

**PROGRAM FOR FEDERAL HIGHWAY REHABILITATION
AND DECENTRALIZATION PHASE ONE**

(BR-0195)

EXECUTIVE SUMMARY

BORROWER: Federative Republic of Brazil

EXECUTING AGENCY: National Highway Department [Departamento Nacional de Estradas de Rodagem] (DNER) and, as coexecuting agencies, the highway departments of several states (DERs)

AMOUNT AND SOURCE: IDB: US\$300 million (OC)
World Bank cofinancing
(approved on June 12, 1997): US\$300 million
Local counterpart funding: US\$150 million
Total: US\$750 million

**FINANCIAL
TERMS AND
CONDITIONS:** Amortization period: 20 years
Disbursement period: 4 years
Interest rate: variable
Inspection and supervision: 1%
Credit fee: 0.75%
Currency: United States dollars

OBJECTIVES: The purpose of the program is to reduce transportation costs in the federal highway system so as to support socioeconomic development in Brazil. Its specific objective is to improve the condition of federal highways.

DESCRIPTION: The proposed operation is a global, multiple-works program the main component of which is the rehabilitation of approximately 6,800 kilometers of paved roads in poor condition, including additional works to reduce the risks of traffic accidents and to repair critical environmental damage already existing on the road segments to be repaired. The program will also include an institutional strengthening component under which technical assistance and training will be provided to the staff of the DNER and respective DERs involved and specific studies will be conducted on pavement management, bridge maintenance, traffic safety, and environmental management. In addition, equipment will be procured for laboratory testing and quality control of asphalt and other materials, along with scales for vehicle weigh stations.

**ENVIRONMENTAL
CLASSIFICATION:**

The Environment Committee, at its meeting on June 4, 1996, classified this project as a Category III operation. No resettlements are expected to be needed and the works are not the type that would require environmental impact assessments (EIAs). The most environmentally significant aspect of the program is repair of the environmental damage already existing in the rights-of-way and areas surrounding the highways. Accordingly, an environmental rehabilitation report prepared for each segment included in the sample. The draft reports were disclosed to the public on April 3, 1997, and revised versions on May 15, 1997. The Committee on Environmental and Social Impact (CESI) approved the environmental report on this operation at its August 1, 1997, meeting, and classified the project as a Category III operation. The report was forwarded to the Public Information Center (PIC) that same day.

BENEFITS:

Rehabilitation of the roads will reduce highway transportation costs for both passengers and freight as well as long-term highway system maintenance costs by reducing the number of costly reconstruction works that would otherwise be necessary. Furthermore, it will help improve economic trends, the competitiveness of Brazilian goods on international markets, and integration with other MERCOSUR countries. It will also lead to lower death rates and material losses from traffic accidents and will help remedy the environmental problems of erosion and sedimentation along many of the highways. In addition, the program will contribute to decentralization of the highway administration and will increase private-sector participation in highway maintenance and operation.

RISKS:

The main risk for timely program implementation is the fact that there are several executing agencies, with the coordination and supervision problems this entails. To minimize this risk, the following measures have been taken: (i) bidding procedures and documents have been standardized; (ii) technical assistance will be given to the DNER and, to a lesser extent, to the DERs; (iii) no counterpart contribution from the participating states will be required; and (iv) resources have been included for timely preparation of additional projects to enable the DNER to carry out alternative works if a state acting as coexecuting agency experiences delays (paragraphs 5.30 to 5.33).

The component for transfer of operation and maintenance of certain highways to the states or to the private sector is the one most sensitive to the above-mentioned institutional complexities. Accordingly, the DNER will monitor these activities to ensure that any necessary adjustments are made in phase two of its highway rehabilitation plan (paragraphs 1.14 and 5.31 to 5.33). However, since failure to transfer the highways to the states would not prevent rehabilitation of those or other highways and would not increase rehabilitation costs, the risks are considered acceptable. The impact of any delays in the privatization component would lead to an increase in rehabilitation costs in phase two (paragraph 5.33).

Another risk is that future budgetary allocations may be insufficient for the necessary maintenance and investment. The risk is considered manageable in the short term, given the fact that the allocations for 1995 and 1996 improved over the previous years and that in two years the Bank may evaluate performance in this respect before approving phase two of the program (paragraph 5.34).

**THE BANK'S
COUNTRY AND
SECTOR STRATEGY:**

The Bank's strategy and project pipeline for Brazil for the period from 1995 to 1997, described in the February 1996 country paper, are consistent with the objectives of both the Eighth Replenishment and the Government of Brazil. They are designed to mitigate the causes and consequences of inflation through measures in the following areas: (i) **modernization of the State:** assigning priority to improving planning and management capacity, reform of public sector activities, and fiscal reform, to which objective the program will contribute through the support to be provided for decentralization of highway administration and for highway concessions and through a medium-term decline in public expenditures for transportation, thereby contributing to better fiscal equilibrium; (ii) **production infrastructure:** providing support for opening up the economy, regional integration, and the for reduction of the "Brazil cost" initiative by making priority investments in the transportation and energy sectors, to which the program will contribute by lowering vehicle operation costs; and (iii) **the social sectors, basic sanitation, and the environment:** to which the program would contribute through the measures included in the works to reduce traffic accidents on the highways and to mitigate severe environmental damage.

| | |
|--|---|
| POVERTY AND SOCIAL TARGETING: | The proposed program does not fulfill the criteria set forth in the Eighth Replenishment document (AB-1704) that would qualify it as poverty-targeted, either with regard to geographical targeting or to beneficiaries. Nor does it specifically target women. |
| EXCEPTIONS TO BANK POLICY: | None. |
| PROCUREMENT OF GOODS AND SERVICES: | Current Bank policies will be followed for the procurement of goods and the awarding of construction contracts and contracts for consulting services to be financed with the program resources. When the proceeds of the Bank loan are used, the threshold above which procurement for the program must be carried out through international competitive bidding will be: US\$350,000 for goods, US\$5 million for works, and US\$200,000 for consulting services (see paragraphs 3.20 to 3.22). |
| RECOGNITION OF PREVIOUS EXPENDITURES: | The borrower has not requested any retroactive financing or recognition of expenses incurred for the preparation of this operation as part of the local counterpart contribution to the program. Since the World Bank cofinancing will be considered, in part, local counterpart funding, the borrower, through the central program coordinating unit, the UCCP, must establish the necessary system for information sharing and feedback to ensure ongoing monitoring of disbursements of the two loans and verification of the <i>pari passu</i> . |
| SPECIAL CONTRACTUAL CONDITIONS: | <p>As conditions precedent to the first disbursement of the Bank loan, the DNER must: (i) establish the UCCP and three regional supporting units, appoint their respective staffs, and hire a consulting firm to provide support (including environmental specialists as part of the team) (paragraphs 3.4 and 5.24); (ii) submit the final version of the operating manual of the program to the Bank, including the environmental protection procedures and standards to be followed by the states acting as coexecuting agencies for the program (paragraph 5.24); and (iii) sign an agreement for execution of the program with the Ministry of Transportation (paragraph 4.1).</p> <p>Prior to receiving resources from the Bank, each state acting as coexecuting agency must: sign the necessary agreements, which must include a maintenance clause, with the DNER; establish a program coordinating unit (UCP); and appoint the unit</p> |

staff and, where deemed necessary, hire a firm to provide it with support (paragraph 3.4).

Within three months after signature of the contract, the DNER will hire the firm that is to provide environmental advisory services to the Environment Unit of the DNER (paragraph 5.25).

Within six months after signature of the contract, the DNER must initiate the process of environmental assessment training and hiring consultants for the study on critical environmental damage in those segments of the paved federal highway system not included in its highway rehabilitation plan (paragraph 5.26).

Within 12 months after signature of the contract, the DNER must undergo training in environmental assessment of highway projects and must hire consulting services to prepare a contingency plan for accidents involving highway transportation of hazardous goods (paragraph 5.27).

Within 24 months after signature of the contract, the DNER must: (i) provide the environment unit with the human and other resources necessary for the performance of its duties; (ii) complete the contingency plan for emergencies; (iii) complete the study on environmental damage on federal roads not included in phases one or two of the DNER highway rehabilitation plan (paragraph 5.28); (iv) take measures to strengthen its Internal Auditing Unit (paragraph 4.12); and (v) conduct an evaluation on the status of implementation of phase one (paragraphs 3.30 and 3.31).

Regardless of the source of the funds, all works to be carried out under the program will be prepared and executed according to the technical, economic, environmental, and traffic safety standards agreed upon with the Bank (paragraphs 2.7, 3.6, and 5.1).

Physical initiation of the works must occur within 39 months after signature of the loan contract (paragraph 3.17).

I. FRAME OF REFERENCE

A. Economic activities and transportation infrastructure

- 1.1 During the first half of the 1990s, investments by the federal government in transportation, including investments in government enterprises operating railroads and pipelines, represented some 0.5% of GDP. The highway subsector received 26% to 50% of those funds, with the balance being divided up roughly equally among air, pipeline, rail, and water transportation and ports.

| TABLE I-1 Freight and passenger transportation in Brazil in 1995 — (%) | | |
|--|--------|--------------|
| Mode | Ton/km | Passenger/km |
| Air | 0.3 | 1.9 |
| Pipeline | 3.5 | n.a. |
| Rail | 21.2 | 1.3 |
| Urban rail | n.a. | 0.6 |
| Waterways (*) | 17.4 | - |
| Road | 57.6 | 96.1 |

(*) Inland navigation and coastal traffic

- 1.2 The relatively even distribution in expenditures has helped ensure a lower concentration of freight transportation by truck than in other Latin American countries, where over 90% of ton-kilometers are conveyed by highway. In Brazil, 59% of domestic ton-kilometers are transported by highway, 21% by railway, 17% by waterways, and 3% by pipeline. However, the relative importance of highway transportation is accurately reflected in these figures, since almost all freight with the highest value/weight ratios is transported by highway, as is 96% of passenger-kilometers.
- 1.3 Coastal navigation covers the entire coastline, where most of the population and major economic activities are concentrated. The country's navigable rivers are located in regions with little economic activity, except for the river and lake system in the southeast of the state of Rio Grande do Sul and the rivers and recently opened locks of the Tietê and Paraná Rivers. The 30,000 km of railways comprise a relatively extensive system, comparable to the 38,000-km system of Canada, the fifth largest in the world. However, 68% of ton-kilometers are transported on only two lines, with the main freight being iron ore. Many other segments have little freight appropriate for rail transportation in their service areas. Furthermore, most of the railways are designed to link ports with the interior and not to connect the main centers of economic activity or to facilitate transportation within the interior.
- 1.4 At present, the main macroeconomic objective of the federal government is to preserve the achievements of the "Real" Plan: an inflation rate reduced to below 10%; economic growth; and improved income distribution. To safeguard these accomplishments, the fiscal deficit (equivalent to 4% of GDP) needs to be reduced.

