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People's Democratic Republic of Yemen Transport Sector Memorandum

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Europe, Middle East and North Africa Regional Office

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CURRENCY EQUIVALENTS

Currency Unit	=	Yemeni Dinar (YD)
US\$1.00	=	YD 0.345
US\$2.5 [^]	=	YD 1.000
US\$2.9 million	=	YD 1 million

SYSTEM OF WEIGHTS AND MEASURES: METRIC

<u>Metric System</u>		<u>British/US System</u>
1 meter (m)	=	3.28 feet (ft)
1 kilometer (km)	=	0.62 miles (mi)
1 sq kilometer (km ²)	=	0.386 sq miles (mi ²)
1 hectare (ha)	=	2.47 acres (ac)
1 metric ton (m ton)	=	2.205 pounds (lb)

ACRONYMS AND ABBREVIATIONS

APA	-	Aden Port Authority
IDA	-	International Development Association
MOC	-	Ministry of Construction
MOP	-	Ministry of Planning
NSC	-	National Shipping Company
PCLT	-	Public Corporation for Land Transport
PDRY	-	People's Democratic Republic of Yemen
PRC	-	People's Republic of China
USSR	-	Union of Soviet Republic of Yemen
vpd	-	Vehicles per day
WFP	-	World Food Programme
YAR	-	Yemen Arab Republic

PEOPLE'S DEMOCRATIC REPUBLIC OF YEMEN
FISCAL YEAR

January 1 to December 31

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MAP

IBRD 13831 - Transport Infrastructure

This report was prepared by Graham Smith (Economist) during the course of appraising the proposed Third Highway Project.

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PEOPLE'S DEMOCRATIC REPUBLIC OF YEMEN

TRANSPORT SECTOR MEMORANDUM

I. SUMMARY AND RECOMMENDATIONS

A. The Transport System

1.01 The transport system of PDRY is rudimentary, reflecting the severely limited resources of the country. The Government is devoting a substantial part of the national development budget to building the essential elements of a transport system capable of integrating the scattered populated areas of the country. Roads have been the primary means to achieve this. Coastal shipping and aviation play a limited role; there are no railways (paras. 2.01, 2.02).

1.02 A significant achievement under the first five-Year Plan (1974-78) has been the completion of a 620 km paved road from Aden to Mukalla, the second largest city, and the start of construction on a paved road from Mukalla to the Wadi Hadramawt (360 km) and of works to improve the existing low-standard paved road from Aden to the YAR border near Taiz. All construction work is carried out by force account units under the Ministry of Construction, with expatriate management assistance for the major projects. About 90% of the road program has been financed by foreign sources, including IDA, the Arab and Kuwait Funds, the People's Republic of China, and the World Food Programme (WFP) (paras 2.03-2.10).

1.03 Parallel with the expansion of the road network, the Government has set up the Public Corporation for Land Transport (PCLT), under the Ministry of Communications, to set rates and fares for private-sector trucking and taxis and to operate bus services on the paved road system. The cost of road transport remains high, however, because of the difficult driving conditions on unsurfaced tracks and inadequate vehicle maintenance, due to the shortage of mechanics (paras. 2.11-2.14).

1.04 The development of local shipping has been inhibited by the lack of natural harbors and the need to offload into lighters in open water at Mukalla. A new port is under construction near Mukalla, at Khalf, that will substantially reduce the cost and time involved in importing goods to the eastern half of the country. (paras. 2.15-2.21).

1.05 The national airline, Alyemda, operates scheduled flights between the international airport at Aden and unpaved airstrips serving Mukalla and six outlying towns not yet connected by paved roads to the national network. Its propeller-driven fleet is dilapidated and flights are frequently subject to lengthy delays (paras. 2.22-2.25).

B. Sector Objectives and Issues

1.06 There remain many remoter populated areas whose development is held back by their inaccessibility. To facilitate improvements in agriculture, schools and medical services in these areas, the Government is planning an ambitious program of works over the next five to ten years to complete a paved

primary road network, build a second international-standard airport, and provide improved port facilities for Aden and Mukalla. This program, estimated at US\$205 million for 1979-83, will require extensive international financial assistance and may tax the Government's construction capacity, but is reasonable when compared with achievements in the past five years. (paras. 2.26, 3.01, 3.02). At the same time more attention needs to be paid to raising the level of maintenance generally. In regard to roads, emphasis should be placed on maintenance and minor improvements, as an economically preferable alternative to the construction of further high-standard paved roads. This will require international assistance in financing feasibility studies, civil works, maintenance equipment and training (paras. 4.03-4.09).

1.07 The provision of transport services in appropriate quantity and quality has lagged behind the construction of new infrastructure. In the Second Plan period increased attention should be paid to improving transport services in all three modes: roads, shipping and aviation (paras. 3.04-4.02, 4.10-4.12).

II. THE TRANSPORT SECTOR

A. The Transport System

2.01 The transport system of PDRY is rudimentary, reflecting the severely limited resources of the country and the lack of economic development until recent years. At independence in 1967 most of the 470 km of paved roads in the country were in and around Aden, the rest of the former federation being served only by low-standard tracks or by air services using unpaved airstrips. Movement of goods between Aden and Mukalla relied on coastal shipping, mostly by dhows. The communities of the hinterland, many of which are isolated from one another by rugged mountain ranges and desert, were of necessity largely self-sufficient. Since then a substantial part of the national development budget has been devoted to building the essential elements of a transport system capable of integrating the scattered populated areas of the country. Roads have been the primary means to achieve this, since there are almost no natural harbors except Aden to facilitate coastal shipping, railways are impracticable due to the rugged terrain and low traffic volumes, and aviation is constrained by its high cost relative to the prevailing income level.

2.02 Many parts of PDRY are now experiencing a significant improvement in their accessibility, thanks to the nearly 950 km of paved road (17% of the 5,600-km network). Road transport accounts for perhaps 90% of all passenger and freight traffic. The rest of the transport network consists of one international and seven local airports; and an international bunkering port at Aden and a secondary lighterage port at Mukalla (see attached map IBRD 13831). There are no railways. Transport services are all either owned or closely regulated by the Government.

B. Roads and Road Transport

Infrastructure

2.03 The backbone of the PDRY highway network is the 620-km long road from Aden to Mukalla, three-quarters of which has been built since 1967. One

other arterial road is paved, that from Aden to the YAR border near Taiz (about 100 km), though parts of it are in rather poor condition and are being rehabilitated. The paved roads in and around Aden and other short stretches mostly in the western governorates bring the total length of paved ^{1/} roads in 1978 to 950 km (Table 1). There are a further 260 km of cobblestone roads, mostly in the Wadi Hadramawt, some built in the 1930s and some in the 1970s. The rest of the network is made up of unsurfaced tracks, estimated at about 4,400 km. The density of PDRY's road network, while low in absolute terms, is similar to that of its neighbors: 17 km per thousand sq.km. compared to 23 in YAR (24% paved) and 22 in Oman (21% paved).

