Transport and Environment
A Review of Current Policies and Procedures

Ian G. Heggie

March 1987

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TRANSPORT AND ENVIRONMENT
A REVIEW OF CURRENT POLICIES AND PROCEDURES

by

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March 1987

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ABSTRACT

Most of the Bank's transport projects have typically been concerned with renewing, improving and marginally expanding existing infrastructure (or with providing transport equipment) and this rarely creates measurable disturbances to the ecological system. There are occasions, however, when transport projects can raise important environmental issues and it was accordingly decided to review the way environmental concerns have been dealt with in past transport projects with a view to recommending improvements.

Bank staff generally give careful considerations to potential adverse environmental impacts and take appropriate steps to avoid them. The main environmental policies which the Bank attempts to implement are to: (i) ensure Bank projects are designed and implemented according to sound principles which minimize adverse impacts on the environment; (ii) assist agencies dealing with the environment to strengthen their capacity to plan and manage their own environment; and (iii) support training for operational staff to give them the skills needed to ensure environmental considerations are fully taken into account during the formulation and implementation of Bank projects. A review of transport projects approved since FY80 revealed numerous examples of sound environmental practice, although it also identified some weaknesses.

A brief checklist has been prepared to help guide Bank staff in the identification of potential adverse environmental impacts; in due course this will be expanded into a set of formal guidelines. Steps to avoid, or minimize, adverse impacts are expected to concentrate on adding environmental objectives to the design brief for detailed engineering, adding or amending clauses in standard contract documents, and providing for surveillance and monitoring of long-term impacts. It is also suggested that Bank staff help to strengthen the institutions that deal with the environment in the Bank's member countries, by involving them -- to the extent needed -- in the project processing cycle. It may also be desirable to provide technical assistance to help strengthen these agencies and improve their capacity to formulate and evaluate alternative policy options. With regard to training of operational staff, it has been decided to offer a half-day training seminar to provide transport staff with the skills needed to identify adverse environmental impacts and to formulate remedial measures to deal with them. Finally, it has also been decided that the Transportation Department's Policy Unit would become the focal point for environmental considerations in the sector and would designate an environmental officer to assist in providing operational advice and develop a work program to provide technical support in this area.
# Transport and Environment

**A Review of Current Policies and Procedures**

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I. Introduction

1. Most of the Bank's transport projects have typically been concerned with renewing, improving and marginally expanding existing infrastructure -- or with providing equipment for railways, ports and road authorities -- and this has rarely created measurable disturbances to the ecological system. However, experience has shown that there are occasions when environmental issues may be important in such projects and the Transportation Department (TRP), which is responsible for improving and disseminating the intellectual and conceptual bases for the work of the operations divisions, has accordingly decided to review the way environmental concerns have been dealt with in past transport projects with a view to recommending improvements.
II. General Bank Policy on the Environment

2. During the late 1960's and early 1970's it became apparent that economic development often had damaging effects on the natural environment, reducing its capacity to sustain long-term development and threatening human health and welfare. It was accepted, however, that modifications to the natural environment were needed to achieve social and economic progress and thereby to alleviate poverty and improve human welfare. The close link between sustainable economic development and sound environmental management was recognized during the deliberations of the 1972 United Nations Conference on the Human Environment. The Conference, recognizing that economic development may itself create environmental problems, concluded that developing countries must direct their efforts to development, bearing in mind their priorities and the need to safeguard and improve the environment. The Conference also noted that states should ensure that international organizations play a coordinated, efficient and dynamic role for the protection and improvement of the environment.

3. The Bank showed early concern for the environment and to this end created the post of Environmental Adviser in late 1970 with a mandate "to review every project for its consequences to the environment." In 1973 the Bank expanded these activities by creating the Office of Environmental Affairs, recently renamed the Office of Environmental and Scientific Affairs (OESA), which acts as a Project Advisory Staff Unit under the Vice-President, Operations Policy. As such, OESA provides advice to operations staff and reviews all projects at the Yellow Cover stage to ensure that the environmental aspects of each project have been effectively dealt with.

4. In 1980 the Bank further strengthened its commitment to promote sound environmental policies by signing the Declaration of Environmental Policies and Procedures Relating to Economic Development (attached as Annex 1)\(^1\). This document effectively committed the Bank to attempt to promote environmentally sound economic development by pursuing five broad policies:

- (i) instituting procedures for systematic examination of all the Bank's development activities -- including policies, programs and projects -- to ensure that appropriate measures are proposed to minimize possible environmental problems;

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\(^1\) The Declaration was signed in February 1980 by the African Development Bank; Arab Bank for Economic Development in Africa; Asian Development Bank; Caribbean Development Bank; Inter-American Development Bank; World Bank; Commission of the European Communities; Organization of American States; UNDP; and United Nations Environment Program. The European Investment Bank became a signatory in April, 1983.
(ii) cooperating with governments and other organizations to ensure that appropriate environmental measures are incorporated in the design and implementation of economic development activities; in this connection, to provide technical assistance to develop the indigenous capacity of member countries to plan and manage their own environment;

(iii) giving consideration to project proposals that are specially designed to protect, rehabilitate, manage or otherwise enhance the human environment and the quality of life;

(iv) supporting the training and further education of operational staff in the environmental aspects of economic development;

(v) initiating, and cooperating in, studies leading to improvement of project appraisal methodologies and preparing and disseminating documentation and other material to provide guidance on the environmental aspects of economic development.

