

11.6 Needs and Options for Institutional Reform

11.6.1 Introduction

The ease of implementation of the infrastructure projects and transport policies proposed for the 8th Five Year Plan (FYP) and later Plan periods will be influenced by the strength and organisational efficiency of the governmental agencies charged with managing that implementation.

Similarly, the efficiency of operation of the transport infrastructure and service operating agencies run by National and Provincial Governments will be influenced by the institutional arrangements for their management.

The structure and organisation of government institutions in the transport sector in Pakistan have remained substantially unchanged for a number of years - in many cases since at least 1971, yet the tasks they are being asked to undertake have changed markedly in the last few years as the emphasis has shifted towards a more commercial approach to the provision of services by the public sector in Pakistan. This change in emphasis has now been formalised in the underlying assumptions of the 8th FYP, but there are few formal proposals for institutional changes associated with this change of emphasis.

A review of the way in which public sector involvement in the transport sector is organised and managed, from Ministerial level down, would therefore seem appropriate at this time. Such a review would be appropriate for funding support from an aid agency such as the World Bank or Asian Development Bank. It should ideally be carried out by international management consultants with previous experience in advising governments on the level of institutional reform needed to successfully pursue the more commercially oriented transport policies now to be adhered to in Pakistan.

This brief note identifies some of the areas such a review could examine.

11.6.2 Ministerial Organisation

At present, responsibility for transport is divided between a number of Ministries, notably Ministry of Communications and Ministry of Railways, which means that decisions on overall transport policy (e.g. the division of investment between road and rail infrastructure) need to be taken at Cabinet or Prime Ministerial level.

A single Ministry to handle National Government's involvement with all modes of transport might now be a more appropriate institution to manage and organise an increasingly commercialised private transport sector. Posts and telecommunications, currently administered by the same Ministry as roads, shipping, ports and air services, is dealt with by a separate "single issue" Ministry, of Posts and Telecommunications.

In addition to the existing transport related functions of the Ministry of Communications, the new Ministry should assume National Government responsibility for the railways and, to the maximum extent possible given the shared use of some sites with the Pakistan Air Force, airports. This would provide, at Ministerial level, a forum for debate of transport related issues and the pursuit of an integrated transport policy. It would also be a platform for liaison with other Ministries and the Planning Commission on the transport needs and implications of proposals (e.g. for major industrial, residential or agricultural development) to other sectors of the economy.

As well as overseeing the management of the transport infrastructure and services provided by National agencies, the Ministry should also supervise agencies involved in transport related research and feasibility studies (e.g. into new modes such as inland waterways or high speed rail, traffic and safety monitoring, and materials research).

While centralising responsibility for transport in a single Ministry, the extent of that responsibility can be reduced if it is found appropriate to devolve day-to-day running of some aspects of Pakistan's transport currently undertaken at ministry level to other levels of Government. Possible areas in which this might be achieved include the corporatisation of the railway and the transfer of

day-to-day responsibility for some infrastructure to Provincial or District levels of government, or even to the private sector.

Some of these possibilities are discussed in more detail below.

11.6.3 A Pakistan National Railway Corporation

(1) Introduction

At present, day-to-day administration of PR is effectively being undertaken by the secretariat of the Ministry of Railways, most of whom also sit in the Board of PR. The railway is thus a government department, and the staff are civil servants. While this arrangement is acceptable for a railway being run as a social service, it is not well suited to the management of the increasingly commercial railway envisaged in the 8th FYP and PR's own annual reports. It would thus seem an appropriate time to examine the options for re-structuring PR to better equip its senior management for the task of turning PR into an efficient commercial railway.

One possibility is of a government owned corporation, similar to PIA, with Ministerial representation in the board. Ownership and overall direction of the railway would remain in the public sector, but day-to-day running of the railway would be passed on to commercially oriented managers with clearly defined targets and responsibilities.

Ultimately, given the hope for gains in railway productivity and profitability, such a structure would be suitable for the privatisation of the railways, if that was politically desirable.

(2) Examples in European Countries

A similar process has been followed in the UK since 1976. A succession of adjustments to the corporate structure of British Rail (BR) have transformed it from a vertically integrated organisation - undertaking a number of non-core activities ranging from rolling stock manufacture and maintenance to catering as well as core railway operating activities - to a horizontally integrated infrastructure and operating divisions buying in many services and supplies under competitive tender from non-BR companies.

Government, as the owners of BR, set annual profitability targets for each of the operating divisions, as well as quality of service and social service objectives (the latter being funded by a pre-determined annual public service obligation payment). In the process, BR has become a much more efficient and profitable organisation, meeting and even exceeding government's profit targets until the recent recession in the UK reduced demand for rail services while maintaining its role as a social-oriented railway in rural areas.

In part this has been achieved by creating an internal market for goods and services within the corporate structure allowing, for example, operating division managers to enter into contracts with infrastructure and engineering division managers specifying: the quantity and quality of goods and services they require in order to operate their planned train services; the (internal) price to be transferred between divisional budgets in the railway accounts; and the variations in that price if the terms of the contract are not met.

Since April 1994 the UK government has moved towards privatisation of the railways, creating a number of separate companies to own the railway infrastructure and rolling stock and to operate passenger and freight services. At present the government is the sole owner of all these companies, and only the infrastructure company (Railtrack) is not still a part of BR. It is too early to judge whether this further step in introducing market forces to the provision of rail services will produce further productivity gains in UK railway operations.

In Sweden, where infrastructure and rolling stock/services became separate corporations in the mid 1980's, the division of ownership is judged to have been a success. Both corporations remain government owned, but private sector and local government owned operators are also allowed to provide services to the national rail network in competition with the national government owned operator.

(3) Conclusion

A number of other countries are adopting alternative approaches to the commercialisation and ultimate privatisation of their monopoly state railways. These should also be examined to identify the best corporate structure for PR to achieve the conflicting commercial and social tasks it faces.

11.6.4 Division of Responsibility between Federal and Other Levels of Government

(1) Overview

At present, the Federal Government has the sole responsibility for Pakistan's shipping, ports, aviation and rail industries, while roads and road transport are largely the responsibility of the Provincial Governments. This situation has arisen in an ad-hoc manner over a number of years, and it may be appropriate to re-examine the division of responsibilities to determine whether it provides the best organisational structure for the transport sector in Pakistan.

Among areas which could be examined are: transfer of local railway lines to Provincial Government; transfer of local airports and airfields to Provincial or even District level Government; and enhanced responsibility for setting and enforcing highway planning and driving standards at National level.

(2) Local Railways

A possible future corporate structure for PR would have a national organisation responsible for the main, international and inter-provincial lines, but would transfer responsibility for local branch lines (particularly the non-standard metre gauge lines) located wholly within a Province to the Provincial authority.

This would allow greater local involvement in specifying the level of service to be provided and in assessing the balance between the social benefit derived and the operating subsidy required. It would also require the costs of the service to be clearly identified, highlighting possible opportunities for cost saving and efficiency gains. As local lines are understood not even to cover their operating costs from revenues, this transfer of responsibility would also need an increase in Provincial funding, which might initially have to be in the form of an additional transfer of Federal funds.

Examples of this division of responsibility for public sector rail services can be found in Germany, where the Federal rail network (DB) is complemented by local systems administered by the Lander (equivalent to States or Provinces in other Federal countries). Some of these lines are actually operated by DB on behalf of the Lander, while others have their own operating and infrastructure units.

In the UK, a number of Municipal authorities have their own urban rail systems separate from the national BR network, but while local (County) authorities are increasingly involved in specifying and subsidising local rural rail services, control and operation of these lines has remained with the national (often now regional, in the move to privatisation) rail service operator.

In Pakistan, however, it might be appropriate to transfer operation of certain lines, in particular the metre gauge network in Sindh, to local control and operation.

(3) Local Airfields

Domestic air services are operated to more than 40 destinations within Pakistan, and all airfields are run by the Federal CAA (although some are shared with the Air Force). Many of these airfields receive only one or two flights a week, but air transport is seen as essential for National integration due to the distances involved and the difficulty of making some journeys by road, particularly in winter.

In other countries most (and in some cases all) airports are operated by local authorities or the private sector. In general, the private sector will be involved in running the larger, busier sites,

where income from commercial services to passengers ("landside" activities) is greater than income from aircraft landing fees etc. ("air-side" activities). Where such commercial opportunities do not exist, it is common for the public administration for the region in which the airfield is located, or the main municipality that it serves, to be involved in operating the airport.

Local involvement in running the airport (and in funding sites that cannot cover their costs from air-side and landside charges) could result in the scale of the airport operations being more closely related to the air transport needs of the local community, staffing and operational efficiencies.

National involvement would be limited to setting and enforcing minimum construction and safety standards. In the UK, the Civil Aviation Authority sets these standards, and undertakes air traffic control in UK air-space, but does not operate any commercial airports - these are all run by the recently privatised British Airports Authority and local authorities.

A similar arrangement may be appropriate in Pakistan, subject to the national defence priorities at shared sites, with the busy international gateways operated by private sector companies or concessionaires and local airports being run by Provincial or Municipal agencies. National supervision would be exercised, as in the UK, by the CAA setting standards for aircraft, airports and staff, and controlling use of air-space.

(4) Highway Standards

Conversely, in the transport sector in which responsibility is devolved to lower levels of government - roads and road transport, it may be appropriate to review the extent (and desirability of) Ministerial powers, exercised through a National authority, to impose common standards of road construction, road use and road pricing throughout the nation.

A typical result of the lack of common standards concerns highway construction and heavy cargo vehicles. It is understood that, in law, the maximum permitted weight on any one axle of a road vehicle is 6 tonnes. Legal limits in other countries are between 11 and 13 tonnes, and registration of vehicles designed to carry 9 or 10 tonnes on twin tyred axles were allowed for a number of years. It is also common practice to strengthen heavy cargo vehicles after registration to take 13 tonnes and more on the main load bearing axles; and axle weight surveys undertaken by NTRC have found a high proportion of 20 tonne axles in some traffic flows.

There has, however, been no formal recognition of this situation via a change in the laws relating to vehicle weights (which would allow consistent enforcement of vehicle weight regulations), and in consequence no general revision to the standards to which roads are built and maintained. Some district engineers in Provincial C & W departments still work on the basis of a maximum 6 tonne axle. As the damage done to roads by heavy vehicles is related to the fourth power of the axle weight, the operation of trucks with even quasi-legal 10 tonne axles results in rapid deterioration of the highway and frequent collapse of provincial and district roads.