2.04 Construction of new roads is proceeding at a pace of about 135 km of paved, 25 km of cobbled and 130 km of low-standard unsurfaced road per year. This represents a growth rate of 15% per year in the paved system, and seems sufficient and appropriate for the immediate future. However, as the main links justifying high-standard paved roads are completed in the coming five to ten years, the growth rate should decline, with increasing emphasis being given to intermediate standard improvements of those sections of the primary and secondary network carrying less traffic.

Organization and Management

2.05 Responsibility for the road network is divided between the Ministry of Construction, which is in charge of the construction and maintenance of the paved roads, and the governorate authorities, who maintain the rest of the network and carry out small-scale construction works. The Ministry of Construction, which groups highways, carpentry and boat building, and the construction of factories and other public buildings, was only established as a separate entity in 1977. Previously these public construction activities were combined with the other transport modes and telecommunications under the Ministry of Communications, which in turn had earlier absorbed the Ministry of Public Works. The organization of the Highway Authority, however, remains essentially that recommended by consultants VIAK under the IDA First Highway Project and implemented in 1972. Maintenance operations are in the process of being decentralized from Aden to district offices in the governorate capitals where workshops and equipment fleets are being established. This is a step in the right direction, although the rate of progress at the local levels is constrained by the shortage of skilled manpower and appropriate tools and equipment.

2.06 Road construction is all by force account. There are no domestic private contractors in PDRY in the highway field, nor to date any foreign contractors; the latter have probably been deterred by the uncertain and limited prospects for continuing operations in PDRY, compared to the much richer neighboring countries of the Gulf area. In the case of large-scale works, the force account units are managed by expatriate consultants or Chinese technical advisors. The number of units has been increased to four and their performance can be expected to improve as experience builds up.

^{1/} For clarity, "paved" as used here excludes cobblestone surfacing.

Investments and Financing

2.07 Expenditures on roads since 1967 are given in Table 2. They show a rapid growth in outlays for construction and studies, more than doubling from 1974 to approximately US\$20 million in 1978. Although MOC accounts do not give a breakdown of maintenance, minor improvements and new construction of unsurfaced roads, IDA mission estimates put outlays on maintenance and minor improvements on all roads in 1978 at about US\$4 million, also more than double the level of four years earlier.

2.08 About 70% of the maintenance expenditure was financed from the investment budget, including 35% by the WFP, and only 30% from the current budget. This reflected the Government's heavy dependence on outside sources, which channel most of their funds through the capital rather than the current budget. Such an allocation appears more than adequate (US\$2-3 million would be sufficient), provided that its availability is assured and financial control arrangements are introduced that allow it to be used flexibly where and when needed. Towards the end of the Second Development Plan (1979-83), provision should also be made for periodic maintenance (resealing or overlaying) of those sections of paved road that are reaching 10 years since opening.

2.09 Overall, foreign sources have contributed about 90% of total expenditure, including local costs. The People's Republic of China lent about US\$12.7 million for the Aden-Mukalla road. IDA has provided credits under two highway projects, one of US\$1.6 million in 1971 for maintenance equipment and studies to help put the Ministry of Public Works on a sound footing, and a second of US\$15.5 million in 1975 to finance construction of the Mukalla-Wadi Hadramawt road, as well as other studies and technical assistance. IDA is also financing the construction of cobblestone feeder roads under its two agricultural projects; US\$1.9 million under the Wadi Hadramawt project (1976) and US\$100,000 under the Wadi Tuban project (1978). The Kuwait Fund provided US\$15.3 million equivalent towards the cost of the Mukalla-Wadi Hadramawt road and for procurement of maintenance equipment. The Aden-Taiz improvement road is being financed by the Arab Fund at a cost of about US\$23 million on the PDRY side. In all of these projects the Government's own contribution has been less than 10% of total project costs. Other assistance has been received on a smaller scale from the German Democratic Republic, the USSR, Hungary and the WFP.

2.10 Table 3 shows the proposed construction program for the Second Development Plan. From an economic viewpoint it is reasonable, as present traffic on most of the links indicates a paved road may be justified. When it is completed, an all-weather network will interconnect the two most important urban centers (Aden and Mukalla) and the four most important and populated agricultural areas (Wadis Tuban, Abyan, Beihan and Hadramawt). North and South Yemen will be connected by an improved paved road via Aden and Taiz. This will satisfy the most immediate and basic requirements for PDRY's national economic integration. From the viewpoint of implementation capacity it is also reasonable, as it implies only a 35-40% increase in real terms over the construction program under the 1974-78 Plan.

Traffic and the Vehicle Fleet

2.11 Few data are available on traffic volumes on the road network, but nowhere are they high. The generally low traffic volumes, even on the paved roads (average 200-300 vpd), reflect the difficulties of terrain, the long distances between communities, and the relatively high cost of road transport. The operational fleet, about half of which is in Aden, is estimated at about 13,000 vehicles (Table 4), or 7 per thousand inhabitants. Although this is about average for countries with PDRY's per capita income, a large number of vehicles are inoperative because of lack of spare parts and trained mechanics.

2.12 On roads outside Aden, passenger vehicles are limited largely to station-wagons used as taxis and landrover-type four-wheel drive vehicles. The general scarcity of private cars is due to the paucity of motorable roads, the low income level of most of the population, including the professional cadre, and a 200% duty on private vehicle purchases. The organization of agriculture into cooperatives and state farms also reduces the demand for a traffic category much in evidence in more market-oriented developing countries: the pickup or small truck making frequent short-distance trips between farm and market. Instead, the centralized organization for distributing the marketable surpluses of cooperatives concentrates commodity movements on less frequent, longer distance hauls in large trucks.

Road Transport Services

2.13 Public passenger transport is controlled by the Public Corporation for Land Transport, a parastatal organization attached to the Ministry of Communications. It operates the urban bus system in Aden and intercity bus services on the Aden-Lahej and Aden-Mukalla roads. Services between Aden, Zinjibar and Mukalla have been barely sufficient to cope with the demand. The PCLT also issues licenses for the operation of privately owned taxis and four-wheel drive vehicles for public passenger transport on unpaved tracks, sets the fares they may charge and levies 15% of their revenue. Bus fares are high by international standards, reflecting high operating costs and high overhead due to the large number of inoperative vehicles. The bus fleet is to be doubled by 1983 with the purchase of some 270 new vehicles.

2.14 Most government corporations and agencies operate their own truck fleets, such as the Public Corporation for Marketing of Fruit and Vegetables or the National Company for Home Trade, which is responsible for marketing all cereals. Common-carrier trucking is still predominantly in the hands of private owner-operators, under regulation by the PCLT. It issues licences, fixes the rates, receives orders and distributes them according to a turn system, collects the fees and retains 15%. Governorate-level subsidiaries are now being set up to increase the system's flexibility, which is hampered by the absence of a telephone system to link distribution centers. The PCLT has also recently established its own fleet of trucks, which can be assigned to different parts of the country when there are large shipments to be moved urgently. The law establishing the PCLT stipulates that, as its resources allow, the corporation will build up this fleet to take over all common-carrier trucking from the private sector. The Second Plan provides for the purchase of 220 trucks, an investment of US\$9 million. Implementation of this

directive will require careful planning and good organization if it is to equal the flexibility and productivity of an owner-operator system. The rates set by PCLT are very high by international standards, due principally to accounting assumptions of short lifetime, low annual mileage and empty backhauls on all trips, all of which leave considerable room for improvement.