5. OESA, which is responsible for implementing the policies proposed under the Declaration, interprets environmental concerns as those pertaining to the natural and social conditions surrounding all organisms, particularly mankind, and including future generations. The principal adverse environmental effects they monitor include water and air pollution, soil erosion, deforestation, damage to unique sites and habitats (especially for endangered species) and damage to mankind's aesthetic and cultural heritage. OESA have environmental staff and they divide their time between screening Bank projects to assess potential environmental impacts and advising on necessary remedial measures to minimize them; helping to formulate technical assistance and loan projects to support environmental improvement in member countries; and preparing guidelines for use by operational staff. Where possible, OESA also attempts to promote better management of renewable resources (e.g., fisheries and forestry), recycling of waste materials, and improve occupational health and safety.
III. **Review of Environmental Considerations in Past Transport Projects.**

6. A brief review of transport projects approved between FY80 and FY85, together with a complete review of those approved in FY86, shows that staff generally give careful consideration to potential adverse environmental impacts and take appropriate steps to avoid them. A review of selected projects is included as Annex 2. For example, the First Transport Project in the Seychelles (approved in FY85) recognized the major environmental impact that major port works can have on the ecology of a small island. The possible impact of dredging operations on coral formations was dealt with by ensuring that tender documents incorporated provisions concerning the control and formation of the bunds to retain the dredged material and deal with discharge of run-off water. Attention was also given to the safe handling of fuel oil and bulk LPG imports. The Chiapas Rural Roads Project in Mexico (approved in FY85) likewise recognized the possible adverse environmental and social consequences of the project and provided for all subproject roads to be examined by the Secretariat for Urban Development and Ecology and it was agreed that no subproject would be considered eligible for Bank financing until it had been cleared by the Secretariat. The Third Highway Project in Nepal (also approved in FY85), which traverses the Karnali Wildlife Reserve, similarly secured a written agreement between the Department of Roads and the National Parks and Wildlife Office, concerning the management and regulation of the road both during construction and afterwards.

7. This trend was maintained in projects approved in FY86. For example, the Rural Transport Sector Project in Colombia provided for a part-time marine biologist to advise the engineer on the ecological aspects of dredging pilot waterways; the Second Highway Maintenance Project in Gambia, which included support for workshop management, specifically drew attention (in the terms of reference for consultants) to the need to improve safety at work; while the Multiproject Loan in Vanuatu (cofinanced with the Asian Development Bank) required that tender documents include provisions requiring the contractors to give special attention to the possible impact on the environment of construction work on wharves and landing stages.

8. However, although the review revealed numerous examples of sound environmental practice, it also identified some weaknesses: a number of projects included vague provisions for dealing with adverse environmental impacts, while some -- although perhaps dealing with environmental considerations in a satisfactory manner -- failed to clearly record this in the Staff Appraisal Reports (SAR).\(^2\)/. The review of FY86 projects showed

\(^2\)/ OMS 2.36, *Environmental Aspects of Bank Work*, states that the SAR should describe any environmental measures proposed; if none are required, this should also be noted in the SAR.
that nearly a quarter identified possible adverse environmental impacts, took steps to remedy them and clearly recorded this in the SAR. About half represented projects that were unlikely to have adverse impacts and the SAR either stated this, or made no mention of the environment. The remainder, some of which might have raised environmental issues, did not mention environment in the SAR, or simply stated, "The project is not expected to have any adverse effect on the environment." The purpose of the remainder of the paper is to ensure that all future transport projects conform to the standards judged to reflect sound environmental practice and clearly reflect this in the SAR.
IV. Proposed Strengthening of Environmental Considerations

1. Potential Environmental Impacts of Transport Projects

9. The Bank's environmental concerns cover both the natural as well as the social conditions surrounding all organisms. The environmental impacts of a project therefore need to be examined in terms of its (i) physical impact (i.e., the effect on noise levels, water quality, soil erosion, flora and fauna, etc.); and (ii) socio-economic and/or cultural impacts (i.e., the effect on settlement patterns, tribal organization, commercial outlook, etc.). Both impacts are important and will be discussed concurrently in the following sections.

10. Most of the transport projects supported by the Bank have limited adverse environmental impacts; on the other hand, some produce significant environmental impacts which call for a full impact assessment, carefully designed remedial measures and subsequent monitoring to ensure these measures are effective. The review of FY86 transport projects suggests that about 10 percent of the Bank's transport projects are likely to have major environmental impacts; the remainder will generate limited impacts for which relatively simple remedial measures are usually available. Major environmental impacts are generally associated with provision of completely new transport facilities, or with significant expansion of existing ones. Rehabilitation and maintenance of facilities rarely generates major impacts, unless the project results in substantial increases in traffic, or produces waste material (e.g., old road pavements) which cannot easily be recycled. Environmental impacts can furthermore have positive as well as negative effects on the environment and sound environmental practice consists of enhancing positive impacts, while minimizing adverse ones.

11. The major environmental impacts likely to be encountered in practice are as follows:

(i) Direct Impacts

(a) Land-use patterns. New facilities, or significant expansion of existing ones, nearly always have a significant impact on existing land-use patterns. There is generally an increase in land-take and this may result in demolition of property and resettlement of displaced persons. The property may furthermore include historic structures, or other buildings of cultural and aesthetic importance. In addition, improved access usually affects the usage of land (e.g., agricultural land converted to commercial uses) and hence its value and it is important to ensure these impacts are compatible with long-term plans for development of the area's natural resources.

3/ In such cases, the procedures set out in O.M.S. 2.33 should be followed.
(b) Severance. Major transport corridors may sever communities, disrupting established trading patterns and breaking social ties. Even relatively minor facilities may interfere with traditional movement patterns and migratory animal routes and can increase vehicle-pedestrian conflict. Such severance is particularly important when transport corridors cross game reserves and national parks.

