TWELFTH MEETING OF EXPERTS ON THE
UNITED NATIONS PROGRAMME IN PUBLIC
ADMINISTRATION AND FINANCE
New York, 31 July–11 August 1995

THE ROLE OF PUBLIC ADMINISTRATION IN DEVELOPING
INFRASTRUCTURE AND PROTECTING THE ENVIRONMENT

Report of the Secretary-General

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INTRODUCTION

1. The present report is intended to introduce several key issues for Governments to consider as they develop new infrastructure policies and facilities that will be not only responsive to and sustainable in terms of the needs and expectations of their citizens but also sensitive to the protection of the environment.

2. As the twenty-first century approaches, Governments face a number of complex challenges as providers of infrastructural services. Among these are improved efficiency, increased reliability, cost-effective management, a growing dichotomy in urban/rural services and sustained economic growth.

3. Developing countries invest over $200 billion per year in new infrastructure, representing roughly 4 per cent of their national output and one fifth of their total investment. Over the past two decades, these investments have paid considerable dividends, such as a substantial increase in the proportion of households with access to clean water, and the per capita doubling of power production and telephone lines. However, 1 billion people in the developing world still lack access to clean water and nearly 2 billion lack access to electric power lines. This report considers several vital areas that are important to the effective formulation of infrastructure policy and its relationship to sustainable development and the environment.

4. The first section considers the role of government itself. The origins, developments, and challenges of infrastructural activities are a direct result of, and an expedient response to, a society's primary need for services. How a Government's policies are influenced by past experiences and technological advances, impact on the environment, and contribute to economic growth are among the aspects considered in that section.

5. How Governments could improve responsiveness in the area of maintenance is evaluated in section II. What are the reasons for the current levels of attention or indifference? What is the degree of political commitment? What is the degree of local involvement? What future options are suggested by current trends and future technologies and needs?

6. Government and the private sector have become significant and increasingly effective in recent years in areas of infrastructural financing, management and project development. Potential benefits and costs, investment opportunities, efficiency and responses for addressing environmental concerns are several of the key aspects considered in section III.

7. Governments are increasingly turning to foreign investment as a source of financing infrastructure. Some important issues raised in section IV include incentives for foreign capital investment; bilateral and multilateral responses; joint ventures; impact of technology; and environmental awareness.

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8. There are two principal sources for financing infrastructure activity - tax revenues and government borrowings. Section V considers the economics of alternative choices and funding decisions. The advantages and limitations of the current choices, market competition, the deficiencies and advancements of budgetary allocations, financing and pricing methods, and instruments for resource mobilization are among the several topics considered.

9. The new and complex problems that have resulted from the extensive and rapid growth of metropolitan populations and the increasing number of large cities have impacted both on infrastructure and on the environment. Recognizing problems and their causes, defining environmental impacts and setting priorities, preserving the environment through improved infrastructure, and formulating an urban environmental management strategy are all considered in section VI.

10. Likewise, there are persistent problems of infrastructure in rural areas. These problems concern, inter alia, feeder roads, for improved marketing of products; clean and accessible water; rural electrification; and greater involvement and improved coordination at the local level. Sustainability of infrastructure demands that appropriate attention be paid to efficient use and maintenance of existing capacity, far-sighted planning, integration of new technologies, adequate emphasis on environmental concerns, and responsiveness to users, both urban and rural.

I. ROLE OF GOVERNMENT AND INFRASTRUCTURE

Origins of the role of the public sector

11. Historically, the combination of a society's primary need for services and its technological potential has been the fundamental catalyst for the formation and execution of large-scale physical works projects. Effective and enduring investments in transportation, telecommunications, and sanitation continue to be a basic measurement of societal development, and public sector efficacy.

12. Advancements in infrastructure have often been a linear response to advancements made in technology. One needs only think about changes from copper wire electronic transmission to fibre optics to appreciate the role of technology. Today, modern service sectors have benefited substantially from the technology-driven "infrastructure revolution".

13. As a commanding public interest, infrastructure can also be characterized as an emerging public trust. Traditionally, Governments have appropriated all aspects of infrastructure. This is particularly true in developing countries. Throughout the first half of the twentieth century, for many industrialized countries private participation had been essential; but the trend from the late 1940s until the 1980s was overwhelmingly towards government or parastatal provision.