2.15 . The technical assistance team working in the Ministry of Construction under the IDA Second Highway Project during 1977-78 submitted recommendations for the PCLT on improving the collection of performance statistics as a first step towards raising the efficiency of its fleet utilization.

C. Shipping

2.16 The PDRY coastline is not favorable for the development of coastal shipping. Shallow beaches extend along most of the coastline, interrupted occasionally by rocky and dangerous headlands. Aden is an excellent natural harbor, but there is only one other natural harbor along the approximately 1200 km of coast, at a virtually unpopulated site in the Fifth Governorate (Ras Burum). The only other sizable town on the coast, Mukalla, has until now had to rely on ships unloading by lighter while standing offshore in unprotected water. A new fishing port is planned at Nishtun, in the Sixth Governorate, that is expected also to serve as general cargo access for that governorate.

Aden

2.17 Aden is not only the principal port in PDRY, but also one of the world's largest bunkering and service ports. It has 30 berths, and a large sheltered harbor basin approachable from all sides with no natural hazards. Its primary activities are bunkering and servicing of ships, in addition to handling most of PDRY's foreign trade. Prior to the closure of the Suez Canal in 1967, the port received about 6,000 ships per year and was a major source of employment in the country. The closure of the Suez Canal resulted in a severe drop in the number of ships calling at Aden to about 1,200 in 1974.

2.18 When the Suez Canal was reopened in June 1975, vigorous efforts were made to prepare the port for the expected increase in traffic. For this purpose, a loan totalling US\$16.8 million for rehabilitating the port was obtained from IDA (US\$3.2 million) and the Arab Fund (US\$13.6). The loan was used for modernizing and replacing equipment, and for providing technical assistance. As can be seen from Table 5, traffic increased after the reopening of the Suez Canal, reaching a level of 2,600 ships per year in 1977, or two-fifths of its pre-1967 level. Since then, however, the volume of bunkering has declined sharply. This disappointing trend is due to the emergence of competing ports in the Red Sea and the rising trend to obtain bunkering fuel from terminal ports rather than mid-distance ports. Since the port of Aden is an important contributor to government revenues (net receipts from bunkering and import-export trade accounted for 7% of domestically generated government revenue in 1978), it would be worthwhile for the Aden Port Authority (APA) to conduct an investigation into the causes of this decline with a view to winning back some of the lost traffic.

2.19 Apart from the bunkering activities, imports of 1.9 million tons of crude oil and 580,000 tons of general cargo passed through the port of Aden in 1978. Exports amounted to 1.5 million tons of refined oil products from the Aden refinery and 90,000 tons of general cargo. Of the 700,000 tons of general cargo handled in 1977 about 100,000 tons were in transit to North Yemen, but the temporary closing of the PDRY/YAR border in 1978 cut off this traffic. While the oil traffic was stable in 1975-77, well below earlier years, the volume of general cargo imports in 1977 and 1978 was almost double that of 1973-76. In principle, the port has sufficient capacity for foreseeable needs, though it has suffered some congestion because of delays in clearing goods inland. The APA has hired consultants to advise on raising the efficiency of cargo handling procedures, and others to assess the feasibility of constructing new alongside berths. Although the Plan allocated US\$6 million for dredging Aden port to accommodate larger ships, the APA has since decided not to proceed, as there is insufficient demand to justify the dredging.

Mukalla

2.20 PDRY's only other port at present, Mukalla, has no facilities for direct loading and unloading alongshore, but requires intermediate loading on lighters that is slow and inefficient, and the risk of damage is high. The port is exposed to monsoon winds that limit its use between May and September. The number of ships (excluding dhows) calling has remained steady over the past three years in the range 100 to 110 per year. About 110,000 tons of dry cargo and 50,000 tons of oil have been unloaded each year; only an insignificant volume (2,000 tons/year) was loaded. The dry cargo imports were mostly of foodstuffs and building materials.

2.21 Improvements are under way in the form of a new port at Khalf. A finger jetty usable throughout the year is being constructed, together with facilities for fishing boats and two general cargo berths of 10 m draft capable of taking ships up to 10,000 dwt. The port, which is being financed by the PDRY government at a cost of YD7.5 million, is part of a multi-purpose project; on-shore the Arab Fund (US\$21 million) and the Kuwait Fund (US\$10 million) are helping finance a fish meal plant and an electric power station. The port was scheduled for completion in 1980, but will be delayed by the bankruptcy in spring 1979 of the contractor, a West German firm. On completion the port should be able to handle 200,000-300,000 tons per year, allowing almost all of the Mukalla hinterland's requirements to be imported directly via Khalf, rather than the present more costly and time-consuming procedure of importing via Aden and forwarding by truck or coastal freighter.

Coastal Shipping

2.22 Coastal trade is mostly handled by dhows whose owners are grouped into a Sea Transport Cooperative. In addition, the National Shipping Company (NSC) owns three elderly coasters of 600-1900 tons capacity which operate as far as Aqaba and India. Freight rates are high by international standards, and maintenance is a problem. Since the completion of the Aden-Mukalla highway, the volume of coastal sea traffic is light, as exchanges between Aden and Mukalla are limited mainly to petroleum products from the Aden refinery and transhipped imports moving eastward, and tobacco from Ghail Bawazir and lime from Mukalla moving westward.

D. Civil Aviation

Airports

2.23 PDRY has one international airport at Aden and seven local airstrips currently receiving scheduled services: Beihan and Ataq in the Fourth Governorate, Riyan (for Mukalla) and Al Ghuraf (for the Wadi Hadramawt) in the Fifth Governorate, Al Gheidah and Qishn in the Sixth Governorate, and the island of Socotra. Dropping from a level of 12,000 aircraft movements per year before independence, traffic at Aden Airport has remained stable at 6,000-7,000 aircraft movements per year since 1967 (9 flights in and out per day), of which three quarters are international (see Table 6). With the general growth in plane size, however, the number of passengers using the airport has climbed steadily to 199,000 in 1975, an average growth rate since 1967 of 8% per year. This traffic has consisted of four-fifths international, one-fifth domestic. Transit traffic has made up about 10% of passengers using the airport. Air freight traffic has remained stable at around 2,200 tons per year.

2.24 International services connect Aden by one or two flights a week with most countries of the Arabian peninsula and the Horn of Africa and with India and the USSR. There are at present no through services to Western Europe. The potential for further growth of international traffic appears to lie largely in an intensification of services within the region and is closely tied to political developments.

Domestic Air Services

2.25 All domestic services are operated by the government-owned airline, Alyemda, with a fleet of four DC3's. It also operates a Boeing 707 and a 720 for international flights. About half of all internal passenger trips in 1977 were between Aden and Riyan (Mukalla), where plane travel avoids a day-long journey by road. All the other local airstrips serve outlying towns not yet connected by paved roads to the rest of the country. Fares are low by international standards and the passenger load factor is consistently high. The quality of service provided by the existing operations is low. The aircraft are very old, maintenance constitutes a continuous problem, and there is a lack of reliable navigational aids. As a result, the services are often subject to lengthy delays, either because of equipment failure or because they cannot operate in poor weather, or because the runways are unusable due to rain.