(c) Noise, air and water pollution. New airports and urban roads typically generate noise and vehicle exhaust emissions contribute to urban air pollution, while facilities handling bulk materials like fertilizer, phosphate rock and sulphur may lead to air and water pollution. Lead-based paint on bridges and other steel structures can likewise lead to water pollution, while transport related activities like operation of an asphalt plant, may contribute to air and water pollution.

(d) Marine resources. Dredging and harbor works can have a significant impact on the coastal current regime, on coastal and marine erosion and on marine flora and fauna. In highly polluted harbors, the dredging spoil may also have toxic properties. The same applies to similar works on inland waterways.

(e) Drainage. Earthworks, retaining structures and culverts may affect erosion, local drainage and run-off patterns, and cause pollution of nearby water resources (transport projects rarely affect large-scale watershed management). Earthworks also affect slope stability and this may result in landslides.

(f) Solid and liquid waste disposal. Disposal of workshop waste, the run-off from vehicle washing facilities, and the waste from ships may lead to pollution of local water resources. The disposal of waste produced when facilities are rehabilitated may likewise cause water pollution and can also be unsightly.

(g) Visual pollution. Transport facilities may be unsightly and landscaping, tree planting and other measures may be an appropriate way of improving visual appearance.

(h) Working conditions. The civil works associated with Bank projects -- together with the workshops, ship repair facilities, etc., financed under such projects -- offer numerous opportunities for improving working conditions, if only by requiring all work to comply with national labor codes and/or health and safety regulations^4^.

^4^ Practically all the Bank's member countries have some type of written code governing these activities.
(ii) Indirect Impacts

(a) Spread of disease. It is often not appreciated that the presence of construction workers -- and of potential new settlers in areas opened up by new transport facilities -- may contribute to the spread of insects, pests and contagious diseases (see Annex 3).

(b) Flora and fauna. On some occasions transport facilities improve access to fragile ecological zones, or to areas containing endangered species of flora and/or fauna. At a more mundane level, improved access may also facilitate illegal logging and hunting.

(c) Socio-cultural impacts. New, or substantially improved transport facilities can have both positive and negative impacts on indigenous populations: on the one hand, the fragile culture and tribal organization of indigenous people may conflict with the customs and ideas of new settlers and administrators, while, conversely, the exchange of ideas associated with improved access may improve farming practices, public health and other important socio-economic attributes.

11. The above list is neither exhaustive, nor does it represent the kind of impacts likely to affect each and every transport project; it is simply indicative of the sort of impacts that may be encountered in practice.

2. Proposed Environmental Policy Framework.

12. The following policy framework has been derived from the principles laid down in The Declaration of Environmental Policies and Procedures Relating to Economic Development (see para. 4), which established the general policies which signatories undertook to try and implement as part of their contribution to the economic development of their member countries. With regard to the transport sector, the substance of the Declaration can be reduced to four broad principles as follows:

(i) ensure that Bank projects are designed and implemented according to sound principles which minimize adverse impacts on the environment (both physical and social).

(ii) assist agencies dealing with the environment in the Bank's member countries to strengthen their capacity to review and formulate environmental policies and also to plan and manage their own environment.

(iii) support training for operational staff to give them the skills needed to ensure that environmental considerations are fully taken into account during the formulation and implementation of Bank projects.

5/ In such cases, the procedures set out in Operational Policy Note (OPN) 11.02 should be followed.

6/ In such cases, the procedures set out in O.M.S. 2.34 should be followed.
(iv) participate in studies designed to improve appraisal methodologies and otherwise assist in providing guidance to project staff on the environmental aspects of economic development.

13. The studies noted in item (iv) (e.g. monitoring and controlling air and water pollution, improving safety on construction sites, etc.) are likely to have implications which go well beyond the transport sector. It may thus be inadvisable for the transport sector to initiate such studies in isolation; it would be preferable for the sector to participate in such work initiated by OESA and others. The transport sector may find it necessary on occasion to promote environmental projects per se (para. 4, item (iii)); however, most environmental actions will continue to be financed as regular project components.

14. The above policy framework provides general guidance on the sort of issues staff might consider when formulating Bank projects; the following section attempts to be more specific and to translate these policies into the operational procedures required to implement them.

3. Procedures for Implementing Environmental Policy.

15. Responsibility for applying sound environmental principles rests with regional transport staff. To guide them in this work an indicative checklist has been attached as Annex 4, listing the most important impacts likely to be encountered in practice. It is proposed to replace this in due course with a set of formal Guidelines to be jointly prepared by TRP and OESA. With this as background, staff need to decide: (a) are there likely to be any adverse impacts and, if so, can they be dealt with by amending the design of the project and/or by including suitable provisions in the contract documents; (b) are some of the impacts and/or remedial measures unclear and is some kind of technical assistance needed to process the project; or (c) is the project likely to have major impacts that call for a full environmental analysis? Based on the review of transport projects approved since FY80, it is expected that about 80 percent of transport projects would fall into category (a) and about half of these would require no specific action, and that 10 percent each would fall into categories (b) and (c).

16. The limited technical assistance needed to process projects in category (b) can probably be provided by the lead advisers assisted, as necessary, by staff from OESA. Such assistance is likely to take the form of advice, and review of project documents, and would not involve consultant support or site visits. The projects in category (c), on the other hand, are likely to involve some kind of environmental impact assessment, formulation of remedial measures in consultation with agencies outside the transport sector, and presentation of project priorities in the form of an

7/ Under OPN 1.01, a lead adviser is designated for each project to ensure, among other things, that Operations Policy Staff and Energy and Industry Staff (including OESA) have an opportunity to comment on the project; the lead adviser also acts as the principal channel for these
environmental impact tableau. This will nearly always require specialist consultant assistance, with the lead advisers and OESA providing logistical support to draw up terms of reference, recruit consultants and guide their work.