Accordingly, among other measures, the federal government is seeking to decrease its transportation infrastructure costs by transferring responsibility for operation and maintenance of a portion of the infrastructure to the states and the private sector (see paragraphs 1.10 to 1.15).

| TABLE I-2 Length of national highways in Brazil in 1996 (km) | | | |
|---|----------------|------------------|------------------|
| Highways | Paved | Unpaved | Total |
| Federal | 51,370 | 14,046 | 65,416 |
| State | 81,881 | 110,924 | 192,805 |
| Municipal | 14,869 | 1,376,369 | 1,391,238 |
| Total | 148,120 | 1,501,339 | 1,649,459 |

Source: DNER — PNV 1996

B. Highway infrastructure and current state of repair of the federal system

- 1.5 There are approximately 1.65 million kilometers of highways in the federal, state, and municipal systems (see Table I-2). Only 10% of the highways are paved and just over a third of these belong to the federal system (51,370 km), over which 43% of ton-kilometers are transported. Indicators of development and highway coverage are low, even for Latin America, with only 0.96 km of paved highways per 1,000 inhabitants and 17 km per 1,000 square kilometers of surface area.
- 1.6 From 1957 to 1996, the paved federal system increased at an average annual rate of 1,200 km, with growth soaring during the period from 1970 to 1975 (at 7,000 km/year) and full use of the National Highway Fund [Fundo Rodoviário Nacional] (FRN) being made. Based mainly on a tax on fuel and lubricants which generated resources for the construction and maintenance of highways and other means of transportation, the FRN allocated 40% of the highway share to the DNER and 60% to states and municipalities. During that period, the DNER and construction companies made significant progress in technology and the DNER instituted systems for vehicle weight control and highway maintenance management.
- 1.7 In the 1980s, the federal government began to use the FRN to cover other expenditures. In 1988, the new Constitution eliminated the FRN and all other related funds, transferring to the states and municipalities on an untied basis the taxes and other fees previously allocated to the FRN. The federal highway sector started to depend exclusively on budgetary allocations just when the age of the pavements began to require high outlays for repairs. The allocations were insufficient to properly maintain the system, fluctuating greatly from year to year, and only allowing the DNER to partially institute its weight control program. Since trucks represented 30% to 70% of vehicle traffic on most Brazilian highways, and a portion of them carried excess loads per axle, the deterioration of the pavements worsened.

- 1.8 Given the lack of fiscal resources, the federal government turned to external financing to undertake rehabilitation of the most critical segments of the federal highway system, and carried out emergency works to repair serious damage and attempt to extend the useful life of the pavements. From 1984 to 1996, the DNER, with support from the World Bank, carried out two rehabilitation programs for highways in poor condition. In 1995 and 1996, the DNER was allocated resources barely sufficient for maintenance, let alone to make repairs and achieve a stable, acceptable state of repair for the system as a whole.
- 1.9 The most recent information available from the DNER (May 1996) on the state of repair of the federal highway system shows that only 31% of it is in good condition (as measured by an international roughness index (IRI) of < 2.5), 47% in fair condition ($2.5 < \text{IRI} < 4$), 13% in poor condition ($4 < \text{IRI} < 5$), and 9% in very poor condition ($\text{IRI} > 5.5$). The segments reported in poor or very poor condition, which total approximately 11,200 km, require urgent attention, with pavement repair or reconstruction. In addition, at least 20% of the segments in fair condition, which are reaching the end of their useful life, can be expected to be added in the short term, for a total length of close to 15,000 km needing rehabilitation.

C. Strategy adopted by the DNER to improve the federal highway system

- 1.10 To address this situation, the DNER devised the following strategy: (i) redefine the federal system according to the proposed guidelines of the new National Transportation System set up in October 1995 and transfer approximately 13,000 km of paved highways that are not of national or international import to the respective states; (ii) grant concessions to private enterprises for a total of close to the 6,300 km that could be commercially operated so as to cover their rehabilitation and maintenance costs through tolls; (iii) enter into agreements to delegate management of approximately 5,500 km of federal highways to certain states for concessioning to private enterprises; and (iv) obtain support from multilateral banks to implement a new federal highway rehabilitation plan, using modern planning and design techniques. Through these measures, the DNER is seeking to make the best possible use of the resources available to repair the 15,000 km that require improvements in the short term and to halt deterioration of the entire federal system by establishing appropriate policies and systems for pavement management and effective highway maintenance administration.
- 1.11 Implementation of this strategy will enable the DNER to: (i) reduce its sphere of activity and therefore its administrative costs so that it can focus on highways of national and international import, which would total 38,370 km in length; (ii) ensure ongoing financing for maintenance through concessions under which funds would be raised through tolls on approximately 11,800 km; and (iii) streamline the bureaucracy and reduce

budgetary resources needed to directly manage only 26,570 km, equivalent to 50% of all paved highways currently within its purview. Privatization will allow the DNER to raise private-sector resources in the short term for repair, maintenance, and operation of the most important part of the federal highway system, while the devolution of responsibility for certain highways to the states (*estadualização*) may increase the resources of the states for those purposes in the medium and long terms.

- 1.12 The DNER has divided execution of its rehabilitation plan into two phases, considering its budgetary constraints, the scope of the plan, and the available execution capacity. Phase one of the plan, the object of the proposed operation, has been scheduled for the period from 1997 to 2001, with a total investment of US\$750 million, to be cofinanced by the IDB and the World Bank, for rehabilitation of approximately 6,800 km of highways. Some 20% of the highways to be transferred from the federal system to the authority of the states would be upgraded prior to the transfer. The federal government has also requested Bank participation in phase two, to which the Bank agreed at the programming mission conducted in July 1997. The government expects to be able to initiate phase two in 1999.

D. Redefinition of the federal highway system and transfers to the states

- 1.13 According to National Transportation System criteria, a highway should be classified as federal, and hence of national import, if: (i) it links the state capitals with the federal capital; (ii) it is part of an international connection under a bilateral or multilateral treaty; (iii) it serves interregional trade or is part of key intermodal systems; or (iv) it is considered to be of strategic importance for national security reasons. The National Congress is currently reviewing a slightly modified version of the definition proposed by the Ministry of Transportation (Bill 1,176). Most of the highways eligible for transfer to the states are of local interest and have a traffic count of less than 2,000 vehicles/day.
- 1.14 The federal government has undertaken negotiations with the states to transfer 17,708 km of highways (13,054 km of paved highways and 4,654 km of unpaved highways) that would no longer be part of the federal system. In order not to overburden the states, before the highways are transferred, the DNER must rehabilitate the paved segments that are in poor condition or close to the end of their useful life. These works will involve approximately 3,780 km, one third of which (1,300 km) would be repaired during phase one, the object of the proposed operation. No works on unpaved highways are to be carried out under the program.
- 1.15 Once there are more than 100 km of repair works on highways eligible for transfer to states that wish to accept them, the

respective DERs will act as coexecuting agencies for the program and will manage the bidding procedures and works supervision contracts. The states of Bahia, Ceará, Minas Gerais, Rio de Janeiro, Paraná, Rio Grande do Sul, and Goiás are currently eligible.

- 1.16 There are four states in which the highways eligible for transfer to the state systems would increase the length of the paved state system by more than 20%, thereby requiring more resources for maintenance: Rio Grande do Sul (+68.7%), Minas Gerais (+51.9%), Maranhão (+32.7%), and Pernambuco (+21.5%). The transfer agreements set forth the obligation on the part of the states to maintain the highways they receive.

E. Privatization of highway operation

- 1.17 Based on previous practices and under the 1988 Constitution and Law 8,987 of February 13, 1995, the DNER has granted concessions for the repair, maintenance, and operation of 856 km of expressways and two bridges to private firms that will recover their investments through toll collections. The government has made initial investments prior to granting concessions in the case of the São Borja-Santo Tomás bridge and widening of the São Paulo-Belo Horizonte highway and São Paulo-Curitiba-Florianópolis highway, which are being partially financed by the Bank. Prospective concessionaires will invest in the installation and outfitting of the systems for toll collection, traffic safety, and user services. The toll collections will for the most part be used to repay the debt contracted by the government and to amortize investments by the concessionaire.

- 1.18 Concurrently with implementation of the proposed program, the DNER plans to issue invitations to tender for the concession of 16 highways totaling 4,100 km in length. Because of their features and the traffic levels they convey, these segments will be financially attractive to private investors. Moreover, under Law 9,277 enacted in May 1996, the DNER

| TABLE I-3 DNER Transfer Plan | | |
|---------------------------------|-------------------|------------------|
| Federal system | To be transferred | Operated by DNER |
| DNER operation | | 51,371 |
| Already concessioned | | 856 |
| Total as of June 1997 | | 50,515 |
| Concessions by DNER | | |
| - Other IDB projects | 1,300 | 49,215 |
| - This program | 4,100 | 45,115 |
| Concessions by states | 5,472 | 39,643 |
| Transfers to states | 13,054 | 26,589 |

has entered into agreements with the states of Rio Grande do Sul and Paraná and is currently negotiating with the states of Santa Catarina, Bahia, Minas Gerais, Pará, and Goiás to delegate to them, for a 25-year period, management and usufruct of the concessions

that will be granted for operation and maintenance of 25 segments of federal highways totaling 5,472 km in length.

- 1.19 The World Bank loan approved on June 12, 1997, which will provide cofinancing for the proposed operation, includes resources for technical assistance and advisory services for the concessioning process, in order to ensure the financial viability of the concessions offered, achieve a constructive partnership with the private sector, reduce bidding document preparation time, and minimize any delays that might occur due to shortcomings in the bidding procedures.

F. The Bank's contribution to program preparation

- 1.20 During preparation of the federal highway rehabilitation program, the DNER and the Bank agreed to broaden the original, almost exclusive focus of repairing the pavements. The current program includes supplementary works for drainage, roadway protection, improvements at critical accident points, expansion of the vehicle weight control program, and significant measures for institutional strengthening. These works and additional measures are considered essential to improve the quality of the projects and works, enhance user safety, and protect the highways against erosion, thereby lowering future maintenance costs. With these components, which will yield extensive social benefits, the program is more comprehensive and economies of scale will be achieved through its nationwide coverage.

G. Institutional considerations: DNER

- 1.21 The DNER has always awarded contracts for construction and rehabilitation works to private firms. In the 1970s, it outsourced almost all its other services and works, including routine maintenance, preparation of engineering designs, works supervision, and other studies and services. At present, the DNER no longer carries out such activities on force account and is only involved in them in certain parts of the Amazon, where it delegated them to the army or the municipalities. Outsourcing of the activities and privatization of highway operation were followed by a 70% downsizing in DNER staff from 1990 to 1996 (mainly through retirements) and the sale of its machines and equipment (see paragraph 4.4). The duties of the DNER are currently limited to awarding contracts for works and services to the private sector, supervising their execution, and exercising regulatory functions.
- 1.22 These duties require qualified staff, mainly at DNER headquarters in Brasilia. Unfortunately, the above-mentioned downsizing had an adverse impact on the number of experienced engineers and other professionals. Budgetary and legal constraints have prevented the transfer of senior employees from regional offices to headquarters or the recruitment of new staff. Furthermore, because institutional and budgetary procedures were not properly adjusted

upon outsourcing of all the activities, timely performance of the necessary ones is difficult when budgetary allocations are inadequate or bureaucratic procedures cause extensive delays in the hiring of private firms. For the DNER to perform its current duties of contract management, it needs financial resources to be available and quality control of engineering designs and works execution to be swift. Because the DNER is subject to cumbersome administrative procedures and budgetary uncertainty – over which neither the DNER nor users have any control – it has found it difficult to meet these needs. It has also encountered obstacles in shifting its works supervision activities (including maintenance works) from its previous focus of supervising operations during highway construction or maintenance works to supervising the performance of such services.