2.26 The Government plans to improve this situation by building an international standard airport at Riyan likely to cost US\$25 million, and buying another jet aircraft, as well as improving telecommunications, navigational aids and maintenance equipment. Aden airport is also being extended and the runways strengthened. The Government has requested assistance from the Kuwait Fund to assist in financing the Riyan airport. It became necessary to scale down the airport's design after unacceptably high bids for the civil works were received in 1978. Here as with the other airports caution has to be exercised in upgrading facilities, which tends to be costly. Runway paving and minor improvements for local traffic may be economically justified, but it should be borne in mind that Aden-Mukalla air traffic fell by nearly half between 1975 and 1977, at the time that the Aden-Mukalla road was completed. National per capita income is too low (US\$320 in 1977) to sustain a high level of aviation services, once the paved road network extends to the outlying regions.

III. TRANSPORT PLANNING AND COORDINATION

A. Transport Planning

3.01 Three ministries are responsible for the main aspects of the transport system: the Ministry of Construction for roads, the Ministry of Communications for road transport services, shipping and civil aviation, and the Ministry of Planning (MOP) for coordinating the planning of investments in the transport sector. The MOP's Director for Transportation works with the modal ministries in the preparation of new projects and advises on their integration into the national investment plan. The degree of preparation of individual projects and the criteria for evaluation will depend somewhat on the expected source of financing, but the use of cost-benefit analysis as required by IDA is accepted and understood.

3.02 The sector allocation to transport under the First Five-Year Plan (1974-78) has been consistently high by international standards; planned at 21% and actually 24% of the capital budget. The sector also has a good record as to its absorptive capacity: actual expenditures rose an average of 50% per year from 1974 to 1978, while the ratio of actual to planned expenditures over the five years was at the commendably high level of 82%, compared to 71% for all sectors combined. The breakdown by mode is shown in Table 7. The transport allocation for the Second Plan Period (1979-83) is about YD 71 million, or 19% of the total investment plan, about 45% more in real terms than actual expenditures under the First Plan. About YD 31 million of this (US\$90 million) will be spent on roads (para. 2.10), and YD 6 million on buses and public-sector trucks. The remaining YD 33 million approximately will help finance, among other projects, completion of the new port at Khalf, the new airport at Riyan and the improvements to Aden airport. The economic justification for a large allocation to aviation is doubtful in view of its limited prospects compared to surface transport (para. 2.26). Current budget allocations for public works and communications (of which road maintenance is a major item) have, on the other hand, been only about 4% of the national current budget, and in 1977 fell to 2%; these should be increased, to ensure a consistent level of funding for maintenance that is not conditional on the availability of foreign financing.

B. Modal Choices

3.03 In a centrally planned economy such as PDRY the coordinating ministry is in a particularly strong position to influence the development of the different transport modes to satisfy the planning criteria, whether they be to minimize total transport cost or to guarantee defined levels of accessibility to different regions, population categories or industries. At the economy's present state of development, the modal choices are not difficult to enumerate, but in view of the limited experience of the different modal operators and hence the lack of relevant data, the choices are not necessarily easy to resolve. Three structural changes are now taking place in PDRY's transport system: (i) the connecting of large parts of the country to the paved road network for the first time; (ii) the modernization of the ports of Aden and Mukalla; and (iii) the construction of a new airport to serve Mukalla.

The first two changes alter the competitive relationship between road and sea transport for freight, and the latter the competitive relationship between road and air transport for passengers.

3.04 International access to PDRY will continue to be concentrated on Aden, by air in the case of passengers and by sea in the case of freight. If political developments favor it, exchanges with the YAR may increase via the new Aden-Taiz road, but the Government's expectation of substantial transit traffic of goods imported via Aden is likely to be overtaken by events in YAR, where the port bottlenecks of recent years are being eliminated by major increases in port capacity. It can be expected that much of the air traffic between Aden and Taiz will divert to the road when it is opened, especially if a good bus service is introduced.

3.05 Internally, the modal choice affecting passengers is that between road and air. Comparisons with other countries suggest that, even after the paved roads to the Wadi Beihan and Wadi Hadramawt are completed, their remoteness from Aden will generate a certain demand for air travel. However, careful study needs to be made to determine the appropriate scope for further development, if any, of airports and air services, considering the low traffic volumes likely (para. 2.26).

3.06 As regards freight, the principal modal choice is between truck and coastal shipping between Aden and Mukalla. With the construction of the new port planned at Nishtun, the option of using shipping to supply the Sixth Governorate will also enter the picture. The main commodity flows in PDRY are (a) agricultural produce moving from the ten or so widely scattered growing areas in the 2nd, 3rd, 4th and 5th Governorates to the consumption centers, primarily Aden and Mukalla; (b) fish from the fishing villages along the coast to the fish processing plants at Aden and Mukalla or to local consumption centers; (c) consumption goods, equipment, fertilizers and other manufactured goods from Aden to Mukalla and the hinterland of each city; and (d) fuel from the Aden refinery to the rest of the country. Although freight rates are unusually high by both truck and ship, the cost of sea transport between Aden and Mukalla, including handling charges, is half that by road, as one would expect over such a distance (600 km). Present traffic volumes on the road indicate, however, that three to six times as much freight is moving by road on this route as by sea. This suggests either an inflexible organization of freight services that discourages use of the lower-cost mode, or that users assign a high value to the greater speed, convenience and reliability of road transport. Both are probably true. For instance, the public companies responsible for distributing key commodities such as cement, fertilizers, rice and wheat have their own truck fleets, and since retail prices are held uniform throughout the country, the transport costs of specific routes are not reflected directly in the commodity prices. Once Khalf is completed, sea should have a real cost advantage for bulk commodities and dry goods between Aden and Mukalla, and the port authorities and the National Shipping Company should therefore pay particular attention to the potential of diverting traffic away from road through improvements in the quality of service by sea.

IV. CURRENT ISSUES

A. Transport Pricing Policy

4.01 The unusually high level of transport rates and fares by road and sea and the low fares by air, while generally consistent with existing local costs and operating efficiency, raise the question as to the criteria by which prices should be set within the distinctive PDRY context. As improved transport services are introduced, the Government should review their pricing carefully as to the trade-offs involved between the possibly conflicting goals of (a) cost recovery, (b) competition between road and air or shipping, and (c) the social obligation to provide a minimum level of accessibility to all communities. Up-to-date knowledge of the costs involved is relevant both to the fixing of common-carrier rates and fares and to the regional cross-subsidization policies of the public companies operating their own truck fleets (para. 3.06). The technical assistance team to the Ministry of Construction (Sotecni) has studied this issue, and close attention should be given to their recommendations on steps to establish some basic cost accounting among the transport operators as the foundation of a rational pricing system.