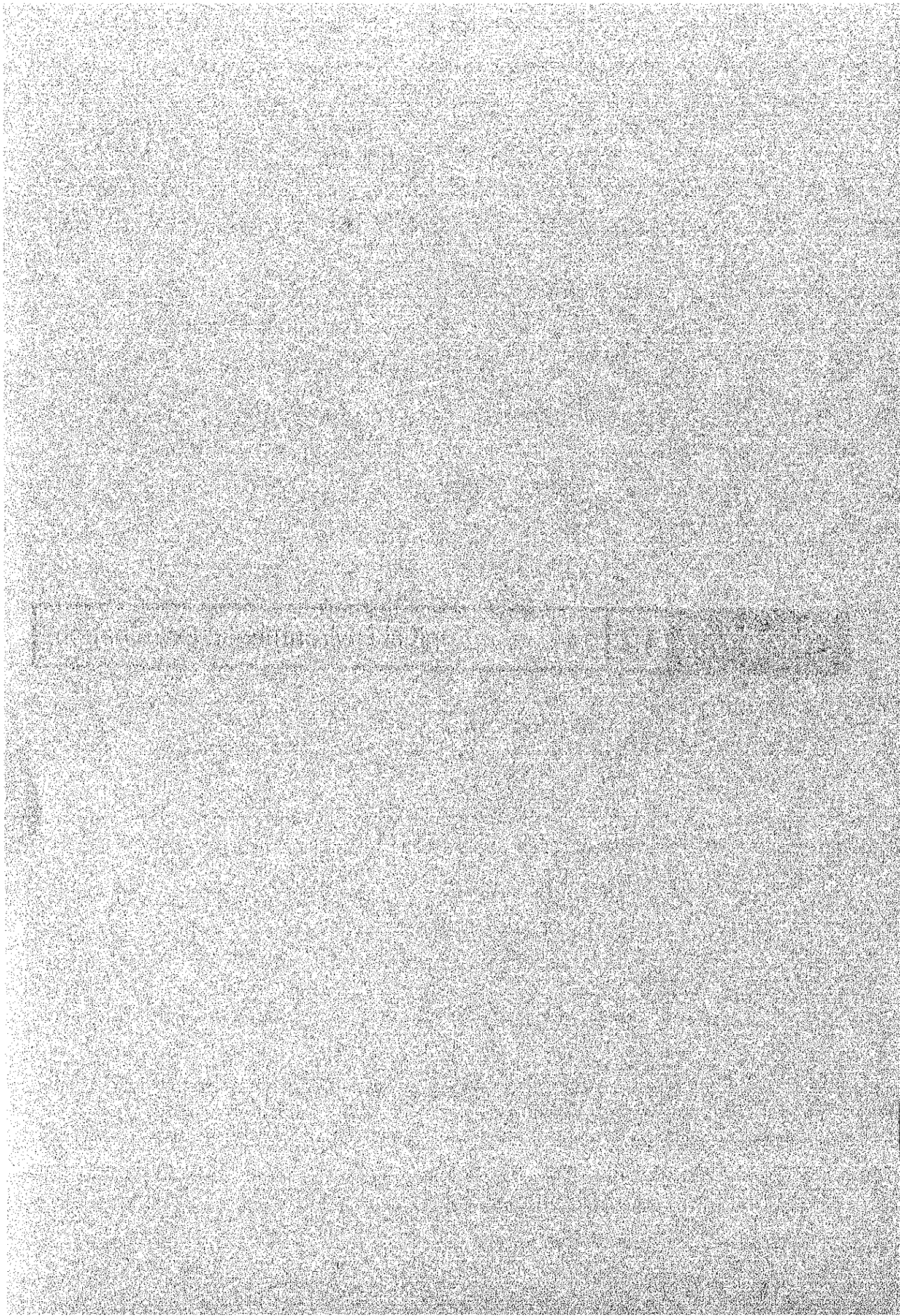
A review of standards (both statutory and those actually being operated), which examines how appropriate the standards are for the transport work on the roads of Pakistan and possible national standards needed include:

- Highway alignment and junction layout;
- Signing;
- Driver education;
- Standards of traffic policing;
- Vehicle construction and use regulations and standards; and
- Vehicle and road use taxation (particularly with regard to licensing fees and token charges on cargo vehicles).

Where appropriate, it may be advisable to introduce powers for a national agency, such as NHA, to set standards to which provincial and municipal agencies would also be obliged to adhere.

CHAPTER **12**

Initial Environmental Examination



CHAPTER 12 INITIAL ENVIRONMENTAL EXAMINATION

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CHAPTER 12 INITIAL ENVIRONMENTAL EXAMINATION

12.1 Legislation

12.1.1 Existing and Future Legislation

There are many separate laws dating back to the last century for protection of the environment but these were primarily aimed at protecting wildlife for subsequent hunting, and conservation of forests for commercial exploitation. The need for revised environmental legislation in Pakistan was recognised in 1973 with the inclusion of ecological concerns in the constitution. The legislation was consolidated to a limited extent in the 1983 Pakistan Environmental Protection Ordinance (PEPO 1983). The implementation of this legislation was severely handicapped as the implementation of the law required a meeting of the Pakistan Environmental Protection Council to set standards and delegate enforcement powers to the provincial EPA's, and this meeting was delayed.

In 1993 the Council met to delegate enforcement powers to the Provincial EPAs and approve standards for pollution control. These are emission standards and being federal standards apply throughout Pakistan. For vehicular emissions, standards apply for smoke, carbon monoxide and noise.

A new draft law is under preparation which will be named the 1994 Act. This will be based on the assimilative capacity of the receiving environment. Therefore the standards could vary from province to province. This variation between federal and province will be permitted as long as provincial standards are stricter than federal standards. Under the legislation the EPAs can call for EIAs on any projects which may have environmental implications. The Federal EUAD are now preparing guidelines for the preparation of EIAs in Pakistan.

This Act has been finalised and is under review by the legislative authorities.

12.1.2 National Conservation Strategy

The PEPO 1983 is essentially aimed at pollution control. More wider ranging issues relating to conserving natural resources are included in the Pakistan National Conservation Strategy (NCS). This was approved by the Federal Government in 1992 and stresses the need to encourage development whilst minimising disturbance to the environment. This together with the Social Action Plan is regarded as the "blueprint" for sustainable development in Pakistan.

12.2 Institutional Arrangements of Environmental Authorities

12.2.1 Federal Authorities

The Federal authorities have divided environmental issues into two convenient sectors named 'brown' and 'green' issues. Brown issues relate to pollution control and fall within the authority of the Federal Pakistan EPA. Green issues relate to conservation of natural resources and fall within the authority of the Environment and Urban Affairs Division. Their organisational structures are shown in the Appendix 12.1.

The environmental department of EUAD consists of 19 professional officers and is up to establishment strength. Several officers are currently undergoing foreign training.

The Pakistan EPA is the Federal Authority and acts as a liaison point for the Provincial EPAs. It currently has 6 professional staff of whom one is away on foreign training. They are scheduled to receive further assistance under the upcoming World Bank funded "Environmental Protection and Resource Conservation" loan project, which will allow for 12 more professional staff. They have recently established a new laboratory which is excellently equipped and staff have undergone foreign training in laboratory techniques.

12.2.2 Provincial Authorities

Each of the four provinces has an EPA. These are described below.

Punjab EPA is an establishment of 35 professional staff. It maintains district offices in each of the main cities of Punjab and has several staff on overseas training. The Director General is acting and has additional duties as Chief Engineer in the Public Health Engineering Department. The EPA is currently administering the disbursement of funds under the World Bank Punjab Urban Environment Project. This will make available some US\$ 50 million in a revolving credit line for pollution control projects. They have recently received a mobile air pollution monitoring laboratory from EC funding.

NWFP EPA has an establishment of 14 professional staff, of whom 7 staff are at a junior level. The Director General is a full time appointment. They are scheduled to receive further assistance under the World Bank 'Environmental Protection and Resource Conservation' loan project.

Sindh EPA has an establishment of 10 professional staff of whom 5 are in post and the remainder have been approved, and are being recruited. The Director General is a full time appointment. Due to their relative lack of technical staff they have concentrated to date on public awareness programmes. They are scheduled to receive further assistance under the World Bank 'Environmental Protection and Resource Conservation' loan project.

Balochistan EPA have a Director General who also has additional duties of Secretary of Forests. The establishment has 2 technical officers. They are scheduled to receive further assistance under the 'Environmental Protection and Resource Conservation' loan project, over the next 6 years. It is intended to strengthen the EPA with two full time officers and to establish an environmental cell in the Planning and Development Department. This will ultimately have 13 professional/technical staff over the next 6 years.

Punjab Planning and Development Department have recently established an environmental cell. It currently has 4 professional staff and is set up to administer the disbursement of funds under the Punjab Urban Environment Project. It is IDA project supported and should have 9 officers eventually.

Other departments take an active role in environmental affairs associated with their projects. For example TEPA, Lahore Development Authority, recently called for an EIA on the new Lahore bypass which was prepared by consultants and reviewed by the World Bank.

12.3 Review of Environmental Aspects Associated with these Projects

The study examined the following main transport sectors :

- Highways
- Railways
- Airports
- Ports
- Inland Waterways

The main environmental aspects associated with the various sectors are :

- Can the project be classed as "Sustainable Development".
- Is an integrated approach being taken which is cross sectoral.
- Is the project supported at higher and grassroots levels.
- Will disruption or relocation of indigenous population occur.
- Have local views been considered.
- Have any potential Land Use conflicts been resolved.
- Have conservation areas been avoided. If not have mitigation measures been included to conserve flora and fauna.
- Have sites of Special Ecological Significance been identified.
- Will the project add to land degradation such as soil erosion, flooding, salinisation, microclimate, beach erosion, siltation, lowered water table, deforestation, or loss of agricultural land.

- Will air pollution levels increase.
- What are the noise aspects.
- Is the institutional framework adequate to exert any necessary controls.

The candidate projects have been reviewed in accordance with JICA Guidelines and with respect to the prevailing legislative and institutional situation in Pakistan. The guidelines require a description of the project, site description and overview of the environmental setting. These have been prepared.

12.4 Conservation Areas

12.4.1 Areas of Concern

It is acknowledged that growing population is placing an increasing stress on natural resource and ecosystems. This leads to degraded rangelands, deforestation and soil erosion which cause the loss of habitats and threatens floral and faunal species.

The main areas of concern in Pakistan are :

- Loss of Biodiversity

Of the 6,000 floral species found in Pakistan 300 are endemic and 500 species are believed to be rare or threatened. Many plants have medicinal properties such as *Ephreda Procera* which is commercially important as a cardiac stimulant.

- Endangered Species

There are an estimated 158 mammal species in Pakistan of which 8 are endangered and 7 vulnerable. Tiger and swamp deer are already extinct and cheetah, hangul (deer) and Indian wild ass are on the verge of extinction. Six species are endemic and one is extremely notable. This is the Indus River dolphin which is classed as the world's most endangered cetacean. The main population group is in Sindh between the Guddu and Sukkur barrage which forms the Indus River Game reserve.

There are 650 species of birds in Pakistan none of which are endemic. The wetlands of Pakistan are of importance to migrating and wintering waterfowl, some of whom travel from breeding grounds in Russia. One species, the Houbara Bustard, migrates from Mongolia to winter in Pakistan. It is classed as internationally endangered due mainly to excessive falconry hunting parties from the Gulf.

There 174 reptile species of which many are found in the Chagai desert. Of these crocodile, gharial, python, and two species of turtle, are endangered. The beaches west of Karachi are an important turtle nesting ground as are parts of the Balochistan coast.

Fish species diversity is greatest in the Indus River, Kirthar national park, and the Northern areas. Marine crustaceans and molluscs are financially important.

12.4.2 Conservation Areas

To date 190 conservation areas have been designated in Pakistan consisting of National Parks, wildlife sanctuaries, and game reserves. These cover 7.3 million hectares of the country.

National Parks are large areas of outstanding natural and scenic beauty whose prime function is to protect landscape, fauna and flora in its natural state. Public access is allowed for recreation, education and research. No hunting or trapping is allowed. Forestry products can be harvested on a sustainable basis.

Wildlife sanctuaries are areas which have been set aside for breeding grounds. Public access, human settlement and livestock grazing is prohibited.

Game reserves are areas where controlled hunting is permitted but not of protected species.