17. Most of the remedial measures needed to minimize adverse environmental impacts (or, on occasion, to enhance beneficial ones) involve adding environmental objectives to the design brief for detailed engineering, adding or amending clauses in standard contract documents, and providing for surveillance and long-term monitoring of impacts that may require remedial measures during implementation or operation of the project (usually by an environmental agency). In the case of transport projects with important social impacts, it may also be necessary to agree on regulatory measures and enforcement arrangements, perhaps to prevent illegal logging, or to regulate the influx of new settlers into an area. One of the best ways of ensuring that remedial measures are incorporated in the project design is by including this requirement in the outline terms of reference for detailed engineering (stating clearly the nature of the environmental attention required) and specifying that all remedial measures should be reflected in subsequent contract documents. In the case of regulatory measures and enforcement arrangements, it is generally preferable to make initial action on these measures a condition of appraisal, negotiation, or Board presentation.

18. One of the best ways of helping to strengthen the institutions dealing with environment in the Bank's member countries, is by establishing regular liaison with them. Most developing countries have one or more agencies dealing with the promotion and enforcement of environmental laws and legislation, advising planning ministries on the environmental aspects of projects, or are part of line-agencies discharging specific environmental responsibilities (e.g., implementing local building regulations, health and safety at work, management of water quality, management of forest land, etc.). These groups generally operate under constitutional, legislative, or other legal provisions and contact between Bank staff and these agencies -- and between them and executing agencies -- helps to strengthen them by publicizing their existence and involving them more closely in the project processing cycle. This is particularly important when the above provisions include the need to hold public consultations and Bank staff should utilize these provisions whenever they are appropriate.

19. While dealing with the institutions responsible for the environment in the Bank's member countries, various weaknesses may be identified that could be addressed under a Bank loan. Such weaknesses may relate to the need for specialized training (e.g., in environmental impact assessment), preparation of studies to explore options and possible solutions to environmental

problems, examination of various policy options and quantification of their various costs and benefits, provision of equipment for measuring and/or monitoring environmental impacts, or -- more fundamentally -- to draft regulations and improve the administrative framework for dealing with the environment. Minor institutional strengthening components could be considered for financing under transport loans, provided they do not lead to a conflict over the choice of executing agency; more important components would normally need to be financed under loans in other sectors (e.g., regulation of road access to forest land under forestry loans and regulation of marine resources -- with regard to dredging -- under fisheries projects), or as free-standing technical assistance loans to be processed by OESA.

20. The training of operational staff is generally handled by the Training and Development Division of the Personnel Management Department. However, in the case of environmental considerations, training courses are still in their infancy and are currently confined to: (i) a brief presentation on the Bank's environmental policy given as part of the orientation seminars for new staff, and (ii) a general one-hour overview of environmental issues included in the Advanced Lending Operations Seminar (given for the first time in November 1986). There is thus no training course available to enable transport staff to acquire or upgrade the skills needed to identify adverse environmental impacts and to formulate remedial measures to deal with them. To fill this gap, an annual half-day training seminar will be organized to provide training for operational staff. The training course will then be supplemented by selected seminars during the course of the year on more specialized topics like marine pollution9/, handling of hazardous materials, etc. An outline for the proposed seminar is attached as Annex 6.

4. Administrative Implications of Environmental Policy

21. It is not expected that implementation of the above environmental policy would have any significant operational implications for staffing or budgeting. The major impact would be on TRP, which will set aside about one - two weeks of staff time to provide the annual training seminar. The TRP Policy Unit will be the focal point for environmental considerations in the transport sector and will designate one member of staff as an environmental officer to support the lead advisers and develop a work program to provide technical support in this area.

9/ A seminar on Environmental Aspects of Maritime Transport and Marine Terminals has already been scheduled for March 1987.
V. Conclusions and Recommendations

22. Most transport projects supported by the Bank -- generally rehabilitation and maintenance of facilities -- have limited adverse environmental impacts; the impacts are furthermore well understood and remedial measures can be prescribed without difficulty. Major impacts are generally associated with provision of new transport facilities, or significant expansion of existing ones. Transport staff generally give careful consideration to potential adverse environmental impacts and take appropriate steps to avoid them. A review of transport projects approved since FY80 revealed numerous examples of sound environmental practice; however, it also identified some weaknesses.

23. Responsibility for applying sound environmental principles rests with regional transport staff. A brief checklist has been prepared to guide them in identification of potential impacts; in due course this will be expanded into a set of formal guidelines. Advice on environmental matters will generally be provided by the lead advisers in TRP assisted, as necessary, by staff from OESA. Remedial measures are expected to concentrate on adding environmental objectives to the design brief for detailed engineering, adding or amending clauses in standard contract documents, and providing for surveillance and long-term monitoring of impacts that may require remedial measures during implementation or operation of the project.

24. It is suggested that transport staff help to strengthen the institutions that deal with the environment in the Bank's member countries, by establishing regular liaison with them and involving them, to the extent needed, in the project processing cycle. It may also be desirable on some occasions for transport projects to include a technical assistance component to help strengthen these environmental agencies and help them to review the various environmental policy options available.