- 1.23 To address these problems, the DNER asked to participate in an administrative modernization program with the Ministry of Public Administration and Reform of the State (MARE), with the support of the Bank through proposed operation BR-0220 (program for modernization of the federal government in Brazil) and a technical assistance project included in the proposed program for modernization of the São Paulo-Florianópolis highway (BR-0150). The present program also includes components for technical assistance and training to enable the DNER to guarantee the quality of its projects and works through a performance-based system.

H. Environmental and traffic safety considerations

- 1.24 There is severe environmental damage in a significant proportion of the highways included in the program, sometimes associated with deficiencies in the masonry works needed for drainage. Typical cases include erosion of banks and other areas near the highways that lead to landslides, the formation of hollows and gullies, and sedimentation in the drainage system. These problems originated during construction or repair of the highways when vegetation was not reestablished and cut slopes, or spoil banks were not built. To correct these problems, each of the rehabilitation projects comprising the program includes the necessary measures for repair of the environmental damage. The program also includes a study on environmental liabilities in other segments of the system to guide future rehabilitation projects and to identify the responsibilities of future concessionaires.
- 1.25 With respect to traffic safety, the DNER belongs to the National Traffic Board [Conselho Nacional de Trânsito] (CONTRAN) and has jurisdiction over traffic engineering on federal roads. Other traffic safety functions are the responsibility of the Ministry of Justice and other ministries and central and municipal government institutions, including highway patrol, legal and regulatory authority, driver licensing, among other activities. Although accident rates remain high, the authorities have recently made significant gains, achieving high rates of seat belt use and

drafting a new traffic code that is expected to be approved by the National Congress by the end of 1997. The Ministry of Justice has asked the Office of International Affairs (SEAIN) to have the Bank assign priority to a proposal for a loan for a national traffic safety program.

- 1.26 Accidents can be decreased by eliminating one or more of their many causes. Correcting faulty traffic engineering can substantially reduce the number of accidents at "critical points." Examples in Brazil include segments of highways in the states of São Paulo and Paraná that had high accident rates (most of which had been attributed to driver error in police reports) but that had no accidents for extended periods after defective designs and traffic control devices were corrected. Under the proposed program, low-cost traffic engineering measures will be taken at critical points in the segments to be rehabilitated, with follow-up reports on their effectiveness and on accident rates in other parts of the federal highway system.

I. Expected benefits of the program

- 1.27 Rehabilitation of the highways will decrease highway transportation costs for both passengers and freight as well as long-term maintenance costs for the highway system. It will also help reduce the macroeconomic deficit and improve the competitiveness of Brazilian goods on the international markets. In addition, it will contribute to the physical and economic integration of Brazil with its MERCOSUR partners, will reduce accident rates, and will mitigate the problems of erosion and sedimentation along the highways. Lastly, it will help improve the quality of rehabilitation project preparation and execution, contribute to decentralization of government activities, and help increase private-sector participation in highway system operation.

J. The Bank's country strategy and rationale for participation

- 1.28 The Bank's strategy and project pipeline for Brazil for the period from 1995 to 1997, described in the February 1996 country paper, are consistent with the objectives of both the Eighth Replenishment and the Government of Brazil. They are designed to mitigate the causes and consequences of inflation through measures in the following areas: (i) **modernization of the State**: assigning priority to improving the planning and management capacity, reform of public sector activities, and fiscal reform, to which objective the program will contribute through the support to be provided for decentralization of highway administration and concessioning and through a medium-term decline in public expenditures for transportation, thereby contributing to better fiscal equilibrium; (ii) **production infrastructure**: providing support for opening up the economy, regional integration, and the initiative for reduction of the "Brazil cost" by making priority investments in the

transportation and energy sectors, to which the program will contribute by lowering vehicle operation costs; and (iii) the **social sectors, basic sanitation, and the environment**: to which the program will contribute through the measures included in the highway works to reduce traffic accidents on the highways and to mitigate severe environmental damage.

K. Experience of the Bank and other financial institutions

- 1.29 The Bank has financed 16 road projects with Brazilian states (US\$1,484 million) and nine with the DNER (US\$1,414 million). The first projects with the states were mainly for feeder roads, including paving of dirt roads. Recent projects have focused on road repair and maintenance and the establishment of structured transportation systems. Most of the projects have been successfully implemented, with the original objectives being achieved. In at least three cases (roads programs in Ceará, Paraná, and Pernambuco), the physical objectives set were surpassed or the benefits achieved exceeded those estimated in the ex ante economic analysis. In certain cases, there were delays in execution due to the lack of timely counterpart funding, and in one case (Goiás), a severe financial crisis led to a significant downsizing of the original goals.
- 1.30 In terms of federal road projects, the proceeds of a number of Bank loans focused on four key highways and, for the past 20 years, on just three. The two most recent were projects to widen and modernize the Fernão Dias highway (stage one: BR-0162, approved in 1993; and stage two: BR-0216, approved in 1996) and the São Paulo-Florianópolis highway (BR-0150), approved in 1995 with cofinancing from Eximbank of Japan. The third operation, for the Porto Velho-Rio Branco highway, was approved in 1985. Stage one of the Fernão Dias highway project experienced initial delays due to the exceptionally low bids submitted by the contractors, which would have jeopardized the financial equilibrium of the contracts and led to voiding of the bidding. A new call for bids was issued, the bid bond amounts were increased, the construction contracts were awarded without incident, and the works are proceeding on schedule. Similar bid bonds are now being used in other projects in the country, and will be for the proposed operation. The São Paulo-Florianópolis works are also proceeding on schedule, with the exception of two subsegments in which the route survey line studies remain pending. Since private enterprises did not consider the necessary investments feasible, an innovative concession system was devised whereby private concessionaires must operate and maintain the highways and pay the government amounts equivalent to the interest and principal payments on the loans (this system was also used for the entire length of the Fernão Dias highway).
- 1.31 To maintain the highways and protect the surrounding areas, under the proposed operation, certain existing environmental problems

such as erosion, sedimentation, and landslides will be corrected. The experience gained with the São Paulo-Florianópolis highway widening project is relevant because considerable investments had to be made to repair the erosion and landslide damage over large areas caused during construction of the original roadway due to the failure to ensure stable slopes or restore vegetation. Such preventive steps were taken for the Porto Velho-Rio Branco highway (BR-0066), and the integrity of the highway has been preserved despite the heavy rains characteristic of the area.

- 1.32 With regard to institutional concerns, the Bank's operations have included technical assistance and training for the state highway authorities – the Highway Departments or equivalent agencies (DERs) – which have had problems similar to those of the DNER. Project preparation procedures for paving and masonry works were found to need substantial improvement, including the incorporation of environmental and traffic safety measures. Such improvements have required specific measures on the part of the Bank, the DNER, and the DERs during project preparation to adjust standards, bidding documents, and supervision and payment procedures.
- 1.33 In most Bank operations for highways, a vehicle weight control component has been included. Considering the danger of early deterioration of the pavements and the recommendation of the Loan Committee on July 17, 1997, the weight control system will be strengthened (see paragraph 2.18).
- 1.34 For the World Bank, which approved the cofinancing for the proposed program on June 12, 1997, this is its ninth operation with the DNER as executing agency. The World Bank has also financed four highway operations with states and three feeder road projects. In 1984, it approved the first of two operations for rehabilitation and maintenance of the federal system, the second having been completed in December 1996. The World Bank also considers its operations with the DNER and the states successful, and mentions difficulties in the execution of the institutional components of certain operations. It has experienced some delays in the execution of works in several projects with the DNER and the states, including cancellations, due mainly to the lack of local counterpart funding. Joint participation of the IDB and the World Bank in the proposed operation will reduce the risk of problems in counterpart funding.

II. THE PROGRAM

A. Objectives

- 2.1 The purpose of the program is to reduce transportation costs in the federal highway system, and its specific objective is to improve the state of repair of the highways.

B. Goals

- 2.2 Without the DNER rehabilitation plan, highway transportation costs would rise rapidly. With the implementation of phase one of the plan, the object of the proposed operation, the following improvements are expected to be achieved: (i) average vehicle operation costs, which were US\$0.42 per vehicle/kilometer as of January 1997, will decrease slightly to US\$0.41 by December 1999; (ii) the percentage of the federal system in poor condition will drop from 21% in May 1996 to 7% by December 1999; and (iii) during the year in which the critical accident points and environmental degradation are corrected, accident rates at those points will decline 30% over the previous year and severe environmental damage in the respective segments will be eliminated.
- 2.3 Since the DNER expects to launch phase two of its plan in the year 2000, the logical framework for the program shows the goals for phase one for 1998 and 1999 and the goals for the plan as a whole for 2000 and 2001, on the assumption that phase two will be carried out on schedule.
- 2.4 The goals for highway transfers to the private sector and to the states, together with the other program components and activities, are shown in the logical framework (Annex II-1).

C. Design of the proposed program

1. Type of operation and main components

- 2.5 The proposed operation is a global multiple-works program the main component of which is the rehabilitation of the pavement and masonry works on approximately 6,800 kilometers of highways currently under DNER jurisdiction. Also included are additional works to reduce the risks of traffic accidents and to mitigate the major adverse environmental impact stemming from the environmental liabilities on the segments. Given the complexity of the proposed program and the institutional weaknesses identified, a component will be financed for technical assistance and training for the staff of the DNER and DERs involved. For the DNER, the following, among other areas, will be covered: traffic safety, technical supervision of highway works, environmental management, concession management, pavement management, and highway and bridge

maintenance. In addition, equipment will be procured for laboratory testing and quality control of materials, along with scales for vehicle weigh stations and computer equipment.

2. Selection criteria for the projects and representative sample

- 2.6 The highway segments that will be rehabilitated by the DNER during phase one of the proposed program were selected, reviewed, and prioritized using the Highway Design and Maintenance Model and the Expenditure Budgeting Model (HDM-III/EBM). Using this selection procedure, the segments that are part of the DNER concession plan were excluded. Because it was impossible to obtain the same degree of detail in the information on all the segments of the system reviewed, in certain cases average figures had to be used and may have caused some distortion in the findings obtained from the models. However, the degree of approximation is considered adequate and will not significantly affect the priorities assigned.
- 2.7 The representative sample used to analyze the operation consisted of 37 highway segments totaling approximately 2,200 km and representing 32% of the length of highways to be rehabilitated under phase one of the proposed program. The estimated cost of the works is US\$170 million, equivalent to 27% of the total amount to be invested in highway works during this phase. The works include various levels of pavement rehabilitation (reconstruction, overlays of variable thicknesses, and sealing), and various types of supplementary works to: (i) repair and/or make the masonry and drainage works more functional; (ii) correct the geometric design of the roadway at certain critical points (placement of a third lane in segments with steep grades and a high percentage of heavy vehicles, correction of dangerous curves, remodeling of intersections, etc.); and (iii) complete or replace traffic control devices and other works for traffic safety and environmental recovery. Regardless of the source of funding, all the projects and works (including those that are not part of the sample) must be prepared and implemented according to the technical, economic, environmental, and traffic safety standards agreed upon with the Bank.