The most critically affected ecosystems are :

- **The Juniper forests of Balochistan.** These have trees over 2,500 years old as well as two endangered animals. The forests are not commercially harvested but are exploited for fuelwood by the locals. Overgrazing by animals hinders regrowth. The Ziarat Juniper Wildlife Sanctuary covers 37,000 hectares but there is no control over the activities of the local population.
- **The Chagai Desert in Balochistan.** This has many endemic species and two rare carnivores of the fox and cat families. There are several proposals to establish wildlife sanctuaries. It is a favorite hunting ground.
- **The Indus River Basin.** The Indus river basin supports a very diverse range of ecological conditions and is under considerable pressure. Riverain forests have been cleared for agriculture. Also irrigation diversions have deprived the riverain forests of water. Diversions for hydroelectric power have also lowered the freshwater flows into the delta which has increased the salinity of the estuary. This has eliminated several mangrove species.
- **The Himalayan Moist Temperate Forest.** These occur in NWFP, AJK and the Northern areas. This forest type is rich in flora and fauna and is being increasingly harvested commercially. New road schemes to facilitate access may add to this. The area contains many endemic and threatened species including the Himalayan Musk Deer and the western tragopan, a type of pheasant. This is classed as the most endangered species of pheasant in the world.

Details of these areas and their location were obtained. This information was used in the project appraisal to prepare the Initial Environmental Examinations.

12.4.3 Environmental Effects Connected With Transportation Projects

New road systems can open up areas which were previously infrequently visited. This can then lead to rapid unplanned and uncontrolled incursion of new populations. If this leads to more grazing of vegetation, cutting of trees for fuel wood, and demands for potable water then an already fragile ecosystem may be stressed beyond its capacity.

Apart from the loss of biodiversity, disturbance of habitats can have secondary effects. Destruction of mangrove ecosystems is thought to contribute to the silting problems of Port Qasim. A mangrove preservation program is being implemented which should stabilize the coastal erosion and shelter the coastal belt behind the littoral beach area where new coastal roads may be constructed.

The location of airports in the migratory routes of birds can lead to birdstrikes which can destroy aircraft engines.

Soil erosion can occur due to wind induced effects where vegetative cover and topsoil has already been lost. This particularly applies to sand dunes which occur along the southern coast. Sand dune stabilization programs are being implemented by the planting of salt tolerant and hardy species which can reduce sand loss and the constant need to clear roads and airports of sand deposits.

12.4.4 Comparison of Environmental Effects From Candidate Projects

The approach taken has been to carry out an environmental appraisal of the possible candidate components of the overall study. These were based on the Seventh Five Year Plan and the Report of the Committee on Transport, Planning Commission 1992. The comparison of these aspects is given in Figure 12.1. This reviews the overall plan sector by sector, gives the strategy, identifies the components, describes relevant environmental factors and states whether an IEE will be required. The IEE is given, where necessary, in tabular form later in the report.

Figure 12.1 Comparison Of Environmental Indicators among Projects

COMPARISON OF ENVIRONMENTAL INDICATORS BETWEEN PROJECTS				
SECTORS	STRATEGY	POSSIBLE COMPONENTS IN 8th FIVE YEAR PLAN	ENVIRONMENTAL FACTORS	IEE NEED
ROADS	Improve Primary Highway Network	Upgrade all National Highways and Provincial Highways that carry heavy vehicles.	If the improved route follows the existing alignment then the new road should not cause severance. This should avoid difficulties of access or interference with rights of way, tribal movement paths for animals and grazing rights. There may be an increase in noise levels but a decrease in air pollution due to higher fuel efficiency and increased dispersion due to faster moving traffic. If the new road is dual carriageway then safety should improve due to carriageway separation. For roads with large volumes of high speed traffic it is necessary to prevent uncontrolled crossing. Footbridges should be provided. If herds of animals need to cross the road then footbridges are not appropriate and underpasses may be necessary. Otherwise accidental killing of animals can lead to strong local opposition. Changes of drainage patterns should be checked. Many areas are already suffering salinity problems due to inadequate drainage.	YES
		Make N5 dual carriageway: Karian - Rawalpindi Chablat - Nowshera Lahore - Sahiwal Upgrade N25 Karachi - Quetta Hub - Bela Kuraro Upgrade N35 Hassan Abdal - Abbotabad Upgrade N40 Quetta - Taftan Construction/improvement N55 Indus Highway Dualisation Kashmore-DG Khan Upgrade N70 Quetta - Taftan		YES YES YES YES
	Improve Provincial Highway Network Open up isolated rural areas	Construction of new rural roads	Need to carefully consider landuse issues and avoid protected areas such as national parks. Opening up of previously inaccessible areas can bring benefits to the local residents through access to medical facilities, schools and markets. Conversely such easy access can allow illegal hunting which with 4 WD vehicles and high powered rifles can exceed permitted bag limits. Creation of new roads can encourage congregation of nomadic villagers with their animals. If forage, grazing and water are inadequate then overuse of foodstocks and water occurs. Soil erosion and loss of arable land can result. Overloading of resources should be considered by taking an integrated planning approach. Coastal roads along the Makran coast may open beaches to tourists. There are protected areas due to turtle breeding (endangered species) and this access must be carefully controlled to prevent interference with breeding patterns. Conservation areas should be avoided.	YES YES
	Urban Transportation. Allow existing system to operate to full capacity by removing bottlenecks	Ring Roads	Reduction in congestion in city centres will alleviate air pollution from heavy vehicles. Main noise source is air horn on trucks which would be removed from city centres. May increase vibration levels on roads damaging surface if not adequately designed. Environmentally beneficial	YES YES NO
	New Bypass	Bicycles to be provided with traffic lanes in city centres. Sukkur Bypass and bridge over Indus Lahore Bypass and Bridge over Ravi Hyderabad Bypass Lowari Tunnel	Reduces road traffic and alleviates congestion in city centres. Reduces road traffic and alleviates congestion in city centres. As above Effects of blasting	YES YES YES YES
	Tunnels			
	Modal Split to be equitable	Reallocate from roads to railways	Reduces road traffic	NO

RAILWAYS	Supplemental measures to fully utilise existing facilities	Electrify: Lala Musa to Rawalpindi Lahore to Lala Musa Samasata to Khanewal Sibi to Quetta Kiamori to Samasata	Could result in improvement due to reduced noise levels from locomotive.	NO
		Track doubling: Lohdran to Shersah Multan to Khanewal Khanewal to Raiwind	Some minor temporary disturbance during construction due to track widening.	YES
	New facilities for freight	Establish freight collection bases and arrange transport to and from these bases.	Any new transportation interchange will encourage tertiary facilities such as roadside shops, foodstalls, and workshops alongside the road in 'ribbon development.' If allowed to develop in an uncontrolled manner this can be unsightly. Specific areas should be set aside for these facilities with areas allocated to prevent vehicles abruptly pulling on and off main highways. Vehicle repair facilities should be removed from the main road by an imposed setback. Their location can be indicated by signage, but as their appearance is usually of the scrap yard type and unsightly they should be assigned a specific location away from the main road.	YES
	Improve speed and tractive force	Electrification	Electrification will increase power demand on the national grid which is already overloaded. This demand should be included in the national energy sector balance.	NO

PORTS	Karachi Port Improve handling capacity	New container terminal with 6 new berths 1 new bulk berth Liquid products terminal	Temporary disturbance to marine ecosystem may result due to dredging. Nearby are mangrove areas which are already over stressed and of high ecological value. Careful attention must be given to preserving these.	YES
	Reduce handling and waiting time	Improve customs facilities Improve road/rail links from and to the port New bridge Dredging/purchase of dredger	Liquid products terminal requires pipelines and tank farms for storage. All tank farms should have protective bunds to contain 110% of storage capacity of largest tank. If above ground, pipelines should be protected from vehicles by crash barriers.	YES
	Port Qasim Service Pak-Iran oil refinery	New oil terminal LPG Terminal Container terminal Grain Terminal Fertiliser Terminal Utilisation of 4,000 hectares of unused land Additional suction hopper dredger; dredging to 3.5 m	Dredging is required to maintain channel depth. Dumping ground of collected silt should be specified to avoid increased turbidity by dumping in breeding or spawning grounds or close to mangroves. Mangroves should be preserved as they assist in the control of siltation at Port Qasim. LPG is classed as a potentially hazardous material due to its explosive nature. Any storage in excess of 20 tonnes is potentially hazardous. Influence of explosion/fireball can be several hundreds of meters. The location of any LPG storage should be carefully considered as it may act as an initiating event to other nearby facilities such as oil storage tanks. Grain and fertiliser bulk storage in hoppers can lead to high concentrations of fine dust and air pollution control equipment may be necessary.	YES
				YES

	Gwadar	<p>New miniport</p> <p>Stage 1: Expand miniport to take 8,000 t DWT</p> <p>Dredge to give 7.5m draft</p> <p>Stage 2: Expand to take 50,000 t DWT</p> <p>Stage 3: Expand to take 100,000 t DWT</p> <p>Provide connecting roads</p> <p>Provide connecting pipelines for liquid products</p>	<p>Extensive dredging may ultimately be needed. The nearby mangroves of Gwadar bay should be considered when deciding where spoil is to be tipped.</p> <p>Also the comments given above may apply depending on the future activities of the port.</p>	
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SHIPPING	Need to upgrade and increase size of merchant fleet	<p>Intention to purchase:</p> <p>Container vessels:7</p> <p>Bulk Carriers:2</p> <p>Crude Oil Tanker:1</p> <p>Product Oil Tanker:1</p> <p>Edible oil carrier:1</p> <p>Passenger Ferries/RORO:2</p>	<p>If large crudetankers/ product tankers are used an oil spill contingency plan is required. Although crude oil spills are more difficult to clean up, product spills can be more toxic to marine life. Both scenarios should be considered.</p>	YES
INLAND WATERWAYS	Use of inland waterways. There are 2,000 km of navigable waterways which could be useful	<p>Navigable waterways from: Port Qasim to Kalabagh Mitharkot to Lahore</p> <p>Feasibility Study is under preparation.</p> <p>Allocation of 5,000 M Rs in budget.</p>	<p>The section of the Indus river between Guddu and Sukkur barrage is the Indus river Game reserve. This provides a habitat for the Indus river Dolphin, an endemic and endangered species. Under no circumstances could disturbance to breeding patterns or habitats be permitted without potential extinction of the species. If canal bank works or dredging of navigation channels is necessary then careful consideration should be given to ways of accomodating the needs of this species.</p>	YES

AIRPORTS				
	Construction of New International Airport in order to promote tourism	New international airport: Islamabad All above to be built on B.O.T. basis:	New international airports are intended to accommodate large long haul aircraft. Schedules are arranged to allow convenient arrival times at foreign destinations and this can imply night flights. Noise levels from fully loaded long range aircraft on take off can be excessive if sensitive areas are located beneath the flight path. These include residential property, hospitals and schools. Restrictions on take off at night may be necessary. Landing at night may be permissible.	YES
	Construction of New Feeder Airports	Mansehra D.G.Khan	Close liaison with the town planning authorities should be maintained. Orientation of runways is usually dictated by operational requirements. For new runways, and new noise sensitive buildings checks should be made on their relative location. Noise contours should be plotted based on the fleet mix to determine planning constraints. In high noise areas other development can be encouraged such as factories, warehouse or perhaps offices.	
	Extension of existing runways to allow use of jets	Gwadar Turbat Moenjodaro Sukkur Multan Bahawalpur Bhagtanwala D.I.Khan Gilgit		
	Extension of passenger terminal	Lahore; new terminal complex Others; Extension of existing passenger terminal buildings	New terminals allow more passengers which require more infrastructure. This includes additional potable water supply, waste disposal, car parking, low cost transport to city centre, and waiting facilities for family members accompanying departing Haj passengers.	YES
	Purchase of new aircraft	Following aircraft to be purchased: Wide bodied - 1 Airbus A310 - 7 B737 - 2 Turboprop - 3	In general purchase of new aircraft will improve noise conditions as older noisier aircraft are phased out. Wide bodied aircraft and airbus are new generation of relatively quiet aircraft due to high bypass ratio engines. Older aircraft such as 737 and some turboprops can be noisy on takeoff.	NO
	Encouragement of Private Sector	Older aircraft to be used	It is commonplace for secondhand aircraft to be used in countries where their lack of certification does not prohibit their operation. These aircraft can be noisy, particularly older jets. The fleet mix and the noise implications should be carefully examined.	YES

12.5 Approach to the Appraisal

The approach to the appraisal has been in accordance with the JICA Environmental Guidelines, that is to :

- Identify all subprojects
- Give a description of the project, site description and overview of the environmental setting.
- Screen subprojects by means of preparing IEE's
- Comment on adverse environmental effects
- State if an EIA is required and scope the requirements of an EIA

The candidate projects have been examined. Where necessary site visits were made to the relevant locations. Sites visited are given in Appendix 12.3. The descriptions of the candidate projects are given in Figures 12.2(A), 12.3(A), 12.4(A) etc. The corresponding IEE appraisals are given in Figures 12.2(B), 12.3(B), 12.4(B) etc.