25. There are no Bank training courses which enable transport staff to acquire, or upgrade the skills needed to identify adverse environmental impacts and to formulate remedial measures to deal with them. An annual half-day training seminar will therefore be organized to provide training for operational staff. The TRP Policy Unit will be the focal point for environmental considerations in the transport sector and will designate one member of staff as an environmental officer to support the lead advisers and develop a work program to provide technical support in this area.
ANNEX 1

DECLARATION OF ENVIRONMENTAL POLICIES AND PROCEDURES
RELATING TO ECONOMIC DEVELOPMENT

RECOGNIZING THAT, the major environmental problems of the
developing countries are not necessarily of the same nature as those of
developed countries in that they are problems which often reflect the
impacts of poverty which not only affect the quality of life but life
itself;

AND WHEREAS, economic development is essential to the
alleviation of major environmental problems by providing for an integral
relationship between societies and their environment;

REALIZING also that such economic development should be
pursued in such a manner as to avoid or minimize environmental problems
peculiar to it;

CONVINCED, that in the long-run environmental protection and
economic development are not only compatible but interdependent and
mutually reinforcing;

ACKNOWLEDGING, that the need for environmentally sensitive and
responsible development has become more important and urgent in light of
increasing population and concomitant pressures on the earth's resources
and life-supporting ecological systems in some areas;

ACKNOWLEDGING, the sovereign right of governments to determine
their own priorities and development patterns;

RECALLING, that the States which adopted the Declaration of
the United Nations Conference on the Human Environment (Stockholm, 1972)
stated their common conviction (Principle 25) that they will ensure that
the international organizations play a coordinated, efficient and
dynamic role in the protection and improvement of the environment;

CONSIDERING, furthermore, that international development
assistance institutions have, along with their member governments, a
responsibility to ensure the sustainability of the economic development
activities financed by them;

THEREFORE, the undersigned declare that they:

1/ The Declaration was prepared by the United Nations Environment
Program.
I.


II.

Will, to the best of their abilities, endeavour to:

1. Institute procedures for systematic examination of all development activities, including policies, programs and projects, under consideration for financing to ensure that appropriate measures are proposed for compliance with Section I above.

2. Enter into cooperative negotiations with governments and with concerned and relevant organizations and agencies to ensure integration of appropriate environmental measures in the design and implementation of economic development activities.

3. Provide technical assistance, including training, on environmental matters to developing countries, at their request, thus developing their indigenous capacity, and facilitating technical cooperation between developing countries.

4. Give active consideration to project proposals that are specially designed to protect, rehabilitate, manage or otherwise enhance the human environment, the quality of life, and resources thereto related.

5. Initiate and/or otherwise cooperate in research and studies leading to improvement of project appraisal methodologies, including cost-benefit analysis, of environmental protection measures.

6. Support the training and informing of operational staff in the environmental dimension of economic development.

7. Prepare, publish and disseminate documentation and audiovisual material providing guidance on the environmental dimension of economic development activities.
First Transport Project, Seychelles, FY85

The project comprises development of a commercial port to handle containers and fuel products (including dredging, rehabilitation of port cargo handling areas and construction of a products discharge terminal), strengthening/rehabilitation of deteriorated sections of road, and provision of technical assistance.

The SAR dealt with the possible environmental impact of the project as follows:

"H. Environmental Impact

The major concern of this project with regard to the environment is the dredging works and the resulting impact on the coral formations in and around the port entrance channel and turning basin. The risk associated with this type of work is that dense clouds of suspended fine particle matter resulting from the dredging and, more particularly, the reclamation work will obscure the coral from essential light and lead to destruction. However, in this case, the dredging and reclamation operations are only expected to last for about four months and careful precautions are built into the tender documents concerning the control and formation of the bunds to retain the dredged material and the discharge of the run-off water. Furthermore, recent experience with the previous dredging and reclamation works undertaken in the port and also at the airport has shown that little, if any, permanent damage to the coral occurred. Thus this potential problem is not considered to be serious.

The increase in vessel bunkering activities as a result of the development of the fishery sector increases the likelihood of a fuel spillage occurring but since the vessels use white oils and the port has equipment to combat fuel spills this is not considered to be a problem.

The construction of the new inter-island transport quay removes a present environmental hazard from the fishing port. At present, with the inter-island traffic of goods, live animals and passengers passing through the fishing port, there is a serious potential problem of fish contamination. Similarly, the construction under the overall program of a berth for reefer vessels in the fishing port avoids the need to transfer frozen fish by truck from the fishing port to the commercial port for export thus increasing the quality and reducing the risk of spoilage.

The petroleum products discharge terminal included in the project will enable LPG to be imported in bulk as against the importation of filled gas cylinders at present. The impact of bulk LPG imports will be to reduce the price of LPG to the general public making it competitive with kerosene for cooking and lighting and avoiding the hazardous handling of large numbers of gas cylinders on the quayside."
Commentary

The above represents a good example of sound environmental design. The only area where environmental concerns might have been strengthened, is with regard to ensuring that the port authority had adequate procedures (as opposed to equipment) to effectively respond to potential spills of fuel oil.
Chiapas Rural Roads Project, Mexico, FY85

The project supports the development of the State of Chiapas in Mexico through implementation of a rural roads construction, rehabilitation, improvement and maintenance program in parallel with simultaneous agricultural and other social and economic development efforts.

The § & deals with environmental considerations in the following terms:

"H. Social and Ecological Considerations

Chiapas is a uniquely sensitive state, from a social, ecological and political point of view, because it contains a high proportion of indigenous inhabitants and ecological reserves of world significance, and it has a permeable border with Guatemala. Chiapas also contains many micro-regions, with varying potential for economic development, which could help to serve national objectives for agricultural production.