4.02 The extent to which pricing may be used as a criterion of resource allocation will of course have to be defined by the political authorities within the context of the country's socialist planning system. In view of certain rigidities noted in some of the existing transport services -- for example, the lag in providing sufficient bus services on the Aden-Mukalla road, and initial overcentralization of the PCLT's truck loading turn system-- it would also be of value to those planning the future development of the transport system, in the Ministry of Planning, the modal ministries and the operating agencies, to have an explicit definition of the criteria that should govern decisions on centralization or decentralization, public or private ownership of vehicles or the provision of unremunerative services.

B. Appropriate Design Standards for Roads

4.03 The discussions between the Ministry of Construction and IDA over preparation of a Third Highway Project have highlighted the difficulties inherent in PDRY's present circumstances in setting appropriate design standards for roads to be constructed. At issue is the conflict between, on the one hand, the country's very limited investment resources, the long distances to be covered between towns, and the low traffic volumes, all of which point to the use of low-cost designs wherever possible, versus the severe shortage of trained manpower for maintenance operations and the real but hard-to-predict risk of flash flood damage, and the bias towards capital rather than current outlays. In combination, these factors lead the Ministry of Construction to prefer stronger and larger drainage structures and avoid gravel pavements, with insufficient regard for the wider economic trade-offs involved. This issue hinges on two unresolved subissues: the attitude to adopt towards maintenance, and the cost-benefit analysis of road reliability. These are discussed in turn below.

C. Appropriate Maintenance Strategy

4.04 PDRY suffers from a severe shortage of skilled labor, due to a historical lack of training facilities and to the emigration of a large part

of the male work force to Saudi Arabia and other countries of the Arabian Peninsula. This makes it particularly difficult for the Government to organize local crews for routine and periodic road maintenance. At the same time the need for prompt maintenance work at the local level is unusually great, since roads throughout the country are frequently blocked by wind-blown sand or by silt and rocks carried on to the roadway by streams. WFP-financed maintenance and minor improvement operations have lacked the flexibility to address this need, since for administrative reasons they have had to be planned 6-18 months in advance.

4.05 The Ministry of Construction can make appreciable savings in initial construction costs by limiting pavement widths, provided the shoulders are regularly maintained. Also, savings in pavement costs are possible because bituminous surface treatments can be used instead of asphaltic concrete, which in PDRY's circumstances is significantly more expensive. However, the bituminous surface treatments require more frequent periodic resurfacing applied in a timely way; hence their appropriateness depends on the establishment of strong local maintenance centers. A further advantage in building up local units is their use in carrying out minor improvements on low-standard roads, a task that is gaining in importance.

4.05 The Government is aware of the potential cost savings at stake in construction as well as of the benefits of prompt action on routine maintenance, but for the time being feels that the manpower shortage is so severe that it has to design roads under the assumption that little maintenance will be carried out. Financing considerations also enter into this issue. Most maintenance expenditures, being current items, have to be financed from the Government's own very limited revenues, whereas the higher capital cost of a relatively maintenance-free design can be borne by the concessionary loans with which PDRY has been financing much of its highway program. The Association, on the other hand, mindful of the very high economic returns on maintenance operations elsewhere, is proposing further assistance under the Third Highway Project to provide more maintenance equipment and in-country training of workshop personnel, as a means to develop local maintenance capabilities.

D. Cost Benefit Analysis of Road Reliability

4.07 The rainfall pattern and the terrain are such that almost any rain causes local flashfloods that threaten severe erosion of road embankments and fords, and yet very little rainfall and runoff data have been collected over the years, from which to predict the frequency and severity of floods. In October 1977 the country had the unfortunate experience of major wash-outs on the Aden-Mukalla road, including the complete destruction of one bridge only months after it was opened, due to an unusually severe flood. There is no local recorded rainfall history by which to judge the frequency of such an occurrence.

4.08 To balance against the considerable extra cost of designing the road to withstand such floods, the cost-benefit analysis needs to establish (i) the probability distribution of different flood levels (with little or no hydrological data to go on); (ii) the predicted amount of damage to the road (with very little experience of paved roads in the country); (iii) the costs

of repairing the damage and the time involved (with very limited maintenance capacity); and (iv) the economic cost of having the road cut for, alternatively, a matter of hours or a number of days (without any relevant economic data). Also assessments need to be made of the value of time to different categories of road users, a difficult enough task even in countries with an established body of economic statistics available. In sum, the calculations on both sides of the cost-benefit equation demand a level of sophistication that for the time being at least is beyond the country's capabilities. Yet the problem cannot be ignored.

4.09 The Association is pursuing its dialogue with the Government on this issue, and with the foreign consulting engineers working in PDRY. Efforts are being made to set up hydrological recording stations and to strengthen the embryonic maintenance operations. On the side of measuring the economic benefits of increasing a road's reliability (i.e. avoiding the costs of wash-outs), the Bank itself has recently been encouraging investigation into the issue in a number of countries, but there remains considerable scope for further research.

E. Poor Vehicle Utilization

4.10 There are several indications -- low traffic volumes in relation to the fleet, high transport rates and fares, and specific instances of vehicles remaining out for service for long periods -- that the general level of vehicle utilization is poor. Examples cited are of trucks standing idle for up to a week between hauls, reflecting on the inefficient organization of the services; or of a substantial number of buses not being usable, for lack of spare parts or of the maintenance skills to install them.

4.11 The extent of this problem is not readily measured since statistics on utilization are not widely collected. However, the importance of the issue can be indicated by estimating the potential savings in foreign exchange from raising the utilization of the existing fleet instead of purchasing new vehicles. Over the next five years the demand for vehicles will rise by about 50%, implying the need for over 8,000 new vehicles if the fleet utilization is not improved, at a cost of about US\$100 million. A 20% improvement in average annual mileage per vehicle could reduce this import bill by US\$50 million; a 30% improvement could reduce it by US\$70 million.

4.12 The Ministry of Communications should follow up on Sotecni's recommendations and explore ways to encourage more efficient vehicle utilization by the modal agencies, in particular by improved vehicle maintenance, better cost accounting and scheduling to avoid empty backhauls.

V. CONCLUSIONS

A. Priority Areas in Sector Policies and Planning

5.01 The first Five-Year Plan period has been one of intense activity in the construction of transport infrastructure. This program has begun to achieve its intended purpose of significantly improving the accessibility of

large parts of PDRY, thereby strengthening the economic and political integration of the country. There remain, however, many remoter populated areas not yet connected to the main transport system and isolated by the resulting high transport costs. To promote agricultural development in these areas and improve their access to medical and administrative services and schools, the Government is planning an ambitious program of works over the next five to ten years to complete a paved primary road network, build a second international-standard airport, and provide adequate port facilities for imports to the eastern half of the country. This program in general reflects a due concern as to the constraints imposed by the Government's limited financial resources and construction capacity. At the same time adequate recurrent funds need to be provided for improving maintenance and raising the productivity of transport facilities. Governorate-level road units need to be built up to raise the level of road maintenance, as well as carry out minor improvements on unpaved tracks, an activity that will take on growing importance as the paved system is completed. This will require international assistance in financing civil works, maintenance equipment, training, and studies to strengthen investment planning.