12.6 Results of Environmental Appraisals

12.6.1 Airports

The IEE is shown in Figures 12.2(A)/(B). Key factors are the choice of aircraft and the location and orientation of the direction of the runway. For any new airport an EIA should be carried out following the scope of works indicated in the IEE.

12.6.2 Makran Coast Roads

The IEE is shown in Figures 12.3(A)/(B). The Makran coast includes an area of Special Ecological Significance which is the breeding grounds for a rare turtle species. An EIA is not required but the breeding grounds must be avoided in any future development.

12.6.3 Inland Waterways

The IEE is shown in Figures 12.4(A)/(B). The economic viability of using inland waterways is dubious as there are conflicting uses with navigation, irrigation, drainage and hydropower usage. The possible route includes the breeding ground of the Indus Dolphin, an extremely rare cetacean considered an endangered species whose habitat must be avoided if development were to occur. Further development must be accompanied by a full EIA following the scope of works indicated in the IEE.

12.6.4 Kohat Tunnel

The IEE is shown in Figures 12.5(A)/(B). An EIA is required for this operation and has in fact already been completed (PCI 1993). In agreement with the findings of the EIA no adverse environmental effects are anticipated in connection with this tunnel project.

12.6.5 Lowari Tunnel

The IEE is shown in Figures 12.6(A)/(B). This a major project and has been discussed politically for many years. The tunnel and approach roads are in a remote high alpine area and apart from construction effects major adverse environmental impacts are not anticipated from the tunnel itself. However of major importance are the secondary effects of opening up the Chitral Valley to

tourism and development. In particular the Chitral valley contains the Kalash peoples who are an endemic populace with a long history. They have a unique pastoral culture based on animism and barter, and at present attract many tourists. The preservation of this culture should be a high priority. An EIA is required and this is already under preparation. (SWECO/PCI 1994). A full comprehensive report on the Lowari Tunnel is given in Appendix 12.4.

12.6.6 Lahore Bypass

The IEE is shown in Figures 12.7(A)/(B). This project will form part of the NHA program linking the motorway and the Multan road. The environmental aspects have already been studied as part of the Punjab Urban Development Loan project (World Bank) and no major adverse environmental effects are anticipated. A full EIA is not considered necessary.

12.6.7 Sukkur Bypass

The IEE is shown in Figures 12.8(A)/(B). Although this is a routine road improvement scheme a full EIA should be carried out at the time of route alignment finalisation in accordance with the scope of works outlined in the IEE.

12.6.8 National Highways

The IEE is shown in Figures 12.9(A)/(B). Environmental aspects have been included in the design of several sections of the road. An EIA on the southern section of the Indus Highway has already been completed. (PCI 1992). In an attempt to control vehicle pollution and avoid long distance traffic entering town centres The NWFP EPA in Peshawar are implementing a Vehicle Emissions Testing Station and policing procedures. If possible this should be supported.

12.6.9 Railways

The IEE is shown in Figures 12.10(A)/(B). No adverse environmental effects are anticipated and a full EIA is not required.

12.6.10 Shipping

The IEE is shown in Figures 12.11(A)/(B). Karachi port is currently undergoing a feasibility review as part of a World Bank loan and a study of the water quality is included in this. Another aspect which needs examination is an audit of the sources of pollution discharging into the port which are a major cause of the poor conditions. This aspect is not being currently addressed and should be investigated.

Port Qasim and the industrial land area immediately behind it are undergoing rapid development. The air quality is rapidly deteriorating due to power stations and steel works. The mangrove swamps around the port are of high ecological value. This is recognised by the port authorities who have set up an environmental section. Oil spill control equipment has been purchased but the section is in need of more assistance and laboratory facilities. A comprehensive report on this is included in Appendix 12.5.

Sindh EPA have major program to generate environmental awareness among industries to limit their discharges to the ocean, and are coordinating a marine pollution committee. They are in need of major assistance to formulate a long term strategy and define the extent of marine pollution. This could be by means of a baseline study and a planned pollution control program.

Additional shipping purchases are being considered. These may include tankers for raw and finished products. These should be vessels having double hulled or similar to avoid the possibility of a major spill in the event of a collision or similar incident.

Figure 12.2 (A) Environmental Baseline Condition Of Projects

CANDIDATE PROJECT : Airport and Aviation

ITEM		DESCRIPTION
Project Name		Airports and Aviation
Background		At present international traffic passes through Islamabad, Karachi, or Lahore.
		There is a need to upgrade these facilities to handle more passengers including Haj passengers. There are a large number of provincial airports that handle regional traffic and act as feeder airports to the hub system.
Objectives		
Location		All Pakistan.
Executing Agency		Civil Aviation Authority, Ministry of Communications
Beneficiaries		Commercial transporters and travelers within Pakistan
Project Components		
Type of Project		Upgrade of some existing airports, construction of new airports, general upgrade of equipment and purchase of new aircraft.
Type of Construction		Karachi; extension of secondary runway, reconstruction of main runway.
		Islamabad; new airport.
		Lahore; new terminal building
		New feeder airport at : Sehwan Sharif, Sindh
		Sialkot, DG Khan, Punjab; Mansehra, NWFP.
Target Year		2005 - 2006
Traffic Volume		International: 7,072,000
		Domestic: 19,300,000
Supplemental Facilities		Purchase of new aircraft, type not yet decided.
Social	Inhabitants	Residents of areas around airports
Environment		
	Land Use	Urban and rural.
	Economy	Farmers and fishermen.
Natural	Topography	Varies, mainly low lying flat areas with exception of some Northern Areas and parts of Balochistan.
Environment		
	Fauna Flora	Occasional migratory bird patterns.
Pollution	Complaints	Occasional noise complaints about Islamabad airport from residents of Rawalpindi.

Figure 12.2 (B) Environmental Screening of Candidate Projects

PROJECT: Airport and Aviation

NO.	ENVIRONMENTAL ITEM	DESCRIPTION	EVALUATION	REMARKS
SOCIAL ENVIRONMENT				
1	RESETTLEMENT	Resettlement due to land occupancy	No	
2	ECONOMIC ACTIVITIES	Loss of basis for economic activity	No	
3	TRAFFIC & PUBLIC FACILITIES	Impacts on schools hospitals and present traffic conditions	Possible	Hospitals and schools are noise sensitive receptors. The orientation of the runway can have a significant effect on the intrusive effects of noise levels. The location of sensitive receptors should be identified before agreeing the direction of the runway of new airports. For extension of new airports night flights should be restricted if intrusive. In both cases (new and extension) Noise Exposure Forecast (NEF) contours should be predicted for the type and mix of aircraft before proceeding with new airport construction. These should refer to population densities.
4	SPLIT OF COMMUNITIES	Community split due to interruption of area traffic	No	
5	CULTURAL PROPERTY	Damage to or loss of archaeological remains or cultural assets	No	
6	WATER RIGHTS & RIGHTS OF COMMONS	Obstruction of fishing rights, water rights or rights of commons	No	
7	PUBLIC HEALTH	Deterioration of public health and sanitary conditions due to generation of garbage and increase of vermin	No	
8	WASTE	Generation of construction and demolition waste debris and logs	No	
9	HAZARDS & RISK	Increase in risks of landslides, cave ins and accidents	No	
NATURAL ENVIRONMENT				
10	TOPOGRAPHY & SOILS	Changes of valuable topography and geology due to excavation or filling work	Yes	Additional runways and taxiing areas create impermeable areas which increase the rainfall runoff. This may require additional drainage. If the airport is at high altitude, in winter deicing fluids may be used which can have adverse effects on water courses and streams
11	SOIL EROSION	Topsoil erosion by rainfall after reclamation and vegetation removal	No	
12	GROUNDWATER	Change of distribution of groundwater by large scale excavation	No	
13	HYDROLOGICAL SITUATION	Changes of river discharge and riverbed condition due to landfill and drainage inflow	No	
14	COASTAL ZONE	Coastal erosion and sedimentation due to landfill or change in marine condition	No	
15	FAUNA & FLORA	Obstruction of breeding and extinction of species due to changes of habitat conditions	Possible	Pakistan lies on the flight route of several migratory species of birds. Any new airport must take account of this in relation to birdstrikes.
16	METEOROLOGY	Changes of temperature precipitation wind etc due to large scale land reclamation and building construction	No	
17	LANDSCAPE	Change of topography and vegetation due to reclamation. Deterioration of aesthetic harmony by structures	No	
POLLUTION				
18	AIR POLLUTION	Pollution caused by exhaust gas or toxic gas from vehicles.	Possible	Some limited air pollution may occur from aircraft operations and particularly during taxiing. This is worst in hot still conditions e.g. in an enclosed valley floor.
19	WATER POLLUTION	Pollution by inflow of silt sand and effluent into rivers and groundwater	No	
20	SOIL CONTAMINATION	Contamination of soil by dust and chemicals such as herbicides	No	
21	NOISE & VIBRATION	Noise and vibration generated by vehicles	Yes	Noise predictions should be made to give contours of equal loudness. Planning restrictions should be imposed on development in any area with noise levels in excess of 35 NEF.
22	LAND SUBSIDENCE	Deformation of land and land subsidence due to lowering of groundwater table	No	
23	OFFENSIVE ODOUR	Generation of exhaust gases and offensive odour by facility construction and operation	No	If dispersion is poor such as in valleys experiencing an atmospheric inversion then smell complaints may arise over the "kerosene" smell of aircraft operations.
OVERALL EVALUATION				
EIA OR EIA NECESSARY		YES. EIA essential to determine noise effects of intensification of use or new airport. This must be done before alignment of runway is finalised. This may be overridden by operational requirements.		