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14. There are a number of reasons for this dominant public sector role in infrastructure development: recognition of its economic and political importance; a belief that problems with technology required a highly activist response by Governments; an expectation that Governments could perform where private markets could not. Yet after years of progress in infrastructure expansion under public leadership, recent experiences have often revealed a chronic misallocation of resources and a repeated failure to respond to demand. Public leadership involving ownership, financing and/or operation has seldom demonstrated any advantage over private sector involvement in poverty reduction or environmental protection.

15. Despite these deficiencies, achievements in infrastructure expansion in the last 20 years have been impressive. Evidence available shows that between 1975 and 1990, countries with low-income economies, and virtually no technological and resource base, have registered the greatest increase in telecommunications, sanitation, and water-supply services. For middle-income economies, the capacity of the power and telecommunications sectors more than doubled during the same period. Between 1960 and 1975, the greatest expansion in paved roads occurred for both urban and rural populations; and although urban populations are significantly better served than rural populations in areas like access to drinking water, sanitation and power, the gaps in coverage have narrowed.

Infrastructure defined

16. Infrastructure is an umbrella term for many activities referred to as "social overhead capital". These activities include services from public utilities like power, telecommunications, piped water-supply, sanitation and sewerage, solid waste collection and disposal, and piped gas. It can also mean the development of massive public works projects like the construction of roads and dams, and irrigation and drainage facilities; and transportation and communications networks.

17. Infrastructure services result from combining physical facilities, hardware - vehicles and equipment - and other outputs. Traditionally these services have been provided by the public sector and have the following additional characteristics: considerable lumpiness in investments; responsive economies of scale; ongoing public monopolies; high levels of externalities (positive or negative); intermediate input characteristics; important network effects; and difficulties in recovering costs.

Lessons of past experiences

18. Several conditions are necessary for infrastructure to achieve its potential. First, there must be the existence of a macroeconomic policy climate favourable to the efficient allocation of resources. Second, for projects to increase the productivity of other areas, there must be a sufficient complement of corresponding resources. Third, for users to benefit as expected, a reliable degree of quality in services must be provided. Fourth, infrastructure is likely to be more economically efficient, and have a favourable impact on the
environment, when it is subject to user charges based on the marginal costs of supply, and willingness to pay.

19. One ingredient for successful infrastructural facilities development seems to be a high degree of autonomy, although this does not mean complete freedom from government oversight and regulation. The relatively autonomous Botswana Water Utility Corporation is a good case-study. However, despite this autonomy, overall conditions, low performance standards, weak finances, a lack of accountability, no realistic incentives, and inconsistent and poorly defined goals of providers still continue to frustrate progress that is truly sustainable.

Defining a crisis

20. Because the volume of recent infrastructure spending has varied considerably among regions, the inconsistency in the quality and quantity of infrastructure suggests that a crisis may exist. Though there continues to be substantial investment in East Asia, countries in Africa and Latin American countries suffer growing annual reductions. However, whether an infrastructure crisis does exist in the 1990s is largely a matter of perception. Infrastructure was not a major barrier to growth in the 1980s – particularly in stagnant or declining economies. However, if the present condition of infrastructure development and management proves a major barrier to future growth, this could potentially qualify as a crisis.

Infrastructure and economic growth

21. To policy makers, public works projects are a necessary strategic tool. Embarking on a major infrastructure project can "prime the pump" of a sluggish economy or increase the rate of growth in an expanding economy. During the immediate post-Second World War period, a series of massive public works projects in the United States of America, for example, illustrated how infrastructure investment contributes to economic development by increasing productivity and providing amenities that enhance the quality of life.

22. Infrastructure services, such as transport, water and electricity, are intermediate inputs to production. Any reduction in input costs raises the profitability of production, thus permitting higher levels of output, income, and employment. Infrastructure services also raise the productivity of other areas, like labour and capital, by permitting the transition from manual to electric machinery, reducing workers' commuting time, and improving information flows through electrical data exchange.

23. Since the mid-1980s, however, there has been increasing concern, and growing debate, about the performance of infrastructure. Macroeconomic studies and formal research on the linkages between infrastructure and economic growth have generally found that infrastructure capital has a significant, positive effect on economic output and growth; but cases of aggregated analysis, which attempts to capture all possible externalities and spillover effects of
investment, do not provide guidance specific enough for policy development, nor do they comprehensively explain the mechanisms by which infrastructure affects growth. For example, empirical research has not been conclusive regarding the important argument as to whether infrastructure investment can be a "leading" factor in stimulating the growth of underdeveloped regions, or a "lagging" one.