The impact of rural road improvement on indigenous inhabitants would be generally positive, as has been shown by earlier rural road construction in the state. Besides the direct benefits to those employed in construction, benefits have included greater access to health services and education, greater commercialization of agricultural and craft products, access to new agricultural lands, and greater mobility of unskilled labor. The rapid expansion of transport services following rural roads improvements has allowed indigenous entrepreneurs, with state support, to enter the transport sector. Furthermore, for many generations, the indigenous inhabitants of Chiapas have provided seasonal farm labor for the producers of commercial crops, as well as maintaining their own small subsistence plots. This pattern has involved many men in temporary or seasonal long-distance migration from their homes in the highlands to the cattle ranches of the Central Depression and the coffee plantations of the Soconusco regions. Small farmers and landless households depend upon wage labor which requires daily or weekly travel, often to several different sites. The labor market in Chiapas is characterized by a high degree of mobility in response to the changing structure of opportunities for unskilled labor. Rural roads construction will enhance the effective use of local labor by expanding the radius of travel from home to work, as well as by generating new employment opportunities both directly (about 3.5 million man-days in road construction) and indirectly (through induced agricultural production).

Chiapas contains a number of unique ecological reserves which are important in terms of wildlife and plants, as well as for watershed management, soil conservation, water quality, fisheries and potential tourism. The two federally protected areas are: the Lacandon Forest Biosphere Reserve, the last humid tropical forest of significant size in Mexico, located in eastern Chiapas; and the Lagunas de Montebello National Park, which contains 80 lakes among pine and oak forest with subterranean
rivers and caves, also located in eastern Chiapas. The impact of rural road improvements upon the physical environment is minimized by the design standards and construction methods, which are based upon the principle of providing access to existing rural communities at minimum cost, while avoiding disturbances to the natural terrain and excessive future road maintenance costs. Alignments generally follow existing trails, and cuts and fills are kept to a minimum. Labor-based methods are used wherever feasible, supplemented by light equipment when necessary. Natural vegetation is removed only if needed to assure adequate sight distances and drainage. Protective measures are taken against erosion, including the use of retaining walls and slope planting.

Mexico has established an environmental review process applicable to all construction works, with the Secretariat for Urban Development and Ecology (SEDUE) acting as the responsible agency. At negotiations the Government confirmed that a subproject would not be considered eligible for financing under the project until its SEDUE clearance has been issued. Data on the initial candidate subprojects under this project have been submitted to SEDUE, and all but seven of the proposed roads have received clearance. The seven roads which require further study are located in the Lagos de Montebello National Park area, near the Guatemalan border. This area contains several population centers to which the Government wishes to provide access, both to serve the needs of rural residents and to organize and direct the flow of refugees across the Guatemalan border. The Government is preparing land use plans for this and other ecologically sensitive areas in Chiapas."

Commentary

The above excerpt from the SAR shows that possible environmental and social consequences of the project were carefully considered, and that reasonable precautions were taken to minimize adverse impacts. Unfortunately, the reference to using design standards which avoid disturbing the natural terrain, was not spelled out very clearly in the annexed terms of reference covering Guidelines for Preparation of Updated Manuals for the construction and maintenance of rural roads.
Third Highway Project, Nepal, FY85

The project comprises completion of 204 km of the East-West Highway, construction of low standard feeder roads on the terai in the vicinity of the Karnali delta, rehabilitation/maintenance of roads and bridges, procurement of equipment and provision of technical assistance.

The SAR dealt with possible environmental impacts as follows:

I. Environmental Impact

The construction of the first section of the East-West Highway will impinge on the environment. Firstly, it will superimpose a fresh and additional traffic pattern on the region, at right angles to the traditional north-south flows. Secondly, it will expose hitherto isolated conservation areas to the easy access of all. In particular, the main project road traverses for about 15 km the Royal Karnali Wildlife Reserve. In order to mitigate the effects of this exposure and severance, HMG proposed measures which will be incorporated into the road's construction, and others to be enforced by the National Parks and Wildlife Office both during and after construction [attached as page 7.]

Because of the presence of elephants in the Reserve, the possible parallel fencing of the road has been deemed impracticable. However, where the new road is intersected by the tracks used by the Wildlife Reserve personnel, fences and gates will be provided to prevent unauthorized access. To minimize physical disruption, no road-building material may be taken from sources outside the road width within the Reserve, or excess materials dumped there.

In addition to these infrastructure provisions, the Park warden will continue to man the entrances and exits to the Reserve on a 24-hour basis, monitoring traffic in and out, and, if needed, restricting traffic to the hours of daylight. The National Parks and Wildlife Conservation Office has the necessary legal authority to regulate traffic through the Reserve, and during credit negotiations, HMG agreed that the boundary gates would be manned both during road construction and afterwards for the project life. Evidence that HMG has in fact adopted the conservation measures described above as well as the regulations, permits, etc. providing for the construction of the 15 km of road within the Wildlife Reserves, will be a condition of credit effectiveness.

The rehabilitation works proposed on the Birganj-Kathmandu road will not detract from the environment. Rather, by expediting traffic flows and eliminating rough, broken sections of roadway, the environment, particularly of the travelling public, will be enhanced.
Commentary

The above excerpt from the SAR is commendable; it not only shows concern for the environmental impact of the project, but also sought assurances from the Government that access to ecologically sensitive areas would be regulated.
Reserve of Understanding on Karnali Wild Life
Reserve Issues - Koharpur - Mahakali Section of K.W.

As per letter No. 2704/040 dt. 2040/12/7 from Kathmandu Wild Life Head Office and as per the resolutions taken at a meeting held on 24th February 1983 in the office of the Honourable Minister of State, Ministry of Forests and Transport, protective measures to be taken in the Karnali Wild Life Conservation area during road construction are as under:

1. Right of way required for construction of the road to be kept to the minimum.

2. Minimum number of trees to be felled.

3. Earth for embankment fillings to be transported from outside the Wild Life area.

4. Construction works to be limited between dawn to dusk.

5. No camp for labourers and office to be permitted within the Reserve area.

6. Be undergone is required on the Highway since free movement for animals will be allowed on Highways. However, right of way for animals and birds will be maintained inside Reserve Area.