D. Description of the program components

- 2.8 The components described below comprise phase one of the DNER rehabilitation plan, which will be financed jointly by the Bank and the World Bank. The amounts indicated in parentheses after each category represent the total investment, while the breakdown of the financing is shown in Table II-1.

1. Engineering and administration (US\$26.1 million)

a. Advisory services for program coordination
(US\$10.1 million)

- 2.9 To administer the program, the DNER will create a central program coordinating unit [Unidade Central de Coordenação do Programa] (UCCP), supported by advisory services from a consulting firm specializing in technical and financial administration and accounting for projects with international financing. The consulting firm will be hired prior to the first disbursement of the proposed Bank loan and its services will be partially financed with the proceeds of the World Bank loan.

b. Studies and designs (US\$16 million)

- 2.10 Specialized consulting firms will be hired to prepare the rehabilitation projects for the approximately 4,600 km of eligible highway segments not included in the representative sample. The technical, economic, and environmental studies and engineering designs for the rehabilitation works will be prepared according to the guidelines set forth in the Operating Manual, which has been reviewed by the Bank. The proceeds of the Bank loan will be used to partially finance the studies for approximately 2,300 km of highways to be rehabilitated.

2. Civil works (US\$663.95 million)

a. Highway rehabilitation (US\$629.9 million)

- 2.11 The repair or reconstruction works to be carried out during this phase of the program concern approximately 6,800 km of highways; 91% of the proceeds of the IDB and World Bank loans will be used to finance them. The IDB resources will mainly be used on the most heavily traveled segments that will continue to belong to the federal system. Since the works involved are more costly, only some 3,200 km in length will be covered, and will consist of the following: (i) sealing, reinforcement, or reconstruction of the existing asphalt pavement; (ii) repair or additional construction of surface and underground drainage works, special masonry structures, where necessary, and reconstruction or reinforcement of shoulders; (iii) traffic signs and installation of traffic safety devices at intersections with other roads and in populated areas; and (iv) measures for environmental protection, and, where deemed necessary, repair of environmental degradation. Construction of a third traffic lane may be considered for highways with congestion problems in which such an option would be viable. In no case will highways be broadened.

b. Works supervision (US\$26.05 million)

- 2.12 Technical and administrative supervision of the program works will be carried out by consulting firms specializing in highway infrastructure projects. Their responsibilities will include (i) verification of compliance with the technical standards and specifications of each project; (ii) review of the designs, construction methods, and works scheduling for the projects they are supervising and recommendations on any necessary changes; (iii) certification of the quality of the works and facilities; (iv) verification that the measures for highway safety and environmental protection called for under the program have been taken; and (v) monthly review of the status of project works and their valuation. The proceeds of the Bank loan will be used to hire the consulting firms that will supervise the works on approximately 3,200 km of highways to be rehabilitated.

c. Weigh stations (US\$8 million)

- 2.13 To ensure that the works are long-lasting and to protect the pavement over the entire highway system from damage caused by vehicles weighing more than the legally established limits, the weigh stations currently not operational due to a lack of equipment or malfunctioning equipment will be reactivated and new stations will be set up for use of mobile scales, thereby providing for effective control throughout the federal system. The Bank will partially finance the spare parts and works required and the procurement of the scales (see paragraph 2.18).

3. Institutional strengthening (US\$15 million)

a. Training (US\$2 million)

- 2.14 Training will be financed with the proceeds of the Bank loan and will include courses on: (i) environmental assessment of highway projects and control of the transportation of hazardous materials; (ii) identification and correction of critical points using low-cost traffic engineering solutions; (iii) new methods for quality control of projects and laboratory tests for quality control of materials; (iv) highway maintenance management; (v) management training; and (vi) auditing and accounting. The training will mainly target DNER staff but, where possible and advisable, staff from the DERs that will act as coexecuting agencies of the program will also be included.
- 2.15 In the preparation of the training programs, account was taken of the experience gained in other training activities carried out by the DNER. Accordingly: (i) because the trainees are widely dispersed, resources are included for travel and per diems, and courses will be given at regional centers; and (ii) for the first time, a goal-oriented training method will be used. Under this method, the most important goals that the DNER needs to achieve in

its duties were first identified, along with the key staff responsible for those results. That staff was then targeted as participants and/or instructors in the courses. Also identified were the concepts needed to achieve the goals in question. Examples and teaching techniques consistent with the work atmosphere will be used.

b. Technical assistance (US\$13 million)

- 2.16 This component will be financed for the most part with resources provided by the Bank. It will include the hiring of consultants to assist the DNER in the development and/or installation of systems and new technologies to improve its capacity to plan, regulate, and control the most important activities in its management of the federal highway system. The main elements of the component are: (i) monitoring and review of the highway rehabilitation projects; (ii) assessment of the cost of highway accidents and the effectiveness of the low-cost accident prevention measures; (iii) advisory services and support for the Highway and Environmental Studies Service of the Studies and Designs Division (SVERA/DEP), implementation of the system for control of emergencies involving hazardous materials, and survey of environmental liabilities in the federal highway system; and (iv) development of new methods for technical supervision of highway projects and works.
- 2.17 The World Bank, in turn, will finance technical assistance for: (i) implementation and dissemination of the HDM/EBM models, particularly with regard to the formulation of annual and multi-annual investment plans; (ii) development of a performance-based contracting system for highway maintenance; and (iii) support for implementation of the highway concession system.

4. Procurement of equipment (US\$7.5 million)

- 2.18 This component will be financed in full with proceeds from the proposed Bank loan and will consist of the procurement of: laboratory instruments and equipment for geotechnical testing and for quality control of asphalt, concrete, and other materials; stationary and mobile scales for outfitting the weigh stations on major highways; and computer equipment and audiovisual systems to expedite the DNER's work and to conduct training activities.

5. Total program cost and financing

- 2.19 The total cost of the program (for phase one of the DNER's rehabilitation plan) is US\$750 million, of which the Bank would finance up to US\$300 million (40%) from the ordinary capital (OC). The balance would be covered by resources from the World Bank (40%) and the federal government (20%), with the World Bank providing US\$300 million in cofinancing through the loan approved in June

1997, and the DNER providing US\$150 million in budgetary allocations.

- 2.20 The terms of the Bank loan will be as follows: (i) amortization period: 20 years; (ii) disbursement period: four years; (iii) interest rate: variable on undisbursed amounts; (iv) credit fee: 0.75% on undisbursed balances; (v) inspection and supervision fee: 1% of the loan amount; and (vi) currency: United States dollars.

| TABLE II-1 Estimated program costs (in thousands of U.S. dollars) | | | | | |
|--|----------------|----------------|----------------|----------------|--------------|
| Components | IDB | WB | Local | Total | % |
| 1. Engineering and administration | 4,800 | 14,100 | 7,200 | 26,100 | 3.5 |
| 1.1 Advisory services for UCCP | 0 | 7,700 | 2,400 | 10,100 | |
| 1.2 Studies and designs | 4,800 | 6,400 | 4,800 | 16,000 | |
| 2. Civil works | 273,000 | 282,900 | 108,050 | 663,950 | 88.5 |
| 2.1 Highway rehabilitation | 255,300 | 272,000 | 102,600 | 629,900 | |
| 2.2 Weigh stations | 7,000 | 0 | 1,000 | 8,000 | |
| 2.3 Works supervision | 10,700 | 10,900 | 4,450 | 26,050 | |
| 3. Institutional strengthening | 11,700 | 3,000 | 300 | 15,000 | 2.0 |
| 3.1 Training | 1,700 | 0 | 300 | 2,000 | |
| 3.2 Technical assistance | 10,000 | 3,000 | 0 | 13,000 | |
| 4. Procurement of equipment | 7,500 | 0 | 0 | 7,500 | 1.0 |
| 5. Finance charges | 3,000 | 0 | 34,450 | 37,450 | 5.0 |
| 5.1 Interest | 0 | 0 | 31,070 | 31,070 | |
| 5.2 Credit fee | 0 | 0 | 3,380 | 3,380 | |
| 5.3 Inspection and supervision | 3,000 | 0 | 0 | 3,000 | |
| TOTAL | 300,000 | 300,000 | 150,000 | 750,000 | 100.0 |

III. PROGRAM EXECUTION

A. Executing agency

- 3.1 The program executing agency will be the National Highway Department (DNER). Interest has been expressed in acting as coexecuting agencies by the Highway Departments (DERs) of the states of Bahia (DER/BA), Ceará (DER/CE), Goiás (DER/GO), Minas Gerais (DER/MG), Paraná (DER/PR), Rio de Janeiro (DER/RJ), and Rio Grande do Sul (DAER/RS). The DNER will be in charge of works projects on federal highways remaining under its control, while the DERs will handle works projects on federal highways to be transferred to them under agreements to be signed with the DNER.
- 3.2 The program works will be carried out by private construction companies under the supervision of private engineering firms. Both types of companies will be hired by the executing agency or the coexecuting agencies, which will in turn oversee the work through their formal structures. Program administration will fall under the responsibility of those formal structures, although each agency will set up a specific unit to ensure proper coordination of all activities.
- 3.3 The DNER will set up a central program coordinating unit (UCCP) at its headquarters in Brasilia, and three regional program coordinating units (URCPs) in the federal highway districts of the states of Bahia, Minas Gerais and Rio Grande do Sul. The UCCP will report to the DNER Director General and the URCPs to the UCCP. Each coexecuting state will set up its own state program coordinating unit (UECP), using its own funds, and such units will report to the directors general or superintendents of the respective DERs. Both the DNER and the state units (where deemed necessary) will receive support from consulting firms specializing in the administration of projects financed by international agencies.
- 3.4 To avoid payroll increases at executing agencies, any additional staff needed in the aforesaid units will be provided by the consulting firms giving support. As a condition precedent to the first disbursement of the loan proceeds, the DNER is to set up the program coordinating units, appoint unit staff, and hire the consulting firm to provide support. Before receiving any program funds, a coexecuting state will be required to set up its executing unit, appoint unit staff, hire the consulting firm to provide support (where deemed necessary), and sign the necessary agreements with the DNER. Those agreements have been approved by the Bank and include the obligation on the part of the state to maintain the highways.

- 3.5 To facilitate program administration, each coexecuting agency will deal with a single bank, and adjustments will be allowed to solve any problems that may arise in execution.