24. A number of studies suggest that infrastructure promotes growth most effectively in situations where a substantial level of activity already exists. Research confirms that infrastructure makes significant contributions to growth through the reduction in costs for services, but in developing countries there is dramatic evidence of the negative impact of inadequate infrastructure services on economic growth and welfare. For example, a survey of manufacturing establishments in Nigeria reported that the expenditures incurred as a result of unreliable infrastructure averaged nearly 10 per cent of their variable costs. In Pakistan, the multiple effects of power outages are estimated to cost nearly 2 per cent of gross domestic product (GDP) with over a 4 per cent reduction in the volume of manufactured exports.

25. A recent study by the World Bank made the following recommendations for infrastructure investment planning and project evaluation. First, investments should be based on analysis of the nature of demand for specific services, not of quantitative projections of physical "needs". Second, the planning of supply should take account of all possible alternatives for generating the flow of services demanded. Third, choosing between potential investments within infrastructure, or between infrastructure and other sectors, is best done with the traditional tools of benefit-cost (rate of return) analysis. Fourth, utilization of a demand orientation both in the evaluation of investments and in their operation and regulation requires performance indicators that reflect quality of service and user satisfaction.

Regulation

26. To many Governments in recent years, the area of regulatory innovation has become an activity as influential as technological change. One of the reasons for increased activity is the effectiveness in promoting new forms of competition. Guidelines for infrastructure regulations should take into account the following: first, responsibilities for regulations and for operation should be formally separated. This is particularly important in the enforcement of environmental, health and safety regulations. In the United States and the United Kingdom of Great Britain and Northern Ireland, the regulatory authority is commonly an independent legal entity. Second, the regulatory process should be capable of straightforward and prompt implementation; rulings should be enforceable, with recourse to appeal. Third, interested groups should have the opportunity to present views and be informed of decisions. Regulatory responsibility can also be maintained through contractual oversight.

27. Though it may be innovative and useful, regulation itself is not a flawless strategy. The correct regulatory mechanisms are not always evident. Regulators themselves are vulnerable to manipulation. Effective implementation of economic
regulations, for example, requires a sophisticated and extensive information base that, in most developing countries, can be imprecise and even deceptive. At times, through hidden or unintended consequences, the regulatory reforms can check or blight the competitive process that they were designed to release. In cases where there are no structural barriers to competition, for example, the appropriate role of government is to liberalize entry into and ensure commercial freedom within the market rather than to regulate specific behaviour.

28. One direct consequence of regulatory innovation has been the unbundling of activities in economies of scale. This has promoted competition by diversifying the many activities that were once performed exclusively by single monolithic entities. By isolating the natural monopoly segments of an industry, unbundling promotes new entry and competition in segments that are potentially competitive. Two cases in point involve the railway services in Argentina and Poland.

Striking a balance between quality and quantity

29. For Governments, a serious challenge in the twenty-first century will be achieving an equitable balance between quality and quantity in infrastructure delivery. The efficiency and quality of countries in infrastructure coverage derive not from general conditions of economic growth and development, but from the institutional environment, which often varies across sectors in individual countries. Generally, there appears to be no correlation between a country's quantity of provision in one sector, and its quality of performance in another. Although quantity tends to be correlated with GDP, quality of infrastructure provision is not so correlated. Urbanization itself is also an important factor in the provision of greater quantities of service. Projected urban growth in Africa, East and South Asia in the coming decades will greatly increase demands for more extensive services and greater access to them.