7. To prevent poaching and other damaging activities, training and scholarships equivalent to Masters degree in Wild Life subject is proposed to further strengthen the existing trained manpower.

8. Protective measures like ban on night driving, speed limit etc. to be enforced.

9. Resettlement of Anrani village to some other place by paying due compensation and to ensure no future spontaneous colonisation within boundary of the Reserve.

10. No fencing is required except at east of Babai where the road alignment coincides with the boundary of the Reserve.

11. Apart from a connecting road between Anrani, Thakurdwar and Kohariyaghat (near Indian Border) radio communication amongst all entry and exit points of Reserve area, Thakurdwar (Park's HQ) and Kathmandu Wild Life Head Office is considered very essential.
NEW ROAD/RAIL CONSTRUCTION AND THE SPREAD OF DISEASE

The construction of new roads or railways, which open up new terrain, may lead to a number of unexpected adverse impacts which can be minimized -- if not avoided -- by appropriate remedial action. A number of the most important impacts (found to be important in the Amazon Basin of Brazil) are as follows:

(i) Impact of Construction Activity

The presence of construction crews often encourages breeding of insects, and spread of communicable diseases. The borrow pits, puddles, vehicle ruts and drainage ditches associated with temporary site works provide new breeding grounds for insects, while canteen refuse, empty cans and coconut shells offer great opportunity for the proliferation of vermin. The presence of construction camps may thus lead to a significant increase in disease-carrying insects and vermin. It is a common observation in the tropics that undisturbed forest is relatively insect-pest free while human habitations are commonly infested.

One of the most serious diseases spread by construction crews is malaria. Other communicable diseases spread by construction workers include: diphtheria, poliomyelitis, tetanus, typhoid and paratyphoid. Meningitis, hepatitis, and leptospirosis are also causing concern and there are also many undescribed or little known diseases, particularly mycoses and viroses, which may be spread by construction workers.

Remedial Measures:

Contract documents for new road/rail construction need to specify good drainage practices (for borrow pits, etc.), suitable sanitation and refuse disposal facilities at construction camps, routine treatment for malaria (screening and elimination of mosquito larvae in puddles, etc.) and immunization of construction workers. Thorough and routine medical examinations might also be specified as an integral condition of employment in the project area.

(ii) Impact of New Settlers

Colonization by new settlers generally leads to deforestation and spread of breeding sites for insects (as per (i) and (ii) above). Unscreened settlers -- who may have little knowledge of sanitation and public hygiene -- likewise help to spread communicable diseases. Agricultural practices very

often aggravate this situation; use of agricultural pesticides affect bird and bat populations (and hence the mosquito population) and may also affect fish with similar results. One of the potentially most serious impacts of new settlers in the Amazon Basin relates to the spread of schistosomiasis. The waters of the Amazon are deficient in plant nutrients and are acidic; this inhibits the survival of the snails which carry schistosomiasis. However, the new colonists are applying lime and fertilizer to their fields. Heavy rains soon leach these nutrients and the lime reduces the acid content of rain water run-off. As a result, the waters of the Amazon are rapidly becoming suitable for the spread of the schistomiasis snail vector.

Remedial Measures:

Remedial measures to deal with these impacts generally lie outside the scope of the typical road/rail project. However, a project officer should ensure, to the extent possible, that the road/rail project forms part of an overall regional development plan which includes specific measures to regulate new settlements, promote sound agricultural practices and provides training in public health.
ANNEX 4

TRANSPORTATION SECTOR

Checklist of issues to be considered when formulating transport projects

A. Highway Sub-Sector

1. New Roads

(i) Ensure that the settlement (both planned and unplanned) facilitated by the project is regulated with regard to deforestation, agricultural practices and public health.

(ii) Ensure right-of-way is selected to minimize damage to the natural environment (including landslide areas and high cut-and-fill sections), the aesthetic environment (including special trees), historic/cultural/aesthetic artifacts, and fisheries or other aquatic resources (it may be desirable to prepare environmental resource maps to help in the selection of suitable alignments).

(iii) Ensure that relevant government agencies consider the project's likely impact on indigenous tribal groups and that such agencies are fully involved in the design, implementation and monitoring of the project.

(iv) Ensure the project is appropriately landscaped (where necessary), that borrow pit location is regulated (as needed) and exposed areas are resurfaced/replanted to prevent erosion and siltation.

(v) Ensure drainage is designed to avoid erosion and siltation (it can often be designed to reduce erosion) and does not contaminate local watercourses.

(vi) Ensure the size and position of billboards are regulated to minimize visual intrusion and avoid safety hazards.

(vii) Ensure the project does not produce unacceptable levels of noise, vibration, or air pollution (e.g. dust from unsurfaced roads, from exhaust emissions, from asphalt plants, or blown from open vehicles).
(viii) Ensure special routes are designated for movement of hazardous materials.

(ix) Ensure measures are considered to ensure pedestrian safety, particularly where major roads pass through villages and towns.

(x) Ensure roads passing through game reserves, natural parks and other scenic areas do not disrupt the ecological balance of these areas and/or impede the free movement of animals.

2. Road Maintenance/Rehabilitation (including workshop construction/rehabilitation)

(i) Ensure waste material (including broken-up pavement surfacing) is recycled, or disposed of in a way that does not lead to aesthetic, or other environmental problems.

(ii) Ensure workshops (including washing facilities) to be reconstructed/rehabilitated under the project, incorporate measures for dealing with contaminated run-off and liquid/solid waste (particularly diesel and oil waste).