Figure 12.3 (A) Environmental Baseline Condition of Project

CANDIDATE PROJECT: Makran Coastal Road

ITEM	DESCRIPTION
Project Name	Improvements to Mekran Coastal Road
Background	The road linking Gwadar port with Karachi is in need of improvement. The new small port at Gwadar is intended to assist fishermen land their catch and planned refridgeration facilities will allow them to transport their catch to market if a suitable road exists.
Objectives	To improve existing road and give better communication to coastal communities.
Location	Southern coast of Pakistan
Executing Agency	NHA / Provincial Govt.
Beneficiaries	Coastal villages and fishermen on Makran coast.
Project Components	
Type of Project	Rehabilitation of existing road.
Type of Road	Two lane blacktop.
Target Year/ Traffic volume	In Year 2010; a staged construction project; flow not known.
Extension/Width/Lanes	Not detailed yet
Road Structure	All weather surface
Supplemental Facilities	Maintenance services.
Social	
Inhabitants	Area very remote, low population density.
Environment	
Land Use	Mainly rural areas with few dwellings
Economy	Fishing, pastoral, animal husbandry.
Natural	
Topography	Flat coastal region, subtropical arid region.
Environment	
Fauna Flora	Little surface vegetation, coastal fringe is breeding ground for rare species of turtle which lays its eggs in the intertidal sands and is classed as an endangered species.
Pollution	
Complaints	No complaints regarding pollution.
Measures taken	

Figure 12.3 (B) Environmental Baseline Condition of Project

PROJECT: Mekran Coastal Road

NO	ENVIRONMENTAL ITEM	DESCRIPTION	EVALUATION	REMARKS
SOCIAL ENVIRONMENT				
1	RESETTLEMENT	Resettlement due to land occupancy	No	
2	ECONOMIC ACTIVITIES	Loss of basis for economic activity	No	
3	TRAFFIC & PUBLIC FACILITIES	Impacts on schools hospitals and present traffic conditions	Yes	Beneficial.
4	SPLIT OF COMMUNITIES	Community split due to interruption of area traffic	No	
5	CULTURAL PROPERTY	Damage to or loss of archaeological remains or cultural assets	No	
6	WATER RIGHTS & RIGHTS OF COMMONS	Obstruction of fishing rights, water rights or rights of commons	No	
7	PUBLIC HEALTH	Deterioration of public health and sanitary conditions due to generation of garbage and increase of vermin	Possible	The construction camps will house large numbers of workers. Adequate and efficient sanitary facilities must be provided although polluting of water courses is unlikely due to proximity of sea. Septic tanks should not be located within 100 metres of wells or streams. Solid waste should be disposed of on site and grazing animals should be prevented from access. Waste should be buried and covered by 0.5 metres of soil.
8	WASTE	Generation of construction and demolition waste debris and logs	No	
9	HAZARDS & RISK	Increase in risks of landslides, cave ins and accidents.	No	
NATURAL ENVIRONMENT				
10	TOPOGRAPHY & SOILS	Changes of valuable topography and geology due to excavation or filling work	No	
11	SOIL EROSION	Topsoil erosion by rainfall after reclamation and vegetation removal	No	
12	GROUNDWATER	Change of distribution of groundwater by large scale excavation	No	
13	HYDROLOGICAL SITUATION	Changes of river discharge and riverbed condition due to landfill and drainage inflow	Possible	Location of road over streams should be made to avoid localised flooding. Otherwise no anticipated effects.
14	COASTAL ZONE	Coastal erosion and sedimentation due to landfill or change in marine condition	Possible	Borrow pits and spoil heaps should be sited so as to avoid flooding or silting of streams.
15	FAUNA & FLORA	Obstruction of breeding and extinction of species due to changes of habitat conditions	Possible	The road should be set back sufficiently from the road to discourage road users from accessing the beach during turtle egg laying season. Any roadside lighting near the beach should be low level or facing inland to avoid confusing the newly creatures.
16	METEOROLOGY	Changes of temperature precipitation wind etc due to large scale land reclamation and building construction	No	
17	LANDSCAPE	Change of topography and vegetation due to reclamation. Deterioration of aesthetic harmony by structures	No	
POLLUTION				
18	AIR POLLUTION	Pollution caused by exhaust gas or toxic gas from vehicles and factories	Yes	Due to excessive emissions of vehicles increase in air pollution is likely. Pressure should be brought to bear to reduce and control smoking vehicles through liaison with EPA and Police.
19	WATER POLLUTION	Pollution by inflow of salt sand and effluent into rivers and groundwater	Yes	Possible if spoil tips and borrow areas improperly sited.
20	SOIL CONTAMINATION	Contamination of soil by dust and chemicals such as herbicides	No	
21	NOISE & VIBRATION	Noise and vibration generated by vehicles	No	Due to low population densities not considered a problem.
22	LAND SUBSIDENCE	Deformation of land and land subsidence due to lowering of groundwater table	No	
23	OFFENSIVE ODOUR	Generation of exhaust gases and offensive odour by facility construction and operation	Yes	Needs careful selection of route in relation to any existing houses.
OVERALL EVALUATION				
	IS EIA NECESSARY	YES, site specific EIA should be carried out prior to road construction to ensure avoidance of turtle areas.		

Figure 12.4 (A) Environmental Baseline Condition of Project

CANDIDATE PROJECT : Inland Waterways

ITEM		DESCRIPTION
Project Name		Inland Waterways
Background		Shipment of bulk materials from Karachi inland to Lahore, Peshawar, and the interior must travel by road or rail. It has been suggested that the Indus river and the system of irrigation canals could be used as a navigation system.
Objectives		To allow cheaper and more reliable movement of non perishable goods.
Location		All Pakistan excluding Balochistan.
Executing Agency		Ministry of Communications
Beneficiaries		Commercial transporters and industrialists of Pakistan
Project Components		
Type of Project		Canalisation of River Indus, upgrade of link canals and construction of locks.
Type of Construction		River training, dredging, earthworks
Target Year		2000
Traffic Volume		Not Known, feasibility study under preparation
Supplemental Facilities		Dock side facilities
Social	Inhabitants	Residents of interior Sindh, NWFP and borders of Punjab.
Environment	Land Use	Mainly rural area with some animal grazing.
	Economy	Farmers and fishermen.
Natural	Topography	Flat, in flood plain of River Indus.
Environment	Fauna Flora	Passes through the Indus Dolphin Sanctuary. This is a blind cetacean, endemic to the area and considered an endangered species.
Pollution	Complaints	Heavy pollution load carried by the River Indus from Pakistan and India.

Figure 12.4 (B) Environmental Baseline Condition of Project

PROJECT: Inland Waterways

NO.	ENVIRONMENTAL ITEM	DESCRIPTION	EVALUATION	REMARKS
SOCIAL ENVIRONMENT				
1	RESETTLEMENT	Resettlement due to land occupancy	No	
2	ECONOMIC ACTIVITIES	Loss of basis for economic activity	No	
3	TRAFFIC & PUBLIC FACILITIES	Impacts on schools hospitals and present traffic conditions	No	
4	SPLIT OF COMMUNITIES	Community split due to interruption of area traffic	No	
5	CULTURAL PROPERTY	Damage to or loss of archaeological remains or cultural assets	No	
6	WATER RIGHTS & RIGHTS OF COMMONS	Obstruction of fishing rights, water rights or rights of commons	Possible	Maybe some interruption to traditional fishing rights
7	PUBLIC HEALTH	Deterioration of public health and sanitary conditions due to generation of garbage and increase of vermin	No	
8	WASTE	Generation of construction and demolition waste debris and logs	Not Likely	
9	HAZARDS & RISK	Increase in risks of landslides, cave ins and accidents	No	
NATURAL ENVIRONMENT				
10	TOPOGRAPHY & SOILS	Changes of valuable topography and geology due to excavation or filling work	Yes	Some river training will be necessary
11	SOIL EROSION	Topsoil erosion by rainfall after reclamation and vegetation removal	No	
12	GROUNDWATER	Change of distribution of groundwater by large scale excavation	No	
13	HYDROLOGICAL SITUATION	Changes of river discharge and riverbed condition due to landfill and drainage inflow	Yes	Some Dredging will take place which may alter river flow regime. Also some water used for irrigation purposes may be diverted and this may deprive agricultural land of essential supplies.
14	COASTAL ZONE	Coastal erosion and sedimentation due to landfill or change in marine condition	Possible	Additional restriction of flow by locks and barrages may reduce freshwater flows to coastal mangrove systems with adverse effects.
15	FAUNA & FLORA	Obstruction of breeding and extinction of species due to changes of habitat conditions	Yes	The route will pass through the Indus Dolphin Reserve which contains the Blind Indus Dolphin, an endangered species included on the IUCN Red List.
16	METEOROLOGY	Changes of temperature precipitation wind etc due to large scale land reclamation and building construction	No	
17	LANDSCAPE	Change of topography and vegetation due to reclamation. Deterioration of aesthetic harmony by structures	No	
POLLUTION				
18	AIR POLLUTION	Pollution caused by exhaust gas or toxic gas from vehicles and factories	No	
19	WATER POLLUTION	Pollution by inflow of silt sand and effluent into rivers and groundwater	No	
20	SOIL CONTAMINATION	Contamination of soil by dust and chemicals such as herbicides	No	
21	NOISE & VIBRATION	Noise and vibration generated by vehicles	No	
22	LAND SUBSIDENCE	Deformation of land and land subsidence due to lowering of groundwater table	No	
23	OFFENSIVE ODOUR	Generation of exhaust gases and offensive odour by facility construction and operation	No	
OVERALL EVALUATION				
IEE OR EIA NECESSARY		YES. EIA essential to accommodate needs of fauna (Indus Dolphin) and flora (coastal mangrove ecosystem)		

Figure 12.5 (A) Environmental Baseline Condition of Project

CANDIDATE PROJECT : Kohat Tunnel

ITEM		DESCRIPTION
Project Name		Kohat Tunnel
Background		The Indus Highway between Peshawar and Kohat passes over the Kohat pass. This is a very steep road at an altitude of approximately 1000 metres and contains many hairpin bends.
Objectives		The project will allow traffic to pass from the GT to Kohat more easily.
Location		Between Kohat and Peshawar in NWF Province.
Executing Agency		NHA
Beneficiaries		Persons using Indus Highway from Peshawar to Kohat
Project Components		A tunnel of 1.9 km length and 25 km of approach roads.
Type of Project		Tunnel and approach roads.
Type of Road		Two lane single carriageway of 7.3 metres.
Target Year		2000
Traffic Volume		As Indus Highway
Extension/Width/Lanes		Resurfacing of existing, 7.3 m. carriageway with 3.0 m shoulders, 2 lanes
Road Structure		AC base course, AC wearing course, aggregate base course, granular subbase.
Supplemental Facilities		Ventilation, lighting, safety, electricity, operations systems.
Social	Inhabitants	Remote area, very few.
Environment	Land Use	Scrub vegetation, some grazing.
	Economy	Pastoral, animal husbandry.
Natural	Topography	Mountainous and steeply undulating.
Environment	Fauna Flora	Some migratory birds, grazing goats and sheep, no endemic or rare species.
Pollution	Complaints	Apart from difficulties in traversing pass, none.