II. INFRASTRUCTURE: WHEN MAINTENANCE IS NEGLECTED

30. A severe barrier to sustainable development in nearly all developing countries has been the consistent failure of infrastructure providers to support facilities through appropriate maintenance programmes. The consequences of inadequate maintenance severely compromise efficiency in all sectors of infrastructure in developing countries. Over time, poor maintenance can result directly in reduced quality of service and increased costs for users. For example, power systems, on the average, generate only 60 per cent of their capacity at any given time; the result is often the installation of individual backup generators. Water-supply systems deliver an average of only 70 per cent of their output to users, annually failing to achieve a best-performance average of 85 per cent; consequently, individual investments in water storage tanks and private wells are frequent and costly. Finally, it is estimated that in Africa over the past decade, some $45 billion in new and reconstructive road costs could have been saved had the propitious investment of $12 billion in general maintenance expenditures been made.
Reasons for neglect

31. Unavailable resources, unskilled staff, inadequate project planning, and lack of coordination are the obvious factors for poor maintenance programmes; but there exists one consistently significant reason in all infrastructure sectors: a systematic bias in favour of new construction at the expense of maintenance and even efficient operations. This preference for new construction over sustained maintenance is the result of the specificity and technical rationality inherent in capital-intensive and standardized construction activities. Research has found that the focus on short-term technical rationality (construction) versus the longer-term process of institutional development (maintenance) is endemic. The practice of providing short-term solutions can conflict with long-term institutional development needs.

32. Part of the bias towards new construction stems from the nature of donor financing. In the Philippines, for example, a recent study found the concentration of one donor to be continually on road construction, even while the deplorable conditions of rural road maintenance were recognized. There is a tendency to view external financing for new investments as free money, and deterioration is thereby allowed to occur. This is true in large developed countries as well. In the United States, for example, grants for expanding urban water and sewer systems encouraged localities in the 1970s to overbuild systems that later required extensive maintenance. Financing ultimately depended on the local capacity to raise revenues through fees and taxes. Scarce resources, low political visibility, and a short-sightedness on the part of political leadership and bureaucracy result in the low prioritization of maintenance activities.

Indifference towards maintenance

33. Why has the level of indifference towards maintenance been growing? In addition to the inherent bias discussed above, several key factors most common in the neglect of maintenance include (a) the inability to exclude users who feel little responsibility, (b) biases in donor incentives against supervision and post-project accountability, (c) the failure to include beneficiaries in project design and (d) the top-down approaches that emphasize the use of complex technologies that have little concern for long-term maintenance. Other sectoral and institutional factors include the lack of daily continuity in operations with distorted incentives for government staffs, and the perception among staff that long-term interests and political gain are more visible in construction projects. Also contributing to inadequate maintenance are technical factors, like age of facilities, low productivity of maintenance staff, inadequate allocation of maintenance funds, misallocation of available funds, and a lack of monitoring and enforcement of specific rules and standards.

Lack of political commitment

34. The flagrant indifference to maintenance tends to reflect a severe lack of political commitment on the part of providers at all levels of government.
Construction activities carry a high visibility, which thus gives them a high political priority. Conversely, maintenance activities are relatively invisible. Also, large high-prestige projects are useful politically. On the other hand, low-income (especially rural) constituencies are relatively weak in making their demands heard. The result is that with the absence of a voice, local communities often exercise an "exit option", which contributes to non-maintenance, minimal commitment to community operating activities, and nonpayment for services. This leads to speculation regarding whether fee payment has the potential to become a political statement, and is not simply a rationalization of cost recovery.

**Involvement of the local level**

35. Institutional capacity-building is not necessarily a top-down procedure. Involvement of all levels of government in sustainable development is a sine qua non. In infrastructure development, the voice of the local levels is all too often inaudible in the policy-making process. Maintenance is a good example. The failure to involve local communities in decision-making can often lead to the application of inappropriate technologies that favour construction over maintenance. A case in point is Sierra Leone, where a capital intensive, relatively expensive feeder-road construction programme took precedence over a local road policy that would have been low-cost, and labour intensive. Existing self-help traditions were undermined when the donor sponsoring the project decided that special groups should maintain the roads. Consequently, there was no local identification with the roads because beneficiaries were not involved.

**Future options**

36. Inadequate maintenance continues to remain a serious challenge. Allowing roads to deteriorate, irrigation canals to leak, water pumps to break down, and sanitation systems to overflow results in lost capacity, declining output and/or a substantial increase in additional investment needed to sustain existing levels of service.

37. An indifference to maintenance is directly associated with poor infrastructure policies which in turn absorb scarce fiscal resources and compromise macroeconomic stability. Furthermore, poor policies lead to low-quality and unreliable service, thereby alienating users. In many cases, because of poor construction and maintenance in areas dominated by low-income populations, the impoverished are the ones to suffer most. Also, country planning processes and priorities, as well as the donor agency bias for results, contribute to a de-emphasis on maintenance in favour of construction, which is very costly.