B. Port Sub-Sector

1. New Ports

It will usually be desirable to undertake some form of environmental impact assessment as part of the initial feasibility studies and to design the project to minimize adverse impacts. Remaining impacts, where significant, may be presented in the form of an impact tableau annexed to the Staff Appraisal Report.

2. Existing Ports (rehabilitation and/or expansion)

(i) Ensure that the project forms part of a compatible development of the port hinterland and that land is appropriately zoned for port-related and other uses (if there is no port area master plan, consider financing the preparation of one under the project).

(ii) Ensure that the project is designed to minimize displacement of port-related commercial activity (which usually surrounds the port area) and involuntary resettlement of the local population (resettlement -- even of squatters -- calls for careful attention).
(iii) Ensure that port access and major linkages to the hinterland, are designed to minimize — and provide acceptable levels of — congestion, noise and air pollution. Transport corridors linking the port with its hinterland should avoid severing local communities.

(iv) Ensure that all structures to be constructed, or modified below high water level (breakwaters, groynes, sand/silt traps and borrow areas; piled structures, jetties, piers and reclaimed land; dredged channels and turning basins; and outfalls — sewerage, storm water and cooling water) are designed to be compatible with the existing marine (or freshwater) environment. If the resulting impacts are likely to be significant, they should be evaluated (preferably by an independent organization) and the results of the evaluation should be approved by all interested parties before proceeding with the project. The evaluation should include studies of: accretion/siltation/erosion, impacts on marine flora and fauna, tidal streams/ocean currents/circulation, and water quality/temperature/oxygenation.

(v) Ensure materials from maintenance and capital dredging are disposed of in an acceptable manner in accordance with national and international codes1/. Where such codes are not applicable, consideration should be given to evaluation and consultation on the same basis as (iv) above.

(vi) Ensure adequate precautions are taken to prevent dust from bulk handling facilities (e.g. fertilizer, phosphate rock, etc.) contaminating nearby water and marine resources, or human settlements.

(vii) In the case of bulk petroleum handling facilities, ensure there are contingencies for handling fuel spills.

C. Railway Sub-Sector

1. New Rail Lines

(i) Ensure that the settlement (both planned and unplanned) facilitated by the project is regulated with regard to deforestation, agricultural practices and public health.

1/ Inter-governmental Conference on the Convention on the Dumping of Wastes at Sea (1972: London), International Maritime Organization; Ports and Dredging in the Developing Countries: Port Safety, Environment and Construction Committee, (1972: Canada), International Association of Ports and Harbors. Most countries have these codes, since copies have been sent to them for ratification.
(ii) Ensure right-of-way is selected to minimize damage to the natural environment (including landslide areas and high cut-and-fill sections), the aesthetic environment (including special trees, historic/cultural/aesthetic artifacts, and fisheries or other aquatic resources (it may be desirable to prepare environmental resource maps to help in the selection of suitable alignments).

(iii) Ensure that relevant government agencies consider the project's likely impact on indigenous tribal groups and that such agencies are fully involved in the design, implementation and monitoring of the project.

(iv) Ensure the project is appropriately landscaped (where necessary), that borrow pit location is regulated (as needed) and exposed areas are resurfaced/replanted to prevent erosion and siltation.

(v) Ensure drainage is designed to avoid erosion and siltation (it can often be designed to reduce erosion) and does not contaminate local watercourses.

(vi) Ensure the project does not produce unacceptable levels of noise, vibration, or air pollution (e.g. coal dust blowing from open wagons).

(vii) Ensure there are adequate procedures for dealing with spills of hazardous materials (this would only be relevant where such materials -- e.g. chemicals or noxious waste -- are to be carried on the new rail line).

2. Railway Maintenance/Rehabilitation (including workshop construction/rehabilitation)

   (i) Ensure scrap and waste material (including retired rolling stock and sleepers) is disposed of in a way that does not lead to aesthetic, or other environmental problems.

   (ii) Ensure workshops (including washing facilities) to be constructed/rehabilitated under the project incorporate measures for dealing with contaminated run-off and liquid/solid waste (particularly diesel and oil waste).

D. Airport Sub-Sector2/

1. Terminal Buildings, Navigational Aids, Emergency Equipment, etc. There will generally be no need to make any explicit reference to environmental considerations.

2/ This sub-sector is currently of minor importance in the Bank's lending program.
2. **Airport Construction or Expansion**

It will nearly always be desirable to undertake an environmental impact assessment as part of the initial feasibility studies and to design the facilities (including selection of the site) to be consistent with local land-use policies and plans, and to minimize adverse environmental impacts (of noise, fuel spills, interference with birds and wildlife, access roads, etc.). The project evaluation will furthermore usually need to be expressed in the form of an impact tableau (or planning balance sheet)\(^3\)/ annexed to the Staff Appraisal Report.

Outline Training Course on Environmental Considerations in the Planning and Implementation of Bank Projects

(3 hours duration)

1. Overview:
   - origins of Bank policy, OMS requirements, role of OPS and OESA

2. Types of Impacts:
   - review of typical Bank projects, identifying potential impacts, citation of classic problem projects

3. Remedial Measures:
   - importance of design concepts, role of specifications and other contract documents, environmental laws and regulations, covenants and other conditionalities

4. Environmental Impact Assessment:
   - development of planning balance sheets and impact tableaus, example of EIA in practice

5. Exercises and Concluding Discussion
   - class to be given a project and required to identify impacts, propose remedial measures, reflect these in terms of reference, etc., and to then write environmental section in SAR.

3 hrs. plus 1/2 hr. break