B. Status of program preparation

- 3.6 Technical, economic, and environmental studies and the corresponding engineering designs are now available for approximately 2,200 km of projects making up the representative sample of the program, and calls for tender could be issued during year one. These projects are accompanied by the necessary environmental rehabilitation measures and require traffic safety measures as well. Studies for a total of 4,000 km are expected to be completed by December 1997.
- 3.7 An environmental rehabilitation report has been prepared for each of the segments included in the sample. Preliminary versions of those reports were made available at a public hearing held on April 3, 1997, and revised versions at a second public hearing on May 15, 1997.
- 3.8 The technical assistance and institutional strengthening components to be included in the program have been defined and agreed upon with the DNER. The project team has reviewed the preliminary terms of reference for each component and passed on its observations and comments to the DNER.
- 3.9 The World Bank is to cofinance the first phase of the proposed program with a contribution equivalent to US\$300 million. The corresponding loan operation was approved on June 12, 1997, and the first disbursements are expected to be made by the end of the current year.

C. Execution of program components

1. Support for the UCCP and UECPs

- 3.10 Since this component is to be financed with World Bank and local funds, the consulting firm will be hired according to World Bank procedures. The firm is to be hired prior to authorization of the first disbursement of the prospective IDB loan, and the term of its contract will be identical to the program execution period.

2. Studies and designs

- 3.11 The Bank will provide partial financing for the preparation of projects for which execution is scheduled to begin in year two or thereafter and which were not included in the representative sample. These projects cover approximately 5,000 km and include both technical/economic feasibility and environmental protection studies and engineering designs.

3. Works supervision

- 3.12 Works supervision by specialized consulting firms will be financed with funds from the IDB, the World Bank, and local counterpart funding. Funds from only one of the two banks will be used for each individual contract and to supervise works financed by that bank. Supervision contracts may be administered by DERs coexecuting works projects on highways to be transferred to the respective state. All other supervision contracts will be administered by the DNER and supervised through its district structures.

4. Civil works

- 3.13 Tenders for works will be handled by: (i) the DNER in the case of projects on highways to remain within the federal system or to be transferred to states not involved in program execution; and (ii) the DERs in the case of projects on highways to be transferred to them. All bidding is to take place in accordance with the procedures set forth herein.
- 3.14 For bidding on works projects, lots or packages of projects will be made up based on location and considering the source of external financing and responsible agency (DNER or DERs). The UCCP will provide advisory assistance to state agencies to ensure compliance with standard procedures and due coordination with the Bank.

5. Institutional strengthening activities

- 3.15 The Bank will finance training activities and most technical assistance (see paragraph 2.14 and 2.16). All training activities are to take place during the first 24 months of the prospective Bank loan. Consultants for technical assistance will be hired in accordance with the bidding and contracting plan agreed upon (see Annex III-3). Special attention is to be given to early commencement of technical assistance projects in connection with implementing the system for pavement management and highway maintenance administration, as well as appropriate coordination among those projects.

6. Equipment procurement

- 3.16 The features and technical specifications needed for bidding on equipment procurement (see paragraph 2.18) are to be prepared and presented to the Bank by the end of December 1997.

D. Execution schedule and timing

- 3.17 The proposed program will be carried out over a period of four years after signing of the prospective loan contract. The physical initiation of all the works is to occur prior to the thirty-ninth month of the loan contract.

E. Bidding for works projects, procurement of goods, and contracting of services

- 3.18 Prior to the call for tenders for each of the works projects included in the program, the executing agency is to present evidence to the Bank that it has obtained all the environmental approvals and permits required under national legislation, and that the public hearings required by the Bank have been held.
- 3.19 Since the works projects are not complex and do not call for any specialized technology, prequalification is not considered necessary. However, the projects may be grouped in lots of a given size calling for specific levels of installed capacity and financial soundness on the part of the bidders, and a two-envelope system is therefore recommended for all tenders involving works projects.
- 3.20 When the works for each project or series of projects put out to tender simultaneously and financed in full or in part with Bank funds is equal to or greater than US\$5 million, international competitive bidding (ICB) is to be used in accordance with Bank procedures. Under that amount, or when financing is entirely local and the works are proposed for inclusion in the counterpart portion of the prospective Bank loan, bidding is to take place in accordance with Brazilian law and procedures. Bidding for works to be financed by the World Bank is to take place in accordance with procedures approved by that institution. Preparation of this operation was coordinated to ensure that bidding documents and procedures used by both banks are substantially similar.
- 3.21 All procurement of goods and services in amounts equal to or greater than US\$350,000 which are financed in part or in full with Bank resources is to take place by ICB. Procurement in amounts below that threshold is to take place by procedures that ensure free competition and guarantee the quality of the goods and services to be acquired, provided such procedures do not run counter to Bank policy.
- 3.22 Contracts for consulting services in amounts of US\$200,000 or greater which are financed in part or in full using the proceeds of the prospective loan are to be concluded by ICB. Contracts for smaller amounts will be governed by local legislation. In all cases, the bidding conditions are to be presented to the Bank for approval.
- 3.23 Annex III-3 contains the proposed bidding and contracting plan indicating the approximate commencement dates for each bidding process.

F. Retroactive financing and recognition of counterpart contribution

- 3.24 The borrower has not requested retroactive financing or the recognition of expenses incurred in the preparation of this operation as part of the counterpart contribution. Since the parallel financing to be provided by the World Bank is considered in part a counterpart to the Bank's financing, the borrower, through the UCCP, is to establish mechanisms for the exchange of information to allow ongoing monitoring of disbursements under both loans and verification of the *pari passu*.

G. Maintaining the federal road system

- 3.25 The DNER has installed, though with some shortcomings, the HDM-III/EBM and the pavement management and road maintenance administration systems. These planning and administration instruments allow the DNER to anticipate deteriorating pavements, plan for the necessary repair and maintenance, and program the use of available resources in order to operate efficiently. However, it is still necessary to review and adjust those systems and to institutionalize systematic collection of the data needed to improve reliability levels. The technical assistance component includes actions in support of system upgrading, as well as information mechanisms to allow appropriate monitoring of the efficiency of investments in rehabilitation and maintenance. The DNER will gradually change maintenance contracts to move from the current system - which measures a large number of services and materials over which it cannot exercise needed control - to a performance-based system of payments.
- 3.26 The level of disaggregation and dispersion of files on maintenance activities performed, together with the lack of systematic periodic evaluations of highway condition, stand in the way of an appropriate evaluation of the efficiency and effectiveness of the maintenance activities. Nor is it possible to gauge whether resources allocated for road maintenance are sufficient. Expenditure by the DNER to maintain federal roads in 1995 and 1996 was US\$138.7 million and US\$107.7 million, respectively, to serve a system of approximately 65,000 km (including both paved and unpaved roads). Average expenditure ranges between US\$2,134 and US\$1,657 per km/year, which is less than the figure of close to US\$3,500/km considered desirable according to internationally recognized standards, especially considering the condition and age of many segments of road in the system, the nature of traffic, and the heavy rains that affect many parts of the country. Restructuring the federal system, transferring a substantial proportion of highways to the states, and granting concessions will considerably reduce the length of road under direct DNER responsibility. Accordingly, if the budget allocation for road maintenance remains on the order of US\$120 million to US\$130 million per annum, a reasonable standard of maintenance could be achieved provided there is an appropriate and timely allocation of resources and these are

applied exclusively to routine and scheduled maintenance and not to rehabilitation or reconstruction, which ought to be considered separately as they involve a considerably higher cost per km.

- 3.27 Bank policy calls for the executing agency to present an annual maintenance report within the first quarter of each year commencing in the year following the effective date of the prospective Bank loan, up to the tenth year following the date of the last disbursement. Such reports are to include: (i) a list of maintenance and/or rehabilitation activities performed during the previous year, indicating location, quantities and approximate amount of expenditure; (ii) execution modalities, sources of financing, and resources used; (iii) a detailed evaluation of road condition in comparison with prior-year results; and (iv) the maintenance plan for the year of the report.
- 3.28 To ensure proper maintenance of roads to be rehabilitated and transferred to state jurisdictions, in any agreements it concludes with the states, the DNER will include the obligation on the part of the states to allocate needed resources to that end.

H. Rights-of-way

- 3.29 Given the nature of the works, it will generally not be necessary to expand the rights-of-way requiring land expropriation or affecting housing or facilities on private property. The possible addition of a third lane on some segments and any renovations to intersections will be done, to the extent possible, within the current strip of public land.

I. Monitoring of program execution and evaluation

- 3.30 Since the proposed operation constitutes the first phase of the DNER rehabilitation plan, the DNER will submit to the Bank for its approval an evaluation of the implementation of the institutional strengthening components and works under the program 24 months after contract signing. This evaluation will be based on the indicators included in the program logical framework (Annex II-1), and will cover the quality of engineering designs and degree of implementation (including environmental issues, traffic safety and weigh station operations, indicating vehicles weighed and fines levied and paid), as well as the results of training and of other studies planned. Adjustments will be made as deemed necessary to achieve the program objectives and goals, and the respective sector issues will be reviewed. In addition, the DNER will keep up-to-date records on that data until program completion and will cooperate with the Bank on the preparation of the project completion report.
- 3.31 The foregoing will be based on the information produced by the UCCP during program administration and on information obtained through implementation of the pavement management and road maintenance

administration systems, together with the results of specific studies and databases set up as part of the program.

IV. BORROWER AND EXECUTING AGENCY

A. Institutional analysis

1. Borrower and executing agency

- 4.1 The borrower of the proposed Bank loan will be the Federative Republic of Brazil and the executing agency will be the Departamento Nacional de Estradas de Rodagem [National Highway Department] (DNER). An agreement between the DNER and the Ministry of Transportation for execution of the program will accordingly have to be signed. The state highway departments (DERs) mentioned in paragraph 3.1 have also expressed their intention to participate.

a. Nature and functions of the executing agency

- 4.2 The DNER is a decentralized agency attached to the Ministry of Transportation. It is responsible for planning, coordination, administration, and oversight of the federal highway system and for implementation of the policies governing the system. It operates by authority of Decree 8,463 of 1943, as amended, and in accordance with its 1991 by-laws, updated in 1995. These by-laws include the agency's Operations Manual, which establishes the responsibilities of each specific area.

b. Organizational structure

- 4.3 The DNER's current structure is appropriate and comprised of the following levels: decision-making body: Executive Board; executive and executive support units: Office of the Director General and Technical Advisory and Planning Office; central departments: Legal; Internal Audit; Administration and Finance; technical units: Engineering, Operations, Technology Development, and Concessions Departments; regional offices: regional highway districts (DVRs).

c. Human resources

| TABLE IV-1 National Highway Department (DNER) Staffing pattern, 1990-1996 | | | |
|---|-----------|-------------------|--------|
| Year | Executive | Middle management | Total |
| 1990 | 1,378 | 14,457 | 15,835 |
| 1991 | 1,077 | 6,428 | 7,505 |
| 1992 | 1,053 | 7,298 | 8,351 |
| 1993 | 995 | 6,536 | 7,531 |
| 1994 | 957 | 5,638 | 6,595 |
| 1995 | 948 | 5,178 | 6,126 |
| 1996 | 933 | 3,877 | 4,810 |

Source: December 31, 1996, data from the DNER's Human Resources Division.

