Tocantins	1200		1113	1150		1113	1100		808	1050		789	1000		840			630	1200	1200	840
																			2950	2950	1562
Maint. Expend. US\$M																					
Maranhao	9.3	9	3	9.9	9.5	1	10.8	10	1.4	11.6	11	9	12.5	12	8			0.8	54	52	22
Piaui	5.6	5	6.5	6.2	6	3.1	6.8	6.5	2.4	7.4	7	1.6	8.5	8	8			1.4	35	33	23
Tocantins	14.4		16	15.4		13	16.1		12	17		18	17.4		19			14.1	80	80	92
Sub-total																			169	164	138
Reh.+ R.M Expend. as a % of total Budget																					
Maranhao	30	30		25	25	28	25	25	32	25	25	47	15	15	12						
Piaui	35	35	22	25	30	4	25	25	7	20	20	4	15	15	19			6			
Tocantins, US\$M	1			2		6	4		6	6		6			6	6		6			
																			6	4	
Maint. Contracted %																					
Maranhao	30	30	30	40	40	40	50	50	100	60	60	100	70	70	100				10		
Piaui	25	25	29		30	23	35	35	15	40	40	5	40	40	50				17		
Tocantins	30		20	40		25	50		50	60		50	70		70				30		
Paved Net work Condition, %IRI<4																					
Maranhao, % with IRI<4	75	75		80	80	92	85	85		90	90		90	90					82		
Piaui, % with IRI<4	50	50	19		60	20		70	64		80			90					63		
Tocantins, 80% with IRI<	6		3.3	5.5		2.9	5		2.8	4.5		3	4		3				3		
Unpaved Network Condition, 80%withIRI<																					
Maranhao	14	14		13	13	18	12	12		11	11		10	10							
Piaui	11	11	11	11	10.5	10.5	11	10	8	11	9.5		11	9					20		
Tocantins	15			14		10	12		8	10		7	9		8				8		

Abbreviations: App. = Appraisal, Revd. = Revised, Achd. = Achieved, R.M = Routine Maintenance

Nota: In all three States, 100% of Maintenance plus Rehabilitation costs and at least 50% of total road expenditures were recovered from fuel taxes (ICMS)

Annex 2. Project Costs and Financing

Annex 2a

Project Costs by Component (in US\$ million equivalent)

Project Component	Appraisal Estimate	Revised Estimate.	Actual/Latest Estimate	% of Appraisal.	% of Revised
Upgrading&Paving	276.8	197.8 ¹	289.7	105%	146% ¹
Rehabilitation	62.3	69.7	59.3	95%	85%
Routine Maintenance	168.8	132.1	141.9	84%	107%
Technical Assist. & Training & Goods	33.9	24.2	20	59%	83%
Contingencies	61	24			
Total	602.8	250	510.9	85%	204%

Note ¹ : the revised estimate did not consider the increased scope of the component in Tocantins nor the last section of BR-230 in Maranhao.

Annex 2b

Project Costs by Procurement Arrangements (in US\$ million equivalent)

Expenditure Categories	Procurement Method Appraisal estimate					Procurement Method Actual/Latest estimate				
	ICB	NCB	Other	NBF	Total	ICB	NCB	Other	NBF	Total
1. Works	189.6	205		168.8	563.4	200.1	145.2		145.6	490.9
2. Goods			2.3		2.3		0.4	0.4		0.8
3. Services			37.1		37.1	3.6	6.8	8.9		19.2
4. Misc.					0					0
Total	189.6	205	39.4	168.8	602.8	203.7	152.4	9.3	145.6	510.9

Annex 2c

Project Financing by Component (in US\$ Million equivalent)

Component	Appraisal estimate			Actual/Latest Estimate			Percentage of Appraisal		
	Bank	Government	Co-financier	Bank	Government	Co-financier	Bank	Government	Co-financier
Upgrading&Paving	152.4	124.3	NA	126.4	119.6	44	83%	96%	NA
Rehabilitation	34.05	28.25	NA	41.7	17.7		122%	63%	NA
Routine Maintenance		168.8	NA		141.9			84%	NA
Services and Goods	20.8	13	NA	13.4	6.5		64%	50%	NA
Contingencies	11.8	49.2	NA						NA
Total	219.1	383.6	NA	181.5	285.7	44	83%	74%	NA

Annex 3: Economic Costs and Benefits

Annex 3 Cost Benefit Analysis

	Appraisal	Latest Estimate
Base year	1993	1996-98
Unit Cost \$/km	88,000	72,000
Total Costs, US\$M	103	79
IERR, %	30	43
NPV, US\$M	146	117

Note: Data for this table came from the Ex-post Economic Analysis for State Highway First-Year Programs (See Annex 7).

Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating		
	Month/Year	Count	Specialty	Implementation Progress	Development Objective
Identification/Preparation	SEPTEMBER 1992	5	ECN, EGR, ENS, PRO, INST		
	MARCH 1993	5	ENC, EGR, ENS, PRO, INST		
Appraisal/Negotiation	MAY 1993	5	ECN, EGR, ENS, PRO, INST		
Supervision	MAY 1994	4	ECN, EGR, ENS, PRO, INST	S	S
	OCTOBER 1994	4	ECN, EGR, ENS, INST	S	S
	APRIL 1995	4	ECN, EGR, ENS, INST	S	S
	OCTOBER 1995	4	ECN, EGR, ENS, INST	U	S
	JANUARY 1996	4	ECN, EGR, ENS, INST	U	S
	OCTOBER 1996	4	ECN, EGR, ENS, INST	S	S
	MAY 1997	5	ECN, EGR, ENS, PRO, INST	S	S
	OCTOBER 1997	4	ECN, EGR, ENS, PRO	S	S
	MAY 1998	4	ECN, EGR, ENS, PRO	S	S
	NOVEMBER 1998	3	ECN, EGR, ENS	S	S
	MARCH 1999	4	ECN, EGR, ENS, PRO	S	S
	MAY 1999	2	ECN, PRO	S	S
	JUNE 1999	1	PRO	S	S
	NOVEMBER 1999	3	ECN, EGR, PRO	S	S
	ICR	JANUARY 2000	2	EGR, PRO	

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US\$ (,000)
Identification/Preparation	44.7	113
Appraisal/Negotiation	6.6	22.5
Supervision	112.8	373.5
ICR		
Total		

Annex 5. Ratings for Achievement of Objectives/Outputs of Components

(H=High, SU=Substantial, M=Modest, N=Negligible, NA=Not Applicable)

	<i>Rating</i>				
<input checked="" type="checkbox"/> <i>Macro policies</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Sector Policies</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Physical</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Financial</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Institutional Development</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Environmental</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
 <i>Social</i>					
<input checked="" type="checkbox"/> <i>Poverty Reduction</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Gender</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Private sector development</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Public sector management</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA

Annex 6. Ratings of Bank and Borrower Performance

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HU=Highly Unsatisfactory)

6.1 Bank performance

Rating

Lending

HS S U HU

Supervision

HS S U HU

Overall

HS S U HU

6.2 Borrower performance

Rating

Preparation

HS S U HU

Government implementation performance

HS S U HU

Implementation agency performance

HS S U HU

Overall

HS S U HU

Annex 7. List of Supporting Documents

Annex 7

List of Supporting Documents

1. Staff Appraisal report. Brazil. State Highway II Management Project. (States of Maranhao, Piaui and Tocantins) Feb 23, 1994 Report No. 12059-BR
2. Memorandum and Recommendation of the President of the International Bank for Reconstruction and Development to the Executive Directors on three Proposed Loans in a total amount equivalent to US\$220 million to the States of Maranhao, Piaui and Tocantins with the Guarantee of the Federative Republic of Brazil for a State Highway Management Project. Feb 23, 1994 Report No. P-6112-BR
3. Loan Agreement (Maranhao State Highway management Project) between International Bank for Reconstruction and Development and State of Maranhao. Loan Number 3715-BR, Nov.2 1994
4. Loan Agreement (Piaui State Highway management Project) between International Bank for Reconstruction and Development and State of Piaui. Loan Number 3713-BR, Nov.2, 1994
5. Loan Agreement (Tocantins State Highway management Project) between International Bank for Reconstruction and Development and State of Tocantins. Loan Number 3714-BR, June 24, 1994
6. Quarterly Progress Reports from the fourth quarter of 1994 to the fourth quarter of 1999
7. State Highway Management Project, Supervision Reports (Forms 590), or Project Status reports from May 1994 to Nov. 1999.
8. Relatório de Encerramento do Projeto de Gerenciamento da Malha Rodoviária do Estado do Tocantins, SEINF/TO-BIRD, March 2000 (2 volumes)
9. Relatório Final de Avaliação do Componente Ambiental de Programa de Gerenciamento da Malha rodoviária Estadual - Contrato 3714-BIRD, Fev. 2000
10. Relatório Final de Projeto de Gerenciamento de Estradas do Estado do Maranhao do Contrato de Empréstimo 3715-BR
11. Avaliação Socio-Econômica da Região Sul do Maranhao e Mapeamento Temático dos Padrões de uso do Solo em 1998
12. Relatório de Encerramento do Programa de Desenvolvimento Rodoviário - PRODER/PI-BIRD (Minuta)
13. Relatório Final dos Dados e Avaliação Técnico-Econômica de Soluções de Recuperação para a Rede Básica Estadual do Piaui
14. Aide Memoires of the Completion Mission in Piaui (January 2000), Maranhao (January 2000) and Tocantins (February 2000)
15. Ex-Post Economic Analysis for State Highway First-Year Programs