Figure 12.5 (B) Environmental Baseline Condition of Project

PROJECT: Kohat Tunnel

NO.	ENVIRONMENTAL ITEM	DESCRIPTION	EVALUATION	REMARKS
SOCIAL ENVIRONMENT				
1	RESETTLEMENT	Resettlement due to land occupancy	No	
2	ECONOMIC ACTIVITIES	Loss of basis for economic activity	No	
3	TRAFFIC & PUBLIC FACILITIES	Impacts on schools hospitals and present traffic conditions	Yes	Improvement on present traffic situation
4	SPLIT OF COMMUNITIES	Community split due to interruption of area traffic	No	
5	CULTURAL PROPERTY	Damage to or loss of archaeological remains or cultural assets	No	
6	WATER RIGHTS & RIGHTS OF COMMONS	Obstruction of fishing rights, water rights or rights of commons	No	
7	PUBLIC HEALTH	Deterioration of public health and sanitary conditions due to generation of garbage and increase of vermin	Possible	Construction camps must be provided with adequate water supply, sanitary waste treatment and garbage disposal facilities.
8	WASTE	Generation of construction and demolition waste debris and logs	Possible	Spoil tips of rock material must be carefully selected.
9	HAZARDS & RISK	Increase in risks of landslides, cave ins and accidents	No	
NATURAL ENVIRONMENT				
10	TOPOGRAPHY & SOILS	Changes of valuable topography and geology due to excavation or filling work	No	
11	SOIL EROSION	Topsoil erosion by rainfall after reclamation and vegetation removal	No	
12	GROUNDWATER	Change of distribution of groundwater by large scale excavation	No	
13	HYDROLOGICAL SITUATION	Changes of river discharge and riverbed condition due to landfill and drainage inflow	No	
14	COASTAL ZONE	Coastal erosion and sedimentation due to landfill or change in marine condition	No	
15	FAUNA & FLORA	Obstruction of breeding and extinction of species due to changes of habitat conditions	No	
16	METEOROLOGY	Changes of temperature precipitation wind etc due to large scale land reclamation and building construction	No	
17	LANDSCAPE	Change of topography and vegetation due to reclamation. Deterioration of aesthetic harmony by structures	No	
POLLUTION				
18	AIR POLLUTION	Pollution caused by exhaust gas or toxic gas from vehicles and factories	No	Due to short length of tunnel, ventilation should not be a problem
19	WATER POLLUTION	Pollution by inflow of silt sand and effluent into rivers and groundwater	No	
20	SOIL CONTAMINATION	Contamination of soil by dust and chemicals such as herbicides	No	
21	NOISE & VIBRATION	Noise and vibration generated by vehicles	Possible	Some, but limited as there is low residential density so problems not anticipated.
22	LAND SUBSIDENCE	Deformation of land and land subsidence due to lowering of groundwater table	No	
23	OFFENSIVE ODOUR	Generation of exhaust gases and offensive odour by facility construction and operation	Possible	Ventilation outlets must be carefully located, but low residential density.
OVERALL EVALUATION				
IEE OR EIA NECESSARY		No		

Figure 12.6 (A) Environmental Baseline Condition of Project

CANDIDATE PROJECT:Lowari Tunnel

ITEM		DESCRIPTION
Project Name		Lowari Tunnel
Background		Chitral in Northwest Frontier Province is very remote and isolated from the rest of Pakistan. Access is only possible over the Lowari Pass at elevation 3,000 metres. This is closed by snow for 6 months of the year.
Objectives		To provide all weather access.
Location		Between Dir and Chitral Districts NWFP
Executing Agency		NHA / Provincial Govt.
Beneficiaries		Inhabitants of Chitral District and valley; 300,000 persons.
Project Components		
Type of Project		Construction of 9 km tunnel and access roads
Type of Road		Highway and tunnel in mountainous area.
Target Year/ Traffic volume		In Year 2000; 200 vehicles day
Extension/Width/Lanes		Rehabilitation of 25 km road, Width 7.3 m., No. of Lanes = 2
Road Structure		Tunnel
Supplemental Facilities		Maintenance services, emergency services.
Social	Inhabitants	Area very remote, low population density in vicinity of tunnel.
Environment		Chitral District includes the valleys of the Kalash peoples which is a very old and unique culture, unique to the region.
	Land Use	Mountainous area; very few dwellings
	Economy	Pastoral, animal husbandry.
Natural Environment	Topography	Mountainous alpine slopes, and in summer, snow covered in winter, Chitral valley fertile and productive.
	Fauna Flora	Substantial forest cover despite heavy deforestation in lower valley. Little surface vegetation, no indigenous or endemic rare species of flora or fauna.
Pollution	Complaints	No complaints regarding pollution. All complaints refer to lack of all year access. Remedial measures are provision of all weather route. There are alternatives including road through Afghanistan.
	Measures taken	

Figure 12.6 (B) Environmental Baseline Condition of Project

PROJECT: LOWARI TUNNEL

NO	ENVIRONMENTAL ITEM	DESCRIPTION	EVALUATION	REMARKS
SOCIAL ENVIRONMENT				
1	RESETTLEMENT	Resettlement due to land occupancy	No	Tunnel involves no landtake and spoiltips will be carefully sited.
2	ECONOMIC ACTIVITIES	Loss of basis for economic activity	No	Tunnel will provide all year access and enhance economy of area.
3	TRAFFIC & PUBLIC FACILITIES	Impacts on schools hospitals and present traffic conditions	Yes	Beneficial.
4	SPLIT OF COMMUNITIES	Community split due to interruption of area traffic	No	
5	CULTURAL PROPERTY	Damage to or loss of archaeological remains or cultural assets	Possible	The valley contains the Kalash peoples, a very old and primitive peoples whose culture and traditional way of life may be adversely affected by easier access. Control of numbers and behaviour of tourists is essential if culture is to be preserved.
6	WATER RIGHTS & RIGHTS OF COMMONS	Obstruction of fishing rights, water rights or rights of commons	Possible	The construction activities may require rock spoil from the tunnel excavation to be dumped near the portals. There is a high quality surface stream near the south portal which is vital to the villagers which must be protected by careful dumping.
7	PUBLIC HEALTH	Deterioration of public health and sanitary conditions due to generation of garbage and increase of vermin	Possible	The construction camps will house 4,000 workers. Adequate and efficient sanitary facilities must be provided to prevent polluting of water courses. Natural facilities such as septic tanks are unlikely to be effective. Chemical latrines should be provided. Solid waste should be disposed of on site. A small scale incinerator should be constructed (not open burning) and the residues buried.
8	WASTE	Generation of construction and demolition waste debris and logs	Possible	The excavation of the tunnel will produce large quantities of rock spoil. This must be stored in locations which will not contaminate the stream near the south portal during periods of rain or snow melt. No logs should be produced. Under no circumstances should fuel wood be used as this will add to the excessive deforestation. Gas should be supplied to the camps for cooking and heating purposes.
9	HAZARDS & RISK	Increase in risks of landslides, cave ins and accidents.	No	The southern portal is located on a seismic fault line. However this is included in the design. No increase in risks is anticipated and the project should be beneficial.
NATURAL ENVIRONMENT				
10	TOPOGRAPHY & SOILS	Changes of valuable topography and geology due to excavation or filling work	No	
11	SOIL EROSION	Topsoil erosion by rainfall after reclamation and vegetation removal	No	No vegetation will be removed as the works are mainly tunneling.
12	GROUNDWATER	Change of distribution of groundwater by large scale excavation	No	Due to the extreme altitude there is little groundwater extraction.
13	HYDROLOGICAL SITUATION	Changes of river discharge and riverbed condition due to landfill and drainage inflow	Possible	Location of spoil tips must be such as to avoid increased silt load to the river. Otherwise no anticipated effects.
14	COASTAL ZONE	Coastal erosion and sedimentation due to landfill or change in marine condition	No	Not applicable
15	FAUNA & FLORA	Obstruction of breeding and extinction of species due to changes of habitat conditions	No	No habitats will be affected and no endemic species have been located near the site.
16	METEOROLOGY	Changes of temperature precipitation wind etc due to large scale land reclamation and building construction	No	
17	LANDSCAPE	Change of topography and vegetation due to reclamation. Deterioration of aesthetic harmony by structures	No	Works are mainly tunneling. Road works are in keeping with aesthetics of area.
POLLUTION				
18	AIR POLLUTION	Pollution caused by exhaust gas or toxic gas from vehicles and factories	Yes	Due to excessive emissions of vehicles efficient ventilating of tunnel is necessary. Location of south ventilating shaft must be carefully chosen to avoid nearby dwellings.
19	WATER POLLUTION	Pollution by inflow of silt sand and effluent into rivers and groundwater	Yes	Possible if spoil tips improperly sited.
20	SOIL CONTAMINATION	Contamination of soil by dust and chemicals such as herbicides	No	
21	NOISE & VIBRATION	Noise and vibration generated by vehicles	No	Due to low population densities not considered a problem.
22	LAND SUBSIDENCE	Deformation of land and land subsidence due to lowering of groundwater table	No	No taking of groundwater will occur.
23	OFFENSIVE ODOUR	Generation of exhaust gases and offensive odour by facility construction and operation	Yes	Needs careful location of ventilation outlet ducts.
OVERALL EVALUATION				
IEE OR EIA NECESSARY		EIA	YES	EIA necessary in view of construction effects, air pollution from ventilation, and long term cultural effects on the Kalash peoples of the Chitral valley.

Figure 12.7 (A) Environmental Baseline Condition of Project

CANDIDATE PROJECT : Lahore Bypass

ITEM		DESCRIPTION
Project Name		Lahore Bypass
Background		Main traffic from north Pakistan to Lahore passes through Lahore. This includes heavy vehicles. This leads to extreme congestion and traffic fumes in Lahore.
Objectives		The project will allow traffic to pass around Lahore on the GT more easily.
Location		Lahore, Punjab Province.
Executing Agency		National Highway Authority
Beneficiaries		Persons using GT and residents of Lahore
Project Components		
Type of Project		City ring road and a linkages bridge between motorway and the Multan road (N5 at the south of Lahore)
Type of Road		Two lane carriageway
Target Year		2000
Traffic Volume		Same as GT
Extension/Width/Lanes		Resurfacing of existing road which passes on top of flood protection bund and a new bridge with 3 lane each direction.
Road Structure		Conventional two lane all weather black top on the road sections both sides of the bridge.
Supplemental Facilities		None
Social	Inhabitants	Residents of Lahore
Environment		
	Land Use	Low density residential, flood protection bund, garbage tip
	Economy	Urban
Natural	Topography	Flat in flood plain of River ravi.
Environment		
	Fauna Flora	None, urban situation, some open grazing.
Pollution	Complaints	Only concerns over flooding and nearby garbage dump.

Figure 12.7 (B) Environmental Baseline Condition of Project

PROJECT: Lahore Bypass

NO.	ENVIRONMENTAL ITEM	DESCRIPTION	EVALUATION	REMARKS
SOCIAL ENVIRONMENT				
1	RESETTLEMENT	Resettlement due to land occupancy	No	
2	ECONOMIC ACTIVITIES	Loss of basis for economic activity	No	
3	TRAFFIC & PUBLIC FACILITIES	Impacts on schools hospitals and present traffic conditions	Yes	Improvement on present traffic situation
4	SPLIT OF COMMUNITIES	Community split due to interruption of area traffic	No	
5	CULTURAL PROPERTY	Damage to or loss of archaeological remains or cultural assets	No	
6	WATER RIGHTS & RIGHTS OF COMMONS	Obstruction of fishing rights, water rights or rights of commons	No	
7	PUBLIC HEALTH	Deterioration of public health and sanitary conditions due to generation of garbage and increase of vermin	Possible	The road will pass in close proximity to a garbage dump. Care must be taken not disturb tipped material.
8	WASTE	Generation of construction and demolition waste debris and logs	Not Likely	
9	HAZARDS & RISK	Increase in risks of landslides, cave ins and accidents	No	
NATURAL ENVIRONMENT				
10	TOPOGRAPHY & SOILS	Changes of valuable topography and geology due to excavation or filling work	No	
11	SOIL EROSION	Topsoil erosion by rainfall after reclamation and vegetation removal	No	
12	GROUNDWATER	Change of distribution of groundwater by large scale excavation	No	
13	HYDROLOGICAL SITUATION	Changes of river discharge and riverbed condition due to landfill and drainage inflow	No	
14	COASTAL ZONE	Coastal erosion and sedimentation due to landfill or change in marine condition	No	
15	FAUNA & FLORA	Obstruction of breeding and extinction of species due to changes of habitat conditions	No	
16	METEOROLOGY	Changes of temperature precipitation wind etc due to large scale land reclamation and building construction	No	
17	LANDSCAPE	Change of topography and vegetation due to reclamation. Deterioration of aesthetic harmony by structures	No	
POLLUTION				
18	AIR POLLUTION	Pollution caused by exhaust gas or toxic gas from vehicles and factories	No	Residential property is not in close proximity to the new road.
19	WATER POLLUTION	Pollution by inflow of silt sand and effluent into rivers and groundwater	No	
20	SOIL CONTAMINATION	Contamination of soil by dust and chemicals such as herbicides	No	
21	NOISE & VIBRATION	Noise and vibration generated by vehicles	Possible	Some, but there is low residential density so problems not anticipated.
22	LAND SUBSIDENCE	Deformation of land and land subsidence due to lowering of groundwater table	No	
23	OFFENSIVE ODOUR	Generation of exhaust gases and offensive odour by facility construction and operation	Possible	Increased air pollution due to increased number of vehicles, but higher speed should aid in dispersion.
OVERALL EVALUATION				
IS EIA NECESSARY		No, but attention should be paid to closeness to residential properties at time of final route selection.		