5.02 The provision of transport services in appropriate quantity and quality has lagged behind the construction of new infrastructure. In the Second Plan period increased attention should be paid to improving transport services in all three modes: roads, shipping and aviation. This involves: (a) a concerted effort to strengthen vehicle maintenance capabilities (paras. 2.11 and 2.25); (b) more efficient use of the vehicle fleet (paras. 2.22 and 4.10 to 4.12); and (c) a closer analysis of pricing policy and the relative resource costs of the different modes (paras. 4.01 to 4.02). The Government should look to suppliers of vehicles and equipment, not only for financing of initial purchases but also for setting up maintenance and repair facilities.

5.03 Such an emphasis on improved transport operations would have significant implications for the budgetary process, since it would require an expansion of the current budget rather than the capital budget, and for the financial criteria and other forms of management control governing the operation of public services. It would also imply a reinforcement of the efforts the Government is already making in almost every field to ease the shortage of trained manpower. Neither of these problem areas is amenable to easy solutions, but both are of major importance in the provision of efficient and appropriate transport services for the productive sectors of the economy that PDRY must necessarily rely on for its continued economic development.

B. Role of External Lenders

5.04 External lenders including the IDA can play a useful role in assisting PDRY in the continued development of its transport sector. During the coming five years lending for transport projects can contribute to meeting the substantial foreign exchange requirements of the national investment plan in a sector with adequate absorptive capacity. By its participation in this process, the IDA, though limited as to the funds it can provide, can help attract other international financing, particularly in assisting the Government to identify and prepare economically sound projects. The thrust of future work of the World Bank in the sector will be directed toward consolidating progress and fostering institutional development, with close attention to the upgrading of local skills needed to operate the transport sector agencies.

5.05 While external financing will necessarily have to focus primarily on the construction of paved roads, emphasis should also be laid on the importance of strengthened maintenance operations and low-cost improvement of unpaved roads in support of agricultural projects. The Government will also be looking to lending agencies for technical assistance and training in all transport modes. Finally, studies to aid the Government in identifying projects tailored to the country's very limited resources will also require external funding. Given the encouraging implementation record of the past five years, such assistance is assured of making a significant contribution to PDRY's continued economic development.

PEOPLE'S DEMOCRATIC REPUBLIC OF YEMENTRANSPORT SECTOR MEMORANDUMLength and Distribution of Highway Network
(km '000)

<u>Governorate</u>	<u>Asphalt</u>		<u>Cobbled</u>		<u>Earth</u>		<u>Total</u>	
	<u>1973</u>	<u>1978</u>	<u>1973</u>	<u>1978</u>	<u>1973</u>	<u>1978</u>	<u>1973</u>	<u>1978</u>
First ^{1/}	105	105	0	0	50	50	155	155
Second	88	136	0	0	625	583	713	719
Third	272	295	0	0	610	558	882	853
Fourth	00	229	0	0	1,089	837	1,089	1,066
Fifth	10	182	203	255	1,972	1,886	2,185	2,323
Sixth	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>486</u>	<u>486</u>	<u>486</u>	<u>486</u>
Total	<u>475</u>	<u>947</u>	<u>203</u>	<u>255</u>	<u>4,830</u>	<u>4,400</u>	<u>5,510</u>	<u>5,602</u>
% of Network	9	17	4	5	88	79	100	100

1/ 83 km of urban roads in Aden.

Sources: VIAK Interim Report, March 19, 1972; Ministry of Public Works for 1973 data; Sotecni Report, June 1978 and Ministry of Construction for 1978 data.

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Table 2.2: HIGHWAY EXPENDITURES (000 YD)

	<u>1967/68</u>	<u>1968/69</u>	<u>1969/70</u>	<u>1970/71</u>	<u>1971/72</u>	<u>1972/73</u>	<u>1973/74</u>	<u>1974/75</u>	<u>1975</u> ^{1/}	<u>1976</u>	<u>1977</u>	<u>1978</u> <u>Estimated</u>
I. Administration and Workshops												
Administration	35.1	27.7	25.7	30.6	35.8	68.2						
Workshops	<u>196.6</u>	<u>201.2</u>	<u>251.4</u>	<u>252.6</u>	<u>172.8</u>	<u>176.6</u>						
Subtotal, Admin. & Workshops	231.7	228.9	277.1	283.2	208.6	244.8	310.0*	373.9	473.9	517.4	521.7	706.5
II. Highway Maintenance												
World Food Programme (WFP), food ^{2/} cash	-	-	-	-	-	-	-	170.9	332.9	412.4	-	600.0
	-	-	-	-	-	-	-	83.8	68.2	81.4	88.1	201.0
Subtotal, WFP	-	-	-	-	-	77.8	287.3	254.7	401.1	493.8	88.1	801.0
Maintenance of bitumen roads ^{3/}	-	-	-	-	-	-	-	39.7	30.1	127.8	158.4	477.0
Mtce. of other roads & tracks	<u>189.6</u>	<u>202.1</u>	<u>133.2</u>	<u>174.7</u>	<u>148.0*</u>	<u>349.2*</u>	<u>394.8*</u>	<u>369.0*</u>	<u>327.4*</u>	<u>400.0*</u>	<u>400.0*</u>	<u>400.0*</u>
Subtotal, Highway Maintenance	189.6	202.1	133.2	174.7	148.0	427.0	682.1	663.4	758.6	1,021.6	646.5	1,678.0
III. Highway Construction												
Subtotal Highway Construction	<u>369.7</u>	<u>173.0</u>	<u>105.8</u>	<u>451.3</u> ^{4/}	<u>1,278.1*</u>	<u>1,956.2*</u>	<u>2,335.8*</u>	<u>2,732.0*</u>	<u>2,226.3*</u>	<u>5,148.8</u> ^{5/}	<u>5,034.5*</u>	<u>6,413.5*</u>
Totals I, II and III	<u>791.0</u>	<u>604.0</u>	<u>516.1</u>	<u>909.2</u>	<u>1,634.7</u>	<u>2,628.0</u>	<u>3,327.9</u>	<u>3,769.3</u>	<u>3,458.8</u>	<u>6,687.8</u>	<u>6,202.7</u>	<u>8,798.0</u>

* Third Highway Project appraisal mission estimates, August 1978

Sources: Second Highway Project Appraisal Report, May 1975
 First Highway Project Completion Report, September 1976
 Ministry of Construction, February and June 1978
 Ministry of Planning, June 1978

Notes: ^{1/} Financial year changed from April 1 to March 31 to January 1 to December 31.