- 4.4 The DNER's personnel matters are the responsibility of the Human Resources Division, attached to the Administration and Finance Department. Table IV-1 shows a 69.6% reduction in force at the DNER between 1990 and 1996, resulting from outsourcing, early retirements, the transfer of headquarters from Rio de Janeiro to Brasilia in 1990, which led to the departure of many employees, and the transfer of the Highway Patrol to the Ministry of Justice. The disadvantages arising from this reduction in force were offset by outsourcing and the modernization of the DNER (see paragraphs 1.21 to 1.23), which included staff training.

d. Staff training

- 4.5 The Technological Training Division of the Technology Development Department will be in charge of the DNER's staff training under the program (see paragraph 2.14).

e. Coexecuting agencies

- 4.6 The DERs of seven states have expressed their intention to participate in the program as coexecuting agencies, and five of them have signed memorandums of intent to that end. Each participating DER will use its official structures and set up a UECP. These UECPs will operate in close coordination with the structures of those DERs and with the DNER's UCCP. The DNER, through the UCCP, will be responsible for consolidating all the program-related information and for submitting any information to the World Bank and IDB as required under the loan contracts. The proposals for setting up the UECPs in the DERs of five of the seven states interested in participating in the program were examined by the Bank and considered appropriate.

f. Federal highway concessions to the private sector

- 4.7 The DNER will grant concessions directly to the private sector during phase one of the program for some 4,100 km of federal highways (see paragraph 1.18). To make this goal feasible institutionally without having to increase its staff, the DNER set up a Concessions Department in 1996 with staff from other departments. The proposed program will include technical assistance financed by the World Bank to support the Concessions Department.

g. Strengthening of the vehicle weight control system

- 4.8 The program will strengthen the vehicle weight control system on federal highways. Weigh stations and equipment will be rehabilitated, mobile scales will be purchased, and stations will be constructed for their operation. The DNER will hire private firms to operate the system. Fines levied for load violations will be paid to the DNER at any bank. To make sure that the fines are paid, the DNER has signed agreements with 12 state traffic departments (DETRANS) and is negotiating extending those agreements, which provide for sharing information on unpaid fines, to cover all the other DETRANS. Such agreements will allow the DETRANS to withhold the issuing of documentation for a driver or vehicle involved in a violation until the DNER fine has been paid. For their assistance, the DETRANS will receive 25% of the amount collected.

B. Financial analysis

1. Financial management and control system

- 4.9 National Treasury transfers to the DNER account for 98.5% of its financial resources. The remaining amount comes from charges for small services the DNER delivers and from a portion of the fines collected for traffic violations on federal highways. The Accounting Division of the DNER's Administration and Finance Department is responsible for administration of these resources. It is also in charge of overseeing execution of the DNER's budget. Each department or unit of the DNER manages its own budget, committing resources only according to its needs. These proposals are consolidated by the Budget and Control Division of the Administration and Finance Department and, once approved by the Director General of the DNER, are sent to the Ministry of Transportation to be included in the Ministry of Planning's overall budget.
- 4.10 The DNER's financial management forms part of the integrated financial administration system, administered by the National Treasury Department under the "single account" system, whereby each government agency functions as a "depository of assets," with payments effected through accounts controlled by the Treasury

Department. The level of execution and control of all these activities is acceptable.

- 4.11 The federal government has a system of internal and external control for transactions carried out by the DNER. Federal audit activities are conducted at the following levels: (i) internal audit by the DNER's Auditing Unit, which requires strengthening; and (ii) external auditing by the Federal Comptroller's Office (SFC) of the Ministry of Finance and the Office of the Auditor General. Each unit involved acts within its respective area and jurisdiction, and the work done by all of them is considered acceptable.

2. Strengthening of the DNER's Auditing Unit

- 4.12 To strengthen the DNER's Auditing Unit, within 24 months after the effective date of the loan contract, the following measures must be taken under the program: (i) expand the coverage of and modernize its information system by procuring the necessary equipment; (ii) train the staff; and (iii) take additional measures to ensure that the unit has the staffing necessary for proper performance of its duties.

3. Auditing of the program's financial statements

- 4.13 The SFC is responsible for the external auditing of the financial statements of projects financed by international lending institutions. Accordingly, the financial statements of the proposed program will be submitted to the Bank with the SFC's report.

4. Expenditures for maintenance of federal highways

- 4.14 Table IV-2 shows the DNER's expenditures on maintenance of federal highways over the 1992 to 1996 period.

| TABLE IV-2 National Highway Department (DNER) Spending on routine maintenance from 1992 to 1996 (millions of U.S. dollars) | | | | | |
|---|-------------|-------------|-------------|--------------|--------------|
| CATEGORY | 1992 | 1993 | 1994 | 1995 | 1996 |
| National Treasury resources | 74.7 | 79.0 | 56.9 | 138.7 | 107.7 |
| Other sources | 0 | 0 | 4.6 | 0 | 0 |
| Total | 74.7 | 79.0 | 61.5 | 138.7 | 107.7 |
| % provided by National Treasury | 100 | 100 | 92 | 100 | 100 |

Source: Data taken from the DNER's annual budget performance balance sheets

- 4.15 According to Table IV-2, the DNER increased maintenance in 1995 and 1996. The average amount of resources spent on maintenance in the last two years is equivalent to US\$123.2 million which, compared with an average US\$71.1 million over the first three years of the period represents an increase of 71.8%. In addition, almost the entire amount came from National Treasury transfers. If the DNER maintains the overall spending average of 1995 and 1996 for the system it operates, it may be able to increase its investments in cleaning, patching, and sealing operations to US\$3,500 per km by the end of 2001 (see paragraph 3.26).

5. Cofinancing with the World Bank

- 4.16 The financing arrangement for this operation provides for contributions of 40% from the Bank, 40% from the World Bank, and 20% from the Brazilian government. Two thirds of the resources from the National Treasury will be used for finance charges and engineering designs and studies. The World Bank loan was approved on June 12, 1997.

V. FEASIBILITY OF THE PROGRAM

A. Technical feasibility

- 5.1 Of the project studies in the program sample, 50% were conducted based on evaluation, calculation, and sizing criteria and methodologies that are compatible with modern practices and internationally accepted engineering standards. To ensure a similar level in the short term for the remaining 50%, a review procedure was established and consulting services were hired. The consultants were instructed to conduct studies to review alternatives and select the most cost-effective from among those listed in the catalogue of pavement rehabilitation solutions. The findings are based on recently-conducted field measurements and surveys that identified the necessary repairs or additional construction of drainage works, the need for and viability of building a third lane to ease traffic and prevent accidents along certain segments, the most essential works for reducing environmental degradation, and the traffic safety devices to be installed at intersections and in urban areas. The sample thus supplements the HDM-obtained cost information, since the model does not account for those other needs.
- 5.2 Although the proposed works do not involve any construction-related complications, attention will have to be paid to works in urban areas, so that traffic safety measures can be implemented and any interference with public service facilities anticipated.
- 5.3 The program will impose a heavy workload on the technical units of the DNER and of some of the DERs, particularly for project review and approval and in terms of resolving any problems that may arise during construction, requiring adjustments and design changes. Accordingly, resources are included under the program to provide technical assistance to those units and to support the work of available staff.

B. Institutional feasibility

- 5.4 The program will be executed through the formal structures of the DNER and the transportation departments of the coexecuting states, which have the capacity to execute programs of this type and have had extensive experience doing so. Nevertheless, to ensure that all the activities to be undertaken are properly planned and coordinated, those agencies will set up program coordinating units (UECPs). The DNER set up the UCCP through Governmental Decree 73 of January 22, 1997. In addition, where deemed necessary, the UECPs will have the human and technical resources they require to perform their functions. Furthermore, they will be supported by consulting firms specializing in the administration of projects financed by international organizations. In view of the foregoing

and considering the additional measures that will be taken to strengthen the DNER, such as staff training, the proposed institutional framework is deemed to adequately satisfy the Bank's requirements for execution of this type of program.

C. Financial feasibility

- 5.5 The financing arrangement for the proposed operation provides for limiting the National Treasury's participation to just US\$150 million, to be disbursed over four years. This figure was reckoned after discounting the IDB participation and World Bank cofinancing from the total cost of the program and is equivalent to approximately 5.6% of Brazil's annual investments in transportation.
- 5.6 The World Bank cofinancing was approved on June 12, 1997. According to the federal government's "1996-2001 multiyear plan" for this operation's execution period, the fiscal impact of the US\$150 million local counterpart over the next four years, will be as follows:
- a. The amounts allocated to infrastructure and transportation are US\$85.7 billion and US\$13.4 billion, respectively.
 - b. The US\$150 million in local counterpart funding represents merely 1.1% of the budget allocated to the transportation sector for the 1996 to 2001 period, a manageable amount inasmuch as the federal government considers the proposed operation to be the most important transportation project and has given it the highest priority.
- 5.7 Under the proposed financing arrangement, a large portion of the local counterpart will be provided by the World Bank cofinancing. The National Treasury's contribution will average less than US\$40 million per year for a high priority project, and there should be no problem with the timely provision of the local counterpart.

D. Economic feasibility

- 5.8 The projects were planned and economic analysis performed at two different levels: system-wide for the plan as a whole and by individual segment for the proposed phase one sample. The Highway Design and Maintenance Model and Expenditure Budgeting Model (HDM-III/EBM) were used to size the DNER's rehabilitation plan. Adjustments were made based on recommendations arising from recent studies that will be included in the next version of the model (HDM-IV). The impact of various levels of investments and rehabilitation policies were simulated for 41,000 km in the federal system, except for 10,400 km which would be rehabilitated by private-sector concessionaires.

- 5.9 The HDM-III/EBM models make it possible to prioritize investments for the system and to establish an indicative schedule for their implementation. However, the models are not appropriate for identifying operations on individual segments and their results are not necessarily consistent with the engineering study recommendations for those segments. In the case of the Brazilian system, the discrepancies are compounded because a heuristic model is involved that has to reduce the 41,000 km in the system to a manageable number of "homogenous" segments. The budget cap established - US\$225 million per year - accentuates the differences between the findings at the macro level and the engineering designs. Lastly, when the simulations were made at the start of program formulation, recent data on pavement deflection and cracks in individual segments were not yet available and had been estimated through sampling.
- 5.10 The base-case scenario for analysis of each segment and system-wide simulations specified routine maintenance along the entire length of the system and patching of 100% of the potholes, without any further operations until pavement reconstruction was needed. The four alternative scenarios would avoid the need for reconstruction through operations such as pavement overlays or surface treatment, with variations in terms of the frequency of the operation and sizing on the basis of traffic volume and composition.
- 5.11 The sample analyzed consisted of 37 segments for which engineering designs were available, totaling some 2,200 km. The availability of the designs made it possible to include the costs rehabilitating masonry works and correcting environmental degradation and critical points. Such costs are estimated separately and are included in the HDM as exogenous costs.

