Republic of Yemen

Ministry of Public Works and Highways
Rural Access Project Central Management Office (RAP CMO)

RURAL ACCESS PROGRAM

SECTORAL ENVIRONMENTAL ASSESSMENT
VOLUME 1

TECHNIPLAN

In collaboration with

SHEBA Engineering Services

Rome, October 2008

EXECUTIVE SUMMARY

Sectoral Environmental Assessment (SEA) has prepared for the Rural Access Program (RAP) under a contract signed between the Ministry of Public Works & Highways and Techniplan S.p.A., on 11th June 2003. It has been prepared in accordance with World Bank Operational Directive (OP) 4.01, *Environmental Assessment*.

Program Description. The overall purpose and long-term development objective of the RAP is an improved livelihood and reduced isolation for rural populations**.** To achieve this objective, the Program will improve planning and implementation of rural roads, thereby reducing a major obstacle to rural economic growth caused by poor access. The Program will be implemented in three phases:

- **Phase I** (August 2001 to April 2005) is setting up the institutional and technical foundation of rural road projects. The approach is being tested in 22 pilot clusters that consist of intermediary roads combined with adjacent tertiary or village-access roads. This phase also includes formulation of a National Highway Master Plan and Governorate Rural Accessibility Master Plans, which provide the basis for selection of future rural road investments.

- **Phase II** (December 2005/2007) will tackle access problems mainly at intermediary road level, also covering related tertiary roads, while setting up a policy and organization framework for gradually moving to feeder networks.

- **Phase III** (2007/2011) will tackle the improvement of tertiary roads at District level, while continuing to support the development and management systems of intermediate networks.

The RAP will be implemented as a nation-wide program, covering all 20 Governorates and 1 Municipality [1]of the country, and their 333 Districts. The Governorate Accessibility Master Plans developed in Phase I will provide the foundation for rational planning and prioritization for rural access investments, as well as decentralized institutional arrangements and financing for management and maintenance of the rural roads.

Environmental Screening Category. Phase I of the Program was placed in environmental category "B", since all civil works were limited to improvements on existing alignments and roads with major impacts were screened out. For Phases II and III, such cases are not excluded, such that project roads may be categorized as "A" or "B". For this reason, the remainder of the overall program has been placed in environmental category "A", to allow the possibility of roads with potential major impacts to be included.

Justification for SEA. Since the location of all roads to be improved is not yet known, a Sectoral Environmental Assessment approach has been selected. This approach provides for a general assessment of program impact, establishment of standard methods of mitigation to be adapted to individual projects and a procedural framework for implementing the environmental and social management process for all roads within the program. The SEA also provides the basis for an Environmental and Social Management Framework Agreement between the Government of Yemen and the World Bank.

[1] *At the end of the Study, the Governorates became 20 with a Municipality. The Consultant could not revise some information included in this report as the data were not yet available.*

Policy and Institutional Framework. Environmental Impact Assessment (EIA) in Yemen is enabled by the Environment Protection Law No 26 of 1995 (EPL). The provisions of this framework law are implemented through Executive Regulations (By-Law 148-2000), issued by a decree of the Council of Ministers. In October 2002, the Environmental Protection Authority (EPA) issued the "Environment & Sustainable Investment Program 2003-08" (ESIP), which constitutes the framework for the Government's environmental policy of the next years. While the Government general environmental policy provides a broad framework for environmental management, there is as yet no environmental policy for the road sector.

Baseline Conditions. The physiographic characteristics of Yemen are very diverse and consist of high, steep mountains, escarpments, deserts, coastal plains and hundreds of wadis running between the mountains and through the coastal plains. Socotra, in the Indian Ocean, is the largest of the 112 Yemeni islands scattered in the Red Sea. The majority of the population concentrates in the wadis and highland plateaus, performing agricultural activities, irrigating from the spates flow in the wadis in the rainy seasons, and from base flow and groundwater. The country is classified into five physical regions (Mountain Massif, Eastern Plateau, Desert Regions, Coastal Plans and Yemen Islands) and 16 sub-regions. There are 36 important ecological sensitive areas, two of which have been declared Protected Areas (Autma and Socotra); four were under declaration as at October 2003; and 30 proposed for declaration. Population density varies markedly across the country, ranging from 1 person per sq. km in the desert areas (such as Al-Mahrah Governorate) to 388 persons per sq. km in Ibb Governorate. Tribal tensions can be a source of social conflict in the selection and implementation of rural roads. Yemen is rich in cultural assets, which are scattered in urban and rural areas; however, there is currently no comprehensive inventory of cultural assets. The agricultural terracing system is widespread in the mountainous zones and is well known as an efficient method of water conservation.