^{2/} Project 688 with extension and Project 2265

^{3/} Transferred from Development Budget

^{4/} Construction Am Ayn - Mukalla began (PRC)

^{5/} Construction Mukalla - Wadi Hadramawt began

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PEOPLE'S DEMOCRATIC REPUBLIC OF YEMEN

TRANSPORT SECTOR MEMORANDUM

Road Authority's Program for 1979-83 Plan

	Total	Total	Construction Period	Under 1973-83 Plan	
	Length (km)	Cost (YD M)		Length (km)	Cost (YD M)
Mukalla-Wadi Hadramawt	365	10.0	1975-80	239	3.5
Aden-Taiz	65	7.1	1977-80	56	4.7
Shuqra-Ahwar	116	5.5	1975-80	92	2.4
Ash Shihr-Sayhut	204	10.2	1978-83	204	9.7
Naqabah-Beiha ^{1/}	284	15.0	1980-83 ^{1/}	90	5.0
Misc. paved roads (reconstruction)	375	2.4	1974-83	175	1.6
Misc. earth roads	808	4.3	1974-83	410	2.3
Reconstruction of 6 bridges in 1st Governorate	-	1.1	1978-81	-	1.1
Workshops improvement	-	0.5	1980-83	-	0.5
Studies	-	0.5	1981-83	-	0.5
TOTAL				1266	31.3

^{1/} As far as Nisab under this Plan, extension to Beiha to follow later.

Source: Second Five Year Plan

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PEOPLE'S DEMOCRATIC REPUBLIC OF YEMEN

TRANSPORT SECTOR MEMORANDUM

New Vehicles Registered

	<u>Cars</u>	<u>Taxis</u>	<u>Buses</u>	<u>Light Commercial</u>	<u>Trucks</u>	<u>Total</u>
1970	532	26	15	450	303	1,326
1971	334	30	0	252	397	1,073
1972	322	20	71	401	434	1,248
1973	178	10	40	270	376	874
1974	159	15	45	420	221	860
1975	205	25	10	456	466	1,162
1976	310	81	184	597	532	1,704
1977	<u>263</u>	<u>148</u>	<u>149</u>	<u>982</u>	<u>1,109</u>	<u>2,651</u>
Total regist, 1970-77	2,303	355	514	3,828	3,838	10,838
Estimated operational fleet (incl. pre-1970)	3,000	300	300	5,000	4,500	13,100

Source: Traffic Department, Ministry of Interior, June 1978
for registration data, mission estimate for operational fleet.

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PEOPLE'S DEMOCRATIC REPUBLIC OF YEMEN

TRANSPORT SECTOR MEMORANDUM

Ocean-Going Traffic Through Port of Aden 1966-78

	<u>1966</u>	<u>1970</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
No. of Ships	6,246	1,607	1,233	1,451	2,336	2,605	2,215
NRT of Ships (000 t)	31,426	8,174	5,107	6,016	9,945	10,738	9,605
<u>Cargo Handled (000 t)</u>							
General Cargo Imported	647	433	374	327	387	618	578
General Cargo Exported	<u>184</u>	<u>93</u>	<u>54</u>	<u>31</u>	<u>80</u>	<u>79</u>	<u>87</u>
Total General Cargo	831	527	428	358	467	697	665
Crude Oil Imported	8,072	6,476	2,885	1,655	1,779	1,811	1,892
Refined Oil Exported	<u>3,986</u>	<u>5,624</u>	<u>2,185</u>	<u>1,478</u>	<u>1,311</u>	<u>1,294</u>	<u>1,526</u>
Total Oil Traffic	12,058	12,101	5,078	3,133	3,090	3,105	3,418
Total Cargo Handled	<u>12,889</u>	<u>12,628</u>	<u>5,499</u>	<u>3,492</u>	<u>3,556</u>	<u>3,802</u>	<u>4,083</u>
<u>Bunkering Traffic (000 t)</u>							
Fuel Oil Bunkers	3,486	927	271	263	563	591	413
Diesel Oil Bunkers	352	46	32	33	75	67	53
Water	483	609	154	149	231	297	288
<u>Passenger Traffic (Persons)</u>							
Disembarked	5,045	5,824	1,000	800	-	n.a.	n.a.
Embarked	8,710	4,897	1,000	600	-	n.a.	n.a.
Transit	<u>128,420</u>	<u>2,532</u>	-	-	-	n.a.	n.a.
Total Passenger Traffic	142,175	13,253	2,000	1,400			

Source: Aden Port Authority

July 1979

PEOPLE'S DEMOCRATIC REPUBLIC OF YEMENTRANSPORT SECTOR MEMORANDUMAir Traffic Through Aden 1966-76

	<u>1966</u>	<u>1970</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>
Aircraft Movements	10,623	6,734	5,648	6,376	7,381
Passenger Traffic ('000)					
Domestic	163.6	147.8	31.1	50.1	66.9
International (Arr. & Dep.)			108.9	126.4	101.0
International Transit	<u>25.1</u>	<u>12.7</u>	<u>22.3</u>	<u>22.8</u>	<u>25.1</u>
Total	188.7	160.6	162.2	199.3	193.0
Freight Traffic (tons)					
Inbound	1,081	1,409	1,760	1,019	905
Outbound	<u>2,104</u>	<u>989</u>	<u>904</u>	<u>863</u>	<u>1,211</u>
Total	3,185	2,398	2,664	1,882	2,165

Source: Central Statistical Organization

January 1979

TABLE 7

PEOPLE'S DEMOCRATIC REPUBLIC OF YEMEN

TRANSPORT SECTOR MEMORANDUM

Capital Budget for Transport 1974-78

(000 YD)

	-----Planned-----											
	1974/75		1975 (9 months)		1976		1977		1978		Total	
		(%)		(%)		(%)		(%)		(%)		(%)
Road infrastructure	3,875	62	3,794	72	6,688	69	6,203	34	8,748	37	29,308	46
Road transport services	<u>361</u>	<u>6</u>	<u>643</u>	<u>12</u>	<u>2,192</u>	<u>22</u>	<u>2,487</u>	<u>13</u>	<u>3,362</u>	<u>14</u>	<u>9,045</u>	<u>14</u>
Subtotal roads	4,236	68	4,437	84	8,880	91	8,690	47	12,110	51	38,353	60
Ports & Shipping	757	12	456	9	550	6	5,796	31	6,684	28	14,243	22
Airports	238	4	221	4	212	2	969	5	2,059	9	3,699	6
Air transport	<u>1,045</u>	<u>17</u>	<u>151</u>	<u>3</u>	<u>116</u>	<u>1</u>	<u>3,130</u>	<u>17</u>	<u>2,800</u>	<u>12</u>	<u>7,242</u>	<u>11</u>
Subtotal civil aviation	<u>1,283</u>	<u>20</u>	<u>372</u>	<u>7</u>	<u>328</u>	<u>3</u>	<u>4,099</u>	<u>22</u>	<u>4,859</u>	<u>21</u>	<u>10,941</u>	<u>17</u>
TOTAL	6,276	100	5,266	100	9,757	100	18,585	100	23,654	100	63,537	100

	-----Actual-----							
	1974/75		1975		1976		1977	
		% of Planned		% of Planned		% of Planned		% of Planned
Road infrastructure	3,140	81	3,086	81	6,705	100	4,962	80
Road transport services	<u>35</u>	<u>10</u>	<u>94</u>	<u>15</u>	<u>2,186</u>	<u>100</u>	<u>2,903</u>	<u>117</u>
Subtotal roads	3,175	75	3,180	72	8,891	100	7,865	91
Ports & shipping	549	73	154	34	432	79	3,284	57
Airports	167	70	135	61	205	97	588	61
Air transport	<u>739</u>	<u>71</u>	<u>26</u>	<u>17</u>	<u>98</u>	<u>84</u>	<u>3,078</u>	<u>98</u>
Subtotal civil aviation	906	71	161	43	303	92	3,666	89
TOTAL	4,630	74	3,495	66	9,626	99	14,815	80