1. Findings

- 5.12 HDM-III/EBM runs indicated that financial investments of less than US\$200 million per year during the next four to five years would be insufficient to halt system deterioration and that investments of US\$300 million per year would be necessary to reduce the percentage of the system comprising segments in poor condition ($IRI > 5$) to 1% in four years. To simulate additional scenarios, the figure of US\$225 million per year for the entire system was selected.
- 5.13 The simulation involving investments of US\$225 million per year indicated that by year three of execution US\$600 million earmarked for phase one works would be spent. An investment of US\$300 million per year would make it possible to complete phase one in just two years (an optimistic scenario for a major program that includes coexecuting agencies).
- 5.14 This simulation recommended works on some 3,580 km of highways to be transferred to the states, but excluded segments that some states considered essential if they were going to agree to

negotiations on the transfers proposed by the DNER. Next, budget caps for the system to be transferred to the states were simulated. It was found that with US\$50 million per year in investments on these roads, some 3,800 km of roads to be transferred could be rehabilitated. Segments whose exclusion would create additional problems for the negotiations with the states were included in the scenario. The system-wide analysis was then based on two subsystems and two different budget caps: (i) US\$175 million in annual investments for the 28,000 km that would remain under DNER jurisdiction; and (ii) US\$50 million for the 13,000 km to be transferred to the states.

| TABLE V-1 Economic rate of return on investments in rehabilitation works Phases I and II | | | | | |
|---|-----------|--|---|--|---|
| System | Km | NPV @ 12% 20 years (US\$10⁶) | NPV @ 12% 4 years (*) (US\$10⁶) | EIRR 20 years (%) | EIRR 4 years (*) (%) |
| Total US\$225x10 ⁶ /year | 13,125 | 9,363 | 4,611 | 104 | 72 |
| DNER system US\$175x10 ⁶ /year | 10,368 | 7,661 | 3,821 | 109 | 79 |
| System for states US\$50x10 ⁶ /year | 3,781 | 1,750 | 752 | 103 | 74 |

(*) Benefits counted until the next intervention on the segment.

- 5.15 The economic internal rates of return (EIRRs) for rehabilitation projects are typically high. Without overlays or surface treatment, vehicle operating costs, patching costs, and, subsequently, the costs of each project all increase (the segment will require reconstruction at a cost of US\$150,000/km instead of US\$15,000/km for double surface treatment and US\$70,000 for a 5-cm-thick overlay). In the specific case of the DNER's rehabilitation plan, the EIRRs are so high that the concept itself becomes less relevant. As shown in Table V-1, the EIRRs range from 72% for the works in the system to be transferred to the states to 79% for the system that will remain under DNER jurisdiction (considering a period of four years). There is also an indication of underinvestment with a budget cap of US\$225 million per year, because the program's net present value increases when investments of US\$300 million per year are made.
- 5.16 The system that remains under DNER jurisdiction is more heavily traveled and the EIRR for its rehabilitation works is higher than the EIRR for the whole set of segments slated for transfer to the states. However, both rates are very high and the relative difference is small, so the distortion arising from the second budget cap does not appear to be very significant.

2. Sensitivity analysis

- 5.17 The EIRRs are high enough to indicate that the program's feasibility as a whole would not be affected by benefit or cost variations of the size usually simulated in a sensitivity analysis. Accordingly, the 37 segments of the sample were examined to determine whether the least profitable ones would be very sensitive to normal adverse situations. The lowest EIRR found was 16.8%, which would still be acceptable with a cost increase of 20% (EIRR = 14.4%).
- 5.18 Although the HDM-III/EBM models were used for all the calculations, the EIRRs produced before and after the engineering design data were available differed widely. Most EIRRs calculated on the basis of field data were higher than those estimated previously from data in the DNER's database, but there were large variances in both directions. The greatest differences are attributed to field measurements done at the segment during preparation of the engineering designs, in which actual pavement cracking and deflection differed from earlier estimates. The costs also presented significant variations between the design data and the previous estimates, based on the condition of the pavement and the additional works required (such as the construction of shoulders and works to correct drainage problems, environmental degradation, and critical points).

3. Weight control

- 5.19 The DNER's vehicle weight control plan, which would be partially financed by the Bank, was examined. The limits established under Brazilian legislation were found to be reasonable and the institutional conditions for operating a weight control system were adequate.

4. Poverty targeting

- 5.20 According to the Eighth Replenishment document (AB-1704), the proposed program does not meet the criteria for poverty-targeting, either geographically or in terms of its beneficiaries, and does not specifically target women.

E. Social and environmental feasibility

- 5.21 The proposed program will have a positive and significant impact by repairing critical environmental damage along the segments where rehabilitation works will be carried out. In addition, new regulations will be enacted and training activities will be conducted to disseminate their implementation.
- 5.22 The program's highway works will have a localized, foreseeable, and reversible negative impact of low- to mid-level intensity. The contracts include the following measures: (i) environmental damage

will be repaired where it exists; (ii) the effects of the use of quarries, asphalt plants, and other sites affected by the works will be mitigated; and (iii) signs that works are under way and traffic safety devices will be installed. In addition, under the contracts, payments will only be made and performance bonds returned if these measures have been implemented. No cases of involuntary population resettlement have been identified in connection with the proposed works; the Bank's policies will apply if any are. The operation is therefore viable from the social and environmental standpoints.

F. Environmental recommendations

- 5.23 For the proposed environmental measures to be adequately implemented, it is recommended that the loan contract include the following contractual clauses.
- 5.24 Prior to the first disbursement, the executing agency will present evidence to the Bank that it has hired the environmental specialists in the consulting firm's team that will support program execution. It will also present to the Bank the final version of the program's Operating Manual, specifying, *inter alia*, the environmental procedures and regulations to be followed by the states that will be coexecuting the program.
- 5.25 Within three months after signature of the contract, the executing agency must submit evidence to the Bank that it has hired the environmental advisors for the DNER's Environmental Unit.
- 5.26 Within six months after signature of the contract, the executing agency will submit evidence to the Bank that it has initiated the training on environmental assessment of highway projects and the process of hiring consultants for the study on the environmental degradation of the section of the paved federal system that is not included in phases one or two of the highway rehabilitation plan.
- 5.27 Within 12 months after signature of the contract, the executing agency will submit evidence to the Bank that it has conducted the training course on environmental evaluation of highway projects and that consultants have been hired to prepare the contingency plan for emergencies involving the highway transportation of hazardous materials.
- 5.28 Within 24 months after signature of the contract, the executing agency will submit to the Bank: (i) evidence that the Environmental Unit at the DNER has the staff and other resources necessary to perform its functions; (ii) the contingency plan for emergencies; and (iii) the study of environmental degradation along federal highways not included in phases one and two of the program.
- 5.29 Within 30 months after signature of the contract, the executing agency will submit to the Bank evidence that the training on

environmental assessment and management of highway projects has been completed.

G. Risks

- 5.30 The main risk for timely implementation of the proposed operation is the fact that there are several agencies involved, with the coordination and supervision problems this entails. To minimize this risk, the following measures have been taken: (i) bidding procedures and documents have been standardized; (ii) technical assistance will be provided to the DNER and, to a lesser extent, to the DERs; (iii) no counterpart contribution from the participating states will be required; and (iv) resources have been included for timely preparation of additional projects to enable the DNER to carry out alternative works if a state acting as coexecuting agency experiences delays in being included in the program.
- 5.31 The components involving the transfer of highway maintenance operations to the states and the private sector are the most sensitive to institutional problems. Accordingly, concessions to be granted by the DNER and the states will be monitored in order to guarantee the necessary maintenance funds to avoid deterioration of the roads, in case of significant delays. Either the participating states or the federal government may provide such funds.
- 5.32 The transfer of responsibilities for highway maintenance and operation from the DNER to the states basically depends on the willingness of the governors to receive them and the effectiveness of the negotiations between them and the federal government's agents. This process may be expedited by the possible approval by Congress of the amendment that has been proposed to establish a highway maintenance fund. The current legal instrument for transfer of responsibility, the delegation agreement, may be replaced by a permanent transfer mechanism if Bill 1,176 becomes law.
- 5.33 These risks are manageable since not transferring the highways to the states will not prevent the DNER from rehabilitating the highways or increase the costs thereof. Conversely, delays in the privatization component would result in an increase in costs that the DNER would have to defray during phase two of the rehabilitation plan.
- 5.34 The DNER depends on other decision-making levels for its budgetary allocations for maintenance, making it vulnerable to budget cuts, especially during periods of macroeconomic adjustment, as has occurred in the past. The medium-term solution to this problem would be the establishment of a highway fund (a proposal currently being discussed in the legislature) or greater autonomy, which could be obtained through the proposed restructuring of the Ministry of Transportation, the DNER, and the MARE, to be supported by the Bank in another operation (the program for modernization of

the federal State in Brazil, BR-0220). Without adequate funding on a stable basis for the necessary maintenance and investments, there will be a significant risk for long-term maintenance. The risk is considered manageable in the short term, given the fact that the allocations for 1995 and 1996 improved over the previous years and that in two years the Bank may evaluate performance in this respect before approving phase two of the program.

LOGICAL FRAMEWORK
PROGRAM FOR FEDERAL HIGHWAY REHABILITATION AND DECENTRALIZATION— PHASE ONE
(BR-0195)

| OBJECTIVES | INDICATORS(*) | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| Reduce operation costs on paved highways. | Average vehicle operation costs will decrease from US\$0.42 per vehicle/kilometer in 1/1997 to US\$0.415 by 12/1998, to US\$0.41 by 12/1999, to US\$0.405 by 12/2000, and to US\$0.40 by 12/2001. | HDM, DP/DNER runs, with constant traffic composition, input prices, and system components. | |
| Rehabilitate highways and reduce accident rates. | <ol style="list-style-type: none"> 1. Km of highways rehabilitated and IRI indices and deflection and cracking rates as set forth in Appendix 1 hereto. 2. Average accident rate per 100,000 vehicles drops by 30% at critical points where interventions performed one year after corrections made in each particular segment. | <ol style="list-style-type: none"> 1. DP/DNER database for IRI, deflection, and cracking for 3/97; future data to be obtained through a revised system to be implemented 2. By 12/98, a system for monitoring accidents caused by highway deficiencies at critical points on the segments in which interventions performed will be implemented and maintained on an ongoing basis to quantify the impact of the improvements made under the rehabilitation projects. Accident rates will also be monitored on all program segments. | <ol style="list-style-type: none"> 1. The necessary funds for proper maintenance and administration are available to ensure sustainability of the highway system |
| <p>RESULTS</p> <p>Environmental improvements)</p> <p>Environmental liabilities corrected on rehabilitated highways</p> <p>Strengthening of the weight control system in the states</p> | <ol style="list-style-type: none"> 1. Critical environmental damage corrected according to specifications in the Environmental Operations Manual 2. In 6/97 there were 25 stationary weigh stations and 3 mobile scales in operation. By 12/99, there will be 44 stationary stations and 28 mobile scales. | <ol style="list-style-type: none"> 1. Certificate of acceptance of the respective works by the DNER 2. Certificate of receipt of the equipment and services, and monthly DNER progress report on weighing | <ol style="list-style-type: none"> 2. Administrative and legal support maintained for the axle-weight control program |