38. For Governments, there are three strategies that may contribute to a greater reform in infrastructure policy, and thereby improve maintenance in the process. These would be (a) the wider application of commercial principles to generate more recurrent income, (b) the broader use of competition, to reduce the cost of construction contracts and maintenance programmes and (c) the
increased involvement of local communities and users in cases where commercial and competitive behaviour is constrained.

III. GOVERNMENT AND THE PRIVATE SECTOR

39. For Governments, interaction with the private sector can take many different forms. The most obvious is service provided by a private operator under contract to the Government. Joint public-private ventures, franchises and concessions, an array of build-operate-transfer (BOT) schemes, deregulation, volunteerism and self-help are common strategies for linking public needs and private sector capacity.

40. Research has concluded that a distinctive set of conditions must exist for public-private interaction to be effective. First, an appropriate legal and institutional framework must be in place; second, a competitive environment or, alternatively, an effective regulatory capacity must be available; third, suitable institutions or organizations should be available and reliable; and fourth, there must be careful planning of the privatization process, where appropriate (this is essential for success).

Potential benefits and costs

41. Large-scale private investment in infrastructure generally offers Governments four potential benefits: (a) reduced risk, (b) greater efficiency and innovation in construction and operation and reduced burdens placed on public sector management, (c) additional funding for investment and (d) positive externalities. Having a greater private sector presence in the economy leads to a better image in the world investment community, a more responsive public policy, more dynamic management attitudes and practices, and greater exposure to outside ideas and market developments.

42. One of the drawbacks of private financing is that priorities may be determined in purely economic terms without, for example, any consideration of social impacts on underserved areas, which may remain underserved. Even government resources may be diverted in order to provide matching money.

43. Another drawback associated with private financing is the diversion of domestic resources to lower-priority activities - to the extent that project selection criteria are distorted by the quest for leverage - so as to bring in foreign investment and make the project work. There are other costs as well. Necessary ancillary investments by the Government can often be significant. Private investors prefer to invest in existing high-demand areas instead of extending services to unserved areas, because the revenue is surer, even though doing so may be against the best interests of a city or a region. Additionally, it has not been conclusively proved that privately funded construction costs less than the public alternatives, especially for projects that are bid for competitively. Foreign owners and creditors may also seek compensation for the inherent riskiness of these projects and for the high transaction costs incurred...
in their preparation and negotiation. Given these considerations, investors might be expected to demand high rates of return.

Management of ongoing infrastructure facilities

44. The successful management of infrastructure services in the public or private sector has three basic characteristics: (a) clear and coherent goals focused on delivering services, (b) autonomous management with both managers and employees held accountable for results and (c) and financial independence. Though these principles may come naturally to private businesses, because of a Government's obligation to balance many different economic, social and political objectives, goals, accountability and financial soundness can be distorted.

45. Persistently poor performances in the public sector support the argument for abandoning reform attempts in favour of relying on the private sector for providing infrastructure services; but improvement in public sector performance can be achieved by applying three core instruments of private sector management philosophy: corporatization, which establishes the quasi-independence of public entities, explicit contracts between public and private sector entities, and a pricing strategy (full-cost indicators) designed to ensure cost recovery.

46. Privatization is becoming extremely popular in developing countries. The value of transactions reached more than $6 billion in both 1991 and 1992. Privatization has gone farthest in the telecommunications field. Argentina, Chile, Hungary, Jamaica, Malaysia, Mexico and Venezuela have all undertaken substantial privatization of telecommunications services.

Private sector investment opportunities

47. Through a wide variety of innovative facilitating arrangements, infrastructural investment opportunity is greatly increased and carries several advantages for both the private and public sectors. For example, the responsibility for operations is separated from the responsibility for investment. Under a lease-type arrangement, the Government supplies the major investments for production facilities. A lease generally awards exclusive rights to the stream of revenues for a period of 6 to 10 years. The contractor bears most of the commercial risks but few, if any, of the financial risks associated with large investments. The practicality of these arrangements is obvious when investment activity occurs in infrequent bursts. Guinea successfully concluded a leasing agreement in its water-supply sector in 1989.

48. Concessions incorporate all the features