Figure 12.8 (A) Environmental Baseline Condition of Project

CANDIDATE PROJECT : Sukkur Bypass

ITEM		DESCRIPTION
Project Name		Sukkur Bypass
Background		Main traffic from north Pakistan to Karachi passes through the vicinity of Sukkur. The highways N-5, N-55 and N-65 converge at this point near Sukkur. The existing bridge was originally constructed as an aqueduct for irrigation. The capacity cannot be expanded. A new bridge with approach roads are to be constructed.
Objectives		The project will allow traffic to pass around Sukkur on the N-65 more easily.
Location		Sukkur, Sindh Province
Executing Agency		National Highway Authority
Beneficiaries		Persons using N-65 and residents of Sukkur
Project Components		
Type of Project		City ring road
Type of Road		Two lane carriageway
Target Year		2000
Traffic Volume		Same as N-65
Extension/Width/Lanes		A bridge with 2 lanes in each direction over the Indus river is included.
Road Structure		Black topped.
Supplemental Facilities		None
Social Environment		
Inhabitants		Residents of Sukkur
Land Use		Mixture of urban and low density rural residential.
Economy		Urban
Natural Environment		
Topography		Flat in flood plain of River Indus.
Fauna Flora		None, urban situation, some open grazing.
Pollution		Complaints
		Information not available

Figure 12.8 (B) Environmental Baseline Condition of Project

PROJECT: Sukkur Bypass

NO.	ENVIRONMENTAL ITEM	DESCRIPTION	EVALUATION	REMARKS
SOCIAL ENVIRONMENT				
1	RESETTLEMENT	Resettlement due to land occupancy	No	
2	ECONOMIC ACTIVITIES	Loss of basis for economic activity	No	
3	TRAFFIC & PUBLIC FACILITIES	Impacts on schools hospitals and present traffic conditions	Yes	Improvement on present traffic situation
4	SPLIT OF COMMUNITIES	Community split due to interruption of area traffic	No	
5	CULTURAL PROPERTY	Damage to or loss of archaeological remains or cultural assets	No	
6	WATER RIGHTS & RIGHTS OF COMMONS	Obstruction of fishing rights, water rights or rights of commons	No	
7	PUBLIC HEALTH	Deterioration of public health and sanitary conditions due to generation of garbage and increase of vermin	No	
8	WASTE	Generation of construction and demolition waste debris and logs	Possible	Attention must be given to location of construction camps
9	HAZARDS & RISK	Increase in risks of landslides, cave ins and accidents	No	
NATURAL ENVIRONMENT				
10	TOPOGRAPHY & SOILS	Changes of valuable topography and geology due to excavation or filling work	No	
11	SOIL EROSION	Topsoil erosion by rainfall after reclamation and vegetation removal	No	
12	GROUNDWATER	Change of distribution of groundwater by large scale excavation	No	
13	HYDROLOGICAL SITUATION	Changes of river discharge and riverbed condition due to landfill and drainage inflow	No	
14	COASTAL ZONE	Coastal erosion and sedimentation due to landfill or change in marine condition	No	
15	FAUNA & FLORA	Obstruction of breeding and extinction of species due to changes of habitat conditions	No	
16	METEOROLOGY	Changes of temperature precipitation wind etc due to large scale land reclamation and building construction	No	
17	LANDSCAPE	Change of topography and vegetation due to reclamation. Deterioration of aesthetic harmony by structures	No	
POLLUTION				
18	AIR POLLUTION	Pollution caused by exhaust gas or toxic gas from vehicles and factories	Possible	Information not available
19	WATER POLLUTION	Pollution by inflow of silt sand and effluent into rivers and groundwater	No	
20	SOIL CONTAMINATION	Contamination of soil by dust and chemicals such as herbicides	No	
21	NOISE & VIBRATION	Noise and vibration generated by vehicles	Possible	Some, but there is low residential density so problems not anticipated.
22	LAND SUBSIDENCE	Deformation of land and land subsidence due to lowering of groundwater table		
23	OFFENSIVE ODOUR	Generation of exhaust gases and offensive odour by facility construction and operation	Possible	Increased air pollution due to increased number of vehicles, but higher speed should aid in dispersion.
OVERALL EVALUATION				
IEE OR EIA NECESSARY		YES, EIA required to ensure no adverse effects to residents at time of final route selection.		

Figure 12.9 (A) Environmental Baseline Condition of Project

CANDIDATE PROJECT: Improvements to National Highways

ITEM	DESCRIPTION
Project Name	Improvements to National Highways and Provincial Highways
Background	Many of the major roads linking Pakistan are in poor condition and some are dirt roads. A program has been suggested to improve these.
Objectives	To improve existing roads. Bypass in some urban areas is planned already but in the future additional bypass construction will be required to avoid traffic conflicts between the local and long distance movements. N-55 (Indus Highway) has already decided to follow the existing alignment at the southern part. EIA on that section was completed in 1992.
Location	All Pakistan
Executing Agency	NHA / Provincial Govt.
Beneficiaries	Users of National highways
Project Components	
Type of Project	Rehabilitation of existing roads. These will include N-5, N-25, N-35, N-40, N-50, N-55, N-65, and N-70 and selected Provincial Highways.
Type of Road	Varies with location. N-5 is scheduled to be dual carriageway for all of its sections.
Target Year/ Traffic volume	Year 2000 - 2010; a staged development program. Flow varies with location.
Extension/Width/Lanes	Varies with location
Road Structure	All weather surface
Supplemental Facilities	Maintenance services.
Social	Inhabitants Area very remote, low population density in vicinity of tunnel.
Environment	Land Use Mainly rural areas with few dwellings
	Economy Pastoral, animal husbandry.
Natural	Topography Varies from mountainous slopes to arid flood plains.
Environment	Fauna Flora Little surface vegetation, no indigenous or endemic rare species of flora or fauna.
Pollution	Complaints No complaints regarding pollution. No anticipated adverse effects as this is works on existing routes.
	Measures taken

Figure 12.9 (B) Environmental Baseline Condition of Project

PROJECT: Improvements to National Highways

NO	ENVIRONMENTAL ITEM	DESCRIPTION	EVALUATION	REMARKS
SOCIAL ENVIRONMENT				
1	RESETTLEMENT	Resettlement due to land occupancy	No	
2	ECONOMIC ACTIVITIES	Loss of basis for economic activity	No	
3	TRAFFIC & PUBLIC FACILITIES	Impacts on schools hospitals and present traffic conditions	Yes	Beneficial.
4	SPLIT OF COMMUNITIES	Community split due to interruption of area traffic	No	
5	CULTURAL PROPERTY	Damage to or loss of archaeological remains or cultural assets	No	
6	WATER RIGHTS & RIGHTS OF COMMONS	Obstruction of fishing rights, water rights or rights of commons	No	
7	PUBLIC HEALTH	Deterioration of public health and sanitary conditions due to generation of garbage and increase of vermin	Possible	The construction camps will house large numbers of workers. Adequate and efficient sanitary facilities must be provided to prevent polluting of water courses. Natural facilities such as septic tanks will probably be effective. They should not be located within 100 metres of wells or water courses. Solid waste should be disposed of on site. Burial is probably the most realistic option. Waste should be covered by 0.5 metres of soil.
8	WASTE	Generation of construction and demolition waste debris and logs	No	
9	HAZARDS & RISK	Increase in risks of landslides, cave ins and accidents.	No	
NATURAL ENVIRONMENT				
10	TOPOGRAPHY & SOILS	Changes of valuable topography and geology due to excavation or filling work	No	
11	SOIL EROSION	Topsoil erosion by rainfall after reclamation and vegetation removal	No	
12	GROUNDWATER	Change of distribution of groundwater by large scale excavation	No	
13	HYDROLOGICAL SITUATION	Changes of river discharge and riverbed condition due to landfill and drainage inflow	Possible	Location of spoil tips must be such as to avoid increased silt load to the river. Otherwise no anticipated effects.
14	COASTAL ZONE	Coastal erosion and sedimentation due to landfill or change in marine condition	No	Not applicable
15	FAUNA & FLORA	Obstruction of breeding and extinction of species due to changes of habitat conditions	No	
16	METEOROLOGY	Changes of temperature precipitation wind etc due to large scale land reclamation and building construction	No	
17	LANDSCAPE	Change of topography and vegetation due to reclamation. Deterioration of aesthetic harmony by structures	No	
POLLUTION				
18	AIR POLLUTION	Pollution caused by exhaust gas or toxic gas from vehicles and factories	Yes	Due to excessive emissions of vehicles increase in air pollution is likely. Pressure should be brought to bear to reduce and control smoking vehicles through liaison with EPA and Police.
19	WATER POLLUTION	Pollution by inflow of silt sand and effluent into rivers and groundwater	Yes	Possible if spoil tips and borrow areas improperly sited.
20	SOIL CONTAMINATION	Contamination of soil by dust and chemicals such as herbicides	No	
21	NOISE & VIBRATION	Noise and vibration generated by vehicles	No	Due to low population densities not considered a problem.
22	LAND SUBSIDENCE	Deformation of land and land subsidence due to lowering of groundwater table	No	
23	OFFENSIVE ODOUR	Generation of exhaust gases and offensive odour by facility construction and operation	Yes	Needs careful selection of route in relation to any existing houses.
OVERALL EVALUATION				
REE OR EIA NECESSARY		YES, site specific EIA should be carried out prior to road construction. (EIA completed in 1992)		

Figure 12.10 (A) Environmental Baseline Condition of Project

CANDIDATE PROJECT : Railways

ITEM		DESCRIPTION
Project Name		Railways
Background		Shipment of bulk materials from Karachi inland to Lahore, Peshawar, and the interior may travel by road or rail. This depends on the break even point as well as the relative efficiency and cost.
Objectives		To improve the passenger carrying and cargo facilities of the railway.
Location		All Pakistan
Executing Agency		Pakistan Railways
Beneficiaries		Commercial transporters, industrialists and passengers in Pakistan
Project Components		
Type of Project		General overall upgrade of railways
Type of Construction		Provision of track, dualisation of existing track, repair of bridges, revamping of lines, electrification
Target Year		2006
Traffic Volume		
Supplemental Facilities		Increased rolling stock, revamping of signalling, management information system, improved signalling and communications.
Social	Inhabitants	Mainly rural areas of interior of Pakistan.
Environment		
	Land Use	Mainly rural area with some animal grazing.
	Economy	Farmers and animal husbandry.
Natural	Topography	Fiat, mainly in valley of River Indus , but extends throughout Pakistan.
Environment		
	Fauna Flora	No specific areas are crossed which are not already accessed at the moment.
Pollution	Complaints	None to date.