LOGICAL FRAMEWORK
PROGRAM FOR FEDERAL HIGHWAY REHABILITATION AND DECENTRALIZATION— PHASE ONE
(BR-0195)

| OBJECTIVES | INDICATORS(*) | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| <p>(strengthening)</p> <p>outsourced to private sector bidding</p> <p>transferred to the states</p> <p>performance-based maintenance contracts on</p> <p>staff trained and properly receiving training received.</p> <p>technical assistance and studies, staff trained, and results in the job by DNER</p> | <p>1. By 6/97, 856 km of highways had been outsourced by the DNER through competitive bidding and concessions for rehabilitation, operation, and maintenance. The DNER will outsource the following cumulative length of highways, either directly or by delegation: by 12/97, 2,000 km; by 12/98, 4,000 km; by 12/99, 6,000 km; by 12/00, 8,000 km; and by 12/01, 10,000 km.</p> <p>2. The following cumulative length of highways will be decentralized to the states (paved and unpaved): by 12/98, 5,000 km; by 12/99, 8,000 km; by 12/00, 12,000 km; and by 12/01, 17,500 km</p> <p>3.1 By 12/98, 5% of the federal highway system will be maintained under contracts for performance-based routine maintenance; by 12/00, 20%; and by 12/01, 50%</p> <p>4. Within 30 months after signature of the contract, staff will be trained and goals achieved, as set forth in the 7/97 terms of reference agreed upon with the Bank regarding:</p> <p style="margin-left: 20px;">a. environmental concerns in highway projects</p> <p style="margin-left: 20px;">b. highway safety</p> <p style="margin-left: 20px;">c. project preparation procedures and standards</p> <p style="margin-left: 20px;">d. quality control of highway works</p> <p style="margin-left: 20px;">e. highway maintenance management</p> <p style="margin-left: 20px;">f. auditing and accounting</p> <p>5a. Indicators for technical assistance for concessions and training in pavement management systems for DNER and DERs to be provided by World Bank and UCCP</p> | <p>1.1 DNER Highway Concession Division files</p> <p>1.2 The Concession Division will monitor the bidding procedures conducted by the DERs and will submit a specific report to the Bank.</p> <p>2. Agreements signed for transfer of highway management to the states; DNER/Ministry of Transportation files</p> <p>3. DNER Maintenance Division files; DNER progress reports</p> <p>4. Reports on course completion and performance monitoring</p> <p style="margin-left: 20px;">a.-f. UCCP/DNER progress reports and final report</p> <p>5a. UCCP/DNER progress reports and final report</p> | <p>1. The toll system continues to be in place and the private sector remains interested in concessions.</p> <p>2. Negotiations are successful for transfer of management from the Ministry of Transportation to the states.</p> <p>3. DNER resources not included in the program will be available on a continuing basis to pay contractors.</p> <p>4. There is (i) a proper salary structure to retain staff trained; and (ii) administrative and budgetary support for their training.</p> |

LOGICAL FRAMEWORK
PROGRAM FOR FEDERAL HIGHWAY REHABILITATION AND DECENTRALIZATION— PHASE ONE
(BR-0195)

| OBJECTIVES | INDICATORS(*) | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|--|---|---|--|
| <p>highways offered by Ministry of Transportation in acceptable state of repair and administration by the states</p> <p>equipped and operational</p> <p>auditing system implemented and actively used for program works</p> <p>monitoring of state of repair of the highway system</p> <p>Items 1 and 2 of the upgraded program)</p> <p>projects not included in the program and terms of reference for their preparation prepared</p> | <p>5b. Final reports received and approved by the DNER and accepted recommendations implemented in each area indicated in the terms of reference agreed upon with the Bank in 7/97:</p> <ul style="list-style-type: none"> a. highway engineering b. traffic safety c. environmental protection d. pavement management system e. bridge management system, phase 3 f. highway maintenance management g. advisory services for concession management <p>6. By 12/31/99, 1,500 km of highways to be part of lots to be transferred to the states will be rehabilitated</p> <p>7. See list agreed upon with the Bank</p> <p>8. See terms of reference agreed upon with the Bank in 7/97</p> <p>9. By 12/99, reliable data will be obtained on deflection, cracking, and other parameters needed for proper management of 100% of the federal highway system, with data to be updated biannually thereafter</p> <p>1.1 See detailed program budget and timetable</p> | <p>5b. UCCP/DNER progress reports on the program and official acceptance of final reports by the DNER</p> <p>6. UCCP/DNER progress reports with monitoring of highways actually transferred</p> <p>7. UCCP/DNER progress report</p> <p>8. Idem</p> <p>9. Idem</p> <p>1.1 UCCP/DNER progress reports</p> | <p>5b. Findings of reports put into practice</p> <p>6. Negotiations successful for transfer of highways to the Ministry of Transportation to the states</p> <p>7. Capacity of staff and equipment used</p> <p>1-4 No unfounded complaints are filed resulting in delays in the hiring of staff</p> |

LOGICAL FRAMEWORK
PROGRAM FOR FEDERAL HIGHWAY REHABILITATION AND DECENTRALIZATION – PHASE ONE
(BR-0195)

| OBJECTIVES | INDICATORS(*) | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|--|-----------------------|
| <p>Documents prepared for works and services</p> <p>Documents published, proposals and firms selected</p> <p>For construction and supervision awarded</p> | <p>1.2 As of 6/97, 100% of the documentation for the engineering studies for rehabilitation of the highways to make up the program will require that the project be properly adjusted to the actual condition of the pavement and traffic and will incorporate the low-cost components for environmental protection and traffic safety agreed upon, in addition to the study on alternatives to reduce costs but that would maintain the technical quality of the project. The HDM/EBM models will be used to set project priorities under the program, the year in which they will be carried out, and a preliminary indication of the estimated cost of pavement rehabilitation, to be adjusted according to the above-mentioned study on technically viable alternatives.</p> <p>2-4 See detailed program budget and timetable</p> | <p>1.2 UCCP/DNER progress report</p> <p>2-4 UCCP/DNER progress reports</p> | |

LOGICAL FRAMEWORK
PROGRAM FOR FEDERAL HIGHWAY REHABILITATION AND DECENTRALIZATION— PHASE ONE
(BR-0195)

| OBJECTIVES | INDICATORS(*) | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---------------------------|--|
| through 11 of the institutional component) reference for the studies, services, and training activities ective bidding documents are documents published, proposals and firms selected | 1-3 See detailed program budget and timetable | 1-3 UCCP progress reports | 1-3 No unfounded complaints are f resulting in delays in the hiring |

the goals for the years 2000 and 2001, phase two of the program will have to be carried out

| WORKS: GOALS FOR THE AWARDING OF CONTRACTS AND EXECUTION (in cumulative kilometers) | | | | |
|--|-------|-------|--------|--------|
| Km rehabilitated | 12/98 | 12/99 | 12/00 | 12/01 |
| Permanent federal system | | | | |
| Contracts awarded | 5,000 | 7,500 | 10,000 | 10,000 |
| Works executed | 2,000 | 5,000 | 7,500 | 10,000 |
| System to be transferred to states | | | | |
| Contracts awarded | 1,250 | 2,650 | 3,800 | 3,800 |
| Works executed | 500 | 1,500 | 2,650 | 3,800 |

| GOALS FOR STATE OF REPAIR OF HIGHWAY SYSTEM (in percent of the system) | | | | | |
|---|-------|-------|-------|-------|-------|
| IRI | 03/97 | 12/98 | 12/99 | 12/00 | 12/01 |
| Permanent federal system | | | | | |
| Poor condition (IRI > 5) | 12 | 10 | 7 | 4 | 2 |
| Good condition (IRI < 3) | 34 | 40 | 44 | 46 | 49 |
| System to be transferred to states | | | | | |
| Poor condition (IRI > 5) | 20 | 17 | 12 | 7 | 4 |
| Good condition (IRI < 3) | 36 | 36 | 41 | 42 | 44 |

| PERCENTAGE OF SYSTEM WITH DEFLECTION AND CRACKING BELOW GIVEN LEVELS (to be established during program execution) | | | | | |
|--|--|--|--|--|-------|
| Deflection | | | | | 12/01 |
| < mm | | | | | |
| Permanent federal system | | | | | |
| System to be transferred to states | | | | | |
| Cracks (length less than __%) | | | | | |
| Permanent federal system | | | | | |
| System to be transferred to states | | | | | |

**PROGRAM FOR FEDERAL HIGHWAY REHABILITATION
(BR-0195)
Itemized Bidding Schedule**

| BIDDING PACKAGES | Source of Fund | Total amount (US\$ thousands) | Type of bidding | Number of contracts | Quarter and notice |
|--|----------------|-------------------------------|-----------------------------------|---------------------|--------------------|
| CONTRACTS FOR CONSULTING SERVICES | | | | | |
| and designs | | | | | |
| Group 1 (1,200 km) | Local | 4,200 | Local call for proposals | several | IV/97 |
| Group 2 (1,100 km) | Local | 3,800 | Local call for proposals | several | II/98 |
| supervision | | | | | |
| Group 1 (1,200 km) | IDB/local | 4,500 | International call for proposals | several | IV/97 |
| Group 2 (1,400 km) | IDB/local | 5,400 | International call for proposals | several | III/98 |
| Group 3 (600 km) | IDB/local | 2,200 | International call for proposals | several | III/99 |
| CIVIL WORKS | | | | | |
| rehabilitation works | IDB/local | 108,700 | International call for proposals | several | IV/97 |
| Group 1 (1,200 km) | IDB/local | 126,900 | International call for proposals | several | III/98 |
| Group 2 (1,400 km) | IDB/local | 52,800 | International call for proposals | several | III/99 |
| Group 3 (600 km) | | | | | |
| ment of weigh stations | IDB/local | 8,000 | National competitive bidding | several | II/98 |
| INSTITUTIONAL STRENGTHENING | | | | | |
| | IDB/local | 2,000 | Individual contracts | to be determined | IV/97 |
| al assistance | | | | | |
| Highway engineering | IDB | 300 | Local call for proposals | several | III/97 |
| Traffic safety | IDB | 750 | Local call for proposals | two | IV/97 |
| Technical auditing of highway works | IDB | 200 | Local call for proposals | two | IV/98 |
| Environmental protection | IDB | 2,950 | International call for proposals | four | IV/97 |
| Pavement management system | IDB | 3,300 | International call for proposals | several | IV/97 |
| Bridge management system | IDB | 1,300 | International call for proposals | one | IV/97 |
| Highway maintenance management | IDB | 1,200 | International call for proposals | one | III/98 |
| PROCUREMENT OF EQUIPMENT | | | | | |
| ry equipment | IDB | 400 | International competitive bidding | several | I/98 |
| ontrol equipment | IDB | 7,000 | International competitive bidding | several | II/98 |
| quipment | IDB | 100 | National competitive bidding | several | I/98 |

PROPOSED RESOLUTION

BRAZIL LOAN /OC-BR. REPUBLICA FEDERATIVA DEL BRASIL
(Rehabilitation and Descentralization
of Federal Highways Program - Stage I)

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such contract or contracts as may be necessary with the Republica Federativa del Brasil, as Borrower, for the purpose of granting a financing to cooperate in the execution of a Program for the Rehabilitation and Descentralization of Federal Highways Stage I. Such financing will be for the amount of up to three hundred million dollars of the United States of America (US\$300,000,000) from the Single Currency Facility of the Ordinary Capital resources of the Bank and it will be subject to the "Terms and Financial Conditions" and the "Special Contractual Conditions" of the Executive Summary of the Loan Proposal.