Source: Ministry of Planning, June 1978
January 1979

PEOPLE'S DEMOCRATIC REPUBLIC OF YEMEN

TRANSPORT SECTOR MEMORANDUM

Proposed Transport Investments under the 1979-83 Plan

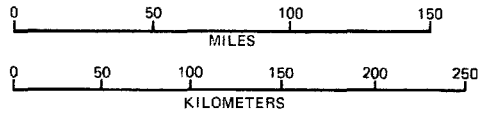
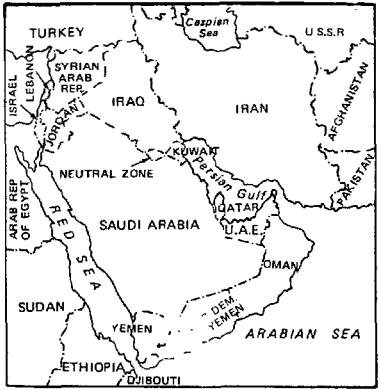
		<u>(YD mn)</u>	<u>%</u>
Road Construction (see Table 3)		31.3	44%
Road Transport (Land Transport Corporation)		6.2	9%
incl. purchase of 266 buses	1.7		
purchase of 220 trucks	3.1	—	—
Subtotal, roads		37.5	53%
Airports		13.4	
incl. construction of Riyan Airport	8.5		
extension of Aden Airport	4.6		
Air Transport (Alyemda)		<u>4.4</u>	
Subtotal, Civil Aviation		17.8	25%
Ports & Shipping		15.3	22%
incl. construction of Khalf port	5.4		
dredging port of Aden ^{1/}	2.0	—	—
TOTAL		<u>70.6</u>	<u>100%</u>

^{1/} Government has decided not to carry this out.

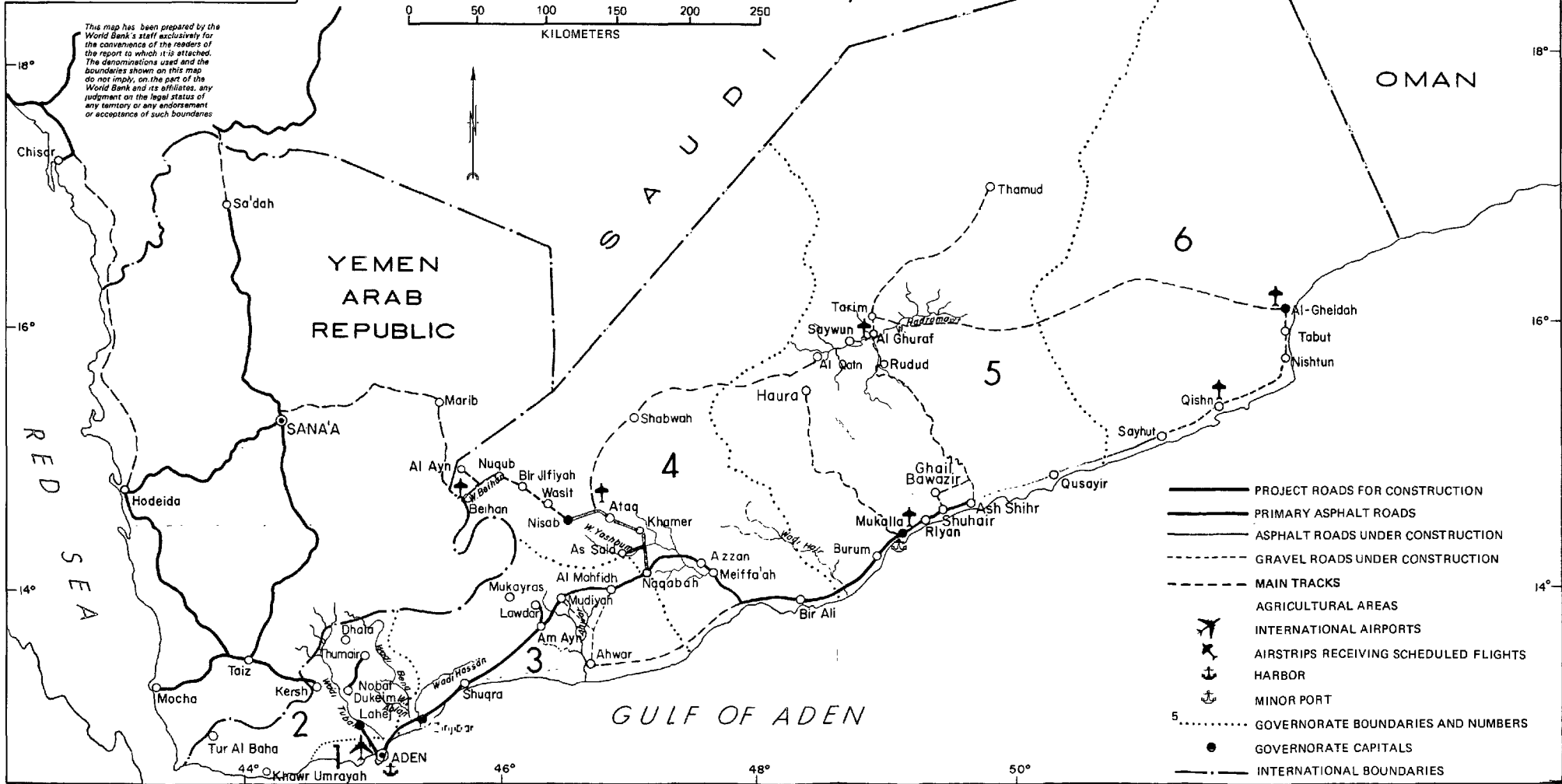
Source: Second Five Year Plan

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PEOPLE'S DEMOCRATIC REPUBLIC OF YEMEN TRANSPORT INFRASTRUCTURE



This map has been prepared by the World Bank's staff exclusively for the convenience of the readers of the report to which it is attached. The denominations used and the boundaries shown on this map do not imply, on the part of the World Bank and its affiliates, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.



- PROJECT ROADS FOR CONSTRUCTION
- PRIMARY ASPHALT ROADS
- ASPHALT ROADS UNDER CONSTRUCTION
- - - GRAVEL ROADS UNDER CONSTRUCTION
- - - MAIN TRACKS
- - - AGRICULTURAL AREAS
- ✈ INTERNATIONAL AIRPORTS
- ✈ AIRSTRIPS RECEIVING SCHEDULED FLIGHTS
- ⚓ HARBOR
- ⚓ MINOR PORT
- 5..... GOVERNORATE BOUNDARIES AND NUMBERS
- GOVERNORATE CAPITALS
- - - INTERNATIONAL BOUNDARIES