Figure 12.10 (B) Environmental Baseline Condition of Project

PROJECT: Railways

NO.	ENVIRONMENTAL ITEM	DESCRIPTION	EVALUATION	REMARKS
SOCIAL ENVIRONMENT				
1	RESETTLEMENT	Resettlement due to land occupancy	No	
2	ECONOMIC ACTIVITIES	Loss of basis for economic activity	No	
3	TRAFFIC & PUBLIC FACILITIES	Impacts on schools hospitals and present traffic conditions	No	
4	SPLIT OF COMMUNITIES	Community split due to interruption of area traffic	No	
5	CULTURAL PROPERTY	Damage to or loss of archaeological remains or cultural assets	No	
6	WATER RIGHTS & RIGHTS OF COMMONS	Obstruction of fishing rights, water rights or rights of commons	No	
7	PUBLIC HEALTH	Deterioration of public health and sanitary conditions due to generation of garbage and increase of vermin	No	
8	WASTE	Generation of construction and demolition waste debris and logs	Possible	Maybe some widening of cuttings, / embankments, and bridge abutments.
9	HAZARDS & RISK	Increase in risks of landslides, cave ins and accidents	No	
NATURAL ENVIRONMENT				
10	TOPOGRAPHY & SOILS	Changes of valuable topography and geology due to excavation or filling work	No	
11	SOIL EROSION	Topsoil erosion by rainfall after reclamation and vegetation removal	No	
12	GROUNDWATER	Change of distribution of groundwater by large scale excavation	No	
13	HYDROLOGICAL SITUATION	Changes of river discharge and riverbed condition due to landfill and drainage inflow	No	
14	COASTAL ZONE	Coastal erosion and sedimentation due to landfill or change in marine condition	No	
15	FAUNA & FLORA	Obstruction of breeding and extinction of species due to changes of habitat conditions	No	
16	METEOROLOGY	Changes of temperature precipitation wind etc due to large scale land reclamation and building construction	No	
17	LANDSCAPE	Change of topography and vegetation due to reclamation. Deterioration of aesthetic harmony by structures	No	
POLLUTION				
18	AIR POLLUTION	Pollution caused by exhaust gas or toxic gas from vehicles and factories	Beneficial	Reduction due to transfer from road to rail Also reduction on newly electrified sections.
19	WATER POLLUTION	Pollution by inflow of silt sand and effluent into rivers and groundwater	No	
20	SOIL CONTAMINATION	Contamination of soil by dust and chemicals such as herbicides	No	
21	NOISE & VIBRATION	Noise and vibration generated by vehicles	Beneficial	Reduction in noise due to transfer from road to rail. New noise levels due to increased rail traffic are less intrusive than road vehicle noise as the social response to rail noise is less than to road noise.
22	LAND SUBSIDENCE	Deformation of land and land subsidence due to lowering of groundwater table	No	
23	OFFENSIVE ODOUR	Generation of exhaust gases and offensive odour by facility construction and operation	No	
OVERALL EVALUATION				
IEE OR EIA NECESSARY		No.		

Figure 12.11 (A) Environmental Baseline Condition of Project

CANDIDATE PROJECT : Shipping

ITEM		DESCRIPTION
Project Name		Shipping
Background		The Pakistan shipping fleet is in need of upgrading and it is planned to expand the fleet and extend it with the purchase of several new vessels. and the system of navigation canals could be used as a navigation system.
Objectives		To phase out the large number of old vessels and replace with new modern vessels.
Location		Karachi port and Port Qasim.
Executing Agency		Ministry of Communications
Beneficiaries		State owned carriers and private sector.
Project Components		
Type of Project		Acquisition of new merchant marine vessels.
Type of Operation		Resupply and substitution of existing fleet. These will be :
		Container ships : 7
		Bulk carriers : 2
		Edible oil tanker : 1
		Crude oil tanker : 1
		Oil products tanker : 1
Target Year		1999
Traffic Volume		Pakistani merchant fleet = 27 vessels. Carries approximately 32,000 passengers per year. Total throughput cargo 30 M tonnes; 13% by Pakistani ships, 87% by foreign vessels
Supplemental Facilities		New berths and dock side facilities
Social	Inhabitants	Main trading is through Karachi port and Port Qasim.
Environment	Land Use	Port Karachi is industrial location in urban area. Port Qasim is in rural area.
	Economy	Farmers and fishermen.
Natural	Topography	Flat, in delta region of River Indus.
Environment	Fauna Flora	Port Karachi is industrial. Port Qasim is part of the Indus Delta wetlands.
Pollution	Complaints	Heavy pollution load carried by the River Indus from Pakistan and India, together with pollution from Karachi
	Measures	Oil spill emergency response and contingency plan.

Figure 12.11 (B) Environmental Baseline Condition of Project

PROJECT: Shipping

NO.	ENVIRONMENTAL ITEM	DESCRIPTION	EVALUATION	REMARKS
SOCIAL ENVIRONMENT				
1	RESETTLEMENT	Resettlement due to land occupancy	No	
2	ECONOMIC ACTIVITIES	Loss of basis for economic activity	No	Should effect improvement
3	TRAFFIC & PUBLIC FACILITIES	Impacts on schools hospitals and present traffic conditions	No	
4	SPLIT OF COMMUNITIES	Community split due to interruption of area traffic	No	
5	CULTURAL PROPERTY	Damage to or loss of archaeological remains or cultural assets	No	
6	WATER RIGHTS & RIGHTS OF COMMONS	Obstruction of fishing rights, water rights or rights of commons	Possible	Maybe some interruption to traditional fishing rights
7	PUBLIC HEALTH	Deterioration of public health and sanitary conditions due to generation of garbage and increase of vermin	No	
8	WASTE	Generation of construction and demolition waste debris and logs	No	
9	HAZARDS & RISK	Increase in risks of oil spills, product spills or unintended discharges or accidents	Yes	Vessls carrying crude petroleum or finished products should be double skinned vessels to avoid loss of cargo in event of accident. Contingency plan must be prepared and tested for control of spills. In event of crude spill containment and capture is probably best, followed by dispersant. In event of products spill higher toxicity and volatility means containment and evaporation are favoured.
NATURAL ENVIRONMENT				
10	TOPOGRAPHY & SOILS	Changes of valuable topography and geology due to excavation or filling work	No	Some river training will be necessary
11	SOIL EROSION	Topsoil erosion by rainfall after reclamation and vegetation removal	No	
12	GROUNDWATER	Change of distribution of groundwater by large scale excavation	No	
13	HYDROLOGICAL SITUATION	Changes of river discharge and riverbed condition due to landfill and drainage inflow	No	
14	COASTAL ZONE	Coastal erosion and sedimentation due to landfill or change in marine condition	No	
15	FAUNA & FLORA	Obstruction of breeding and extinction of species due to changes of habitat conditions	Possible	The access to Port Qasim passes through the Indus Delta wetlands which contain extensive mangrove ecosystems. These are already under stress due pollution and loss of freshwater input. Further stress should be avoided.
16	METEOROLOGY	Changes of temperature precipitation wind etc due to large scale land reclamation and building construction	No	
17	LANDSCAPE	Change of topography and vegetation due to reclamation. Deterioration of aesthetic harmony by structures	No	
POLLUTION				
18	AIR POLLUTION	Pollution caused by exhaust gas or toxic gas from vehicles and factories	No	
19	WATER POLLUTION	Pollution by inflow of silt sand and effluent into rivers and groundwater	No	
20	SOIL CONTAMINATION	Contamination of soil by dust and chemicals such as herbicides	No	
21	NOISE & VIBRATION	Noise and vibration generated by vehicles	No	
22	LAND SUBSIDENCE	Deformation of land and land subsidence due to lowering of groundwater table	No	
23	OFFENSIVE ODOUR	Generation of exhaust gases and offensive odour by facility construction and operation	No	
OVERALL EVALUATION				
	IEE OR EIA NECESSARY	YES. EIA essential to examine types of vessels and emergency response plan.		

12.7 Conclusions

The environmental aspects of the candidate projects have been reviewed and IEEs prepared. The comparison of their relative environmental aspects is given in Figure 12.12. Issues of major concern are :

- Makran coast development and impacts on turtle breeding grounds.
- Inland waterway development and the breeding grounds of the Indus river dolphin.
- Lowari Tunnel project and the planned development of the Chitral Valley including the Kalash native people.
- Development of the national and provincial highways network and support to local authority efforts to control vehicle pollution such as the NWFP EPA program.
- The coastal region of Pakistan is under stress from land based pollution sources as well as shipping activities. Support is required to assist in the control of this.

No major adverse environmental impacts have been identified in the candidate projects and several Full EIAs have already been carried out. Where necessary, attention has been drawn to sensitive ecological issues and the need for full EIAs. These would apply to new airports, inland waterways, and major port and shipping projects. Other candidate projects which would need an EIA have already been prepared.

Figure 12.12 Comparison of Environmental Impact of Alternative Transport Sectors
(For International see legend in lower left corner)

ENVIRONMENTAL ITEM	ACTIVITY	CONSTRUCTION			ROAD NETWORKS			RAIL TRANSPORT			AIRPORTS AND AIRTRAVEL			PORTS, HARBOURS, & SHIPPING		
		OPERATION	DUALISATION	TUNNELS	ELECTRIFICATION	DUALISATION	NEW AIRPORT	NEW AIRCRAFT	NEW PORTS	MORE SHIPPING	INLAND WATERWAYS					
SOCIAL ENVIRONMENT																
1	RESETTLEMENT	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	
2	ECONOMIC ACTIVITIES	O	B	B	B	B	B	B	B	B	B	B	B	B	B	
3	TRAFFIC & PUBLIC FACILITIES	OOOT	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	
4	SPLIT OF COMMUNITIES	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
5	CULTURAL PROPERTY	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
6	WATER RIGHTS & RIGHTS OF COMMONS	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
7	PUBLIC HEALTH	OOOT	O	O	O	O	O	O	O	O	O	O	O	O	O	
8	WASTE	O	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	
9	HAZARDS & RISK	O	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	
NATURAL ENVIRONMENT																
10	TOPOGRAPHY & SOILS	OOOT	O	O	O	O	O	O	O	O	O	O	O	O	O	
11	SOIL EROSION	O	OO	O	O	O	O	O	O	O	O	O	O	O	O	
12	GROUNDWATER	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
13	HYDROLOGICAL SITUATION	OOOT	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	
14	COASTAL ZONE	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
15	FAUNA & FLORA	O	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	
16	METEOROLOGY	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
17	LANDSCAPE	OOOT	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	OO	
POLLUTION																
18	AIR POLLUTION	OO	OOO(1)	OOOO	OOO	B(2)	B(2)	B(2)	B(2)	B(4)	B(4)	B(4)	B(4)	B(4)	B(4)	
19	WATER POLLUTION	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
20	SOIL CONTAMINATION	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
21	NOISE & VIBRATION	OOOT	OOO	OOO	OOO	B(3)	B(3)	B(3)	B(3)	B(4)	B(4)	B(4)	B(4)	B(4)	B(4)	
22	LAND SUBSIDENCE	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
23	OFFENSIVE ODOUR	O	OOO(1)	OO	OO	B(3)	B(3)	B(3)	B(3)	B(4)	B(4)	B(4)	B(4)	B(4)	B(4)	
LEGEND																
O = NO ENVIRONMENTAL EFFECTS																
OO = SOME LIMITED EFFECTS																
OOO = SIGNIFICANT EFFECTS																
OOOO = SEVERE EFFECTS																
B = BENEFICIAL																
T = TEMPORARY																
NOTES																
(1) SMOKE EMISSIONS FROM VEHICLES																
(2) ACCIDENTS ON TRACK WITH PEDESTRIANS OR ANIMALS																
(3) LESS NOISE, LESS AIR POLLUTION																
(4) NEW AIRCRAFT HAVE LOWER NOISE LEVELS AND GENERATE LESS FUMES																