Environmental Impacts. Rural roads have a range of potential positive and negative impacts, depending on their location within the country. Roads located in the escarpments are characterized by hairpin bends whereas in flat areas they follow rather straight alignments. These geometric features affect the volumes of earthworks and consequent impacts on the environment. Water harvesting along and even on the road surface is routine practice and is a major consideration in rural road design, as is cross-drainage, discharge to adjacent lands, flood protection and wadi hydrology. Slope stabilization is a key issue in vertical alignment design to avoid landslides in the mountainous zones. Traditionally, rural roads designs in Yemen have featured a roadbed of 8 meter width, with a road surface 6 meters wide and shoulders of 1.0 meter on each side. In the case of mountain roads, this design requires rather deep cuts into the mountainside to achieve the design width of the roadbed, leading to the erosion of exposed slope surfaces and often to slides of slopes onto the road. In addition, such road widths can lead to land taking through populated or agricultural areas, which is difficult to justify, given the volume of traffic on these roads. Narrower road widths provide more economically justified investments and reduce the need for land taking or excessive excavations. Consultations revealed an overwhelming desire for improved access and willingness to collaborate with the Program. Positive socio-economic impacts noted include reduced transport costs and travel time, improved comfort and safety, increased mobility, stimulus to economic development, improved community cohesion and intercommunity cooperation and improved accessibility to social services and markets. Increased road accidents and adverse impacts on water gathering patterns were identified during women's consultations as particular areas of social concern. Over the life of the program, the RAP investments will cover about 1% of the entire network scattered among the 20 Governorates. Impacts are expected to be localized and it is therefore reasonable to assume a negligible risk of cumulative negative impacts.

Environmental Management Plan (EMP). The EMP consists of standard mitigation measures to be adapted to each individual road and institutional arrangements for ensuring consistent implementation of the environmental and social management processes. Standard mitigation measures have been developed to address potential environmental impacts as they may occur during the design/construction and the operational (post-construction and maintenance) phases. An EMP Table provides an overall summary of impacts, mitigation measures and monitoring responsibilities during implementation. The main mitigation measures include:

- **Improved and environmentally-sound technical designs, tested during Phase I**, including:
  - (i) narrower road design widths, "pinch points" and other measures to avoid excessive mountain cuts or land taking;
  - (ii) slope stabilization measures;
  - (iii) Flood protection in the wadis, incorporation of water harvesting measures, and reduction of cross-drainage effects and discharge to adjacent lands, with particular attention to agricultural terraces, graveyards and other sensitive areas.

- **Measures related to the conduct of design/construction and maintenance works activities.** The main ones include:
  - (i) careful selection, management and rehabilitation of investigation sites, site compounds, borrow areas and diversion roads;
  - (ii) controlled disposal of materials and surplus fill;
  - (iii) avoidance of groundwater pollution through appropriate storage and use of petroleum products, paving materials and other hazardous items;
  - (iv) limitation of effects on biological resources through identification and mitigation of impacts on critical vegetation, fauna and natural habitats affected by the roads;
  - (v) separate men and womens' consultations to avoid tribal conflicts, address potential permanent and temporary land acquisition needs, and address gender considerations; and
  - (vi) Cultural resource assessments, management plans and chance find procedures, as appropriate.

- **Social Framework Agreements (SFA)**, developed during Phase 1, as the mechanism for reaffirming public agreements to the environmental and social mitigation measures, as discussed in the public consultations. The SFA also provides a framework for addressing unforeseen environmental and social issues that may arise during implementation.

- **Policy Frameworks for Resettlement, Natural Habitats and Cultural Resources**, which will be triggered when appropriate issues are identified during screening or based on chance finds during implementation.

Implementation arrangements are based on a standard environmental and social management process developed during Phase 1. The process includes procedures and standard instruments for screening, categorization, environmental assessment, and project implementation. It also includes prior review and approval by RAP and the World Bank following the screening and the environmental assessment steps. Environmental contract clauses are incorporated as an explicit annex into RAP's standard contract documents. Overall responsibility for the implementation of the above process will be with the RAP CMO, through its Environmental and Social Unit (E&SU). The Unit is fully operational with two qualified staff. However, in view of the increasing workload, this should be expanded to include at least four staff.

Institutional strengthening should be carried out through: (i) increase of staff; (ii) training and in-house seminars at RAP CMO; and (iii) training sessions for engineering consultants and contractors. From a sector-wide perspective, the RAP is introducing an operational approach to systematically address environmental and social issues on rural roads.

Public Disclosure. Consistent with procedures of the World Bank, the Government of Yemen will make this Draft SEA available to the public through: (i) the World Bank InfoShop; (ii) the RAP CMO, Sana'a and on the RAP CMO Website; (iii) the Ministry of Water and Environment and the EPA, Sana'a; and (iv) the RAP CMO Regional Offices. Annex 3 provides a record of public consultations carried out during the preparation of the SEA. Comments gathered during the disclosure of the Draft SEA will be incorporated into the Final Sectoral Environmental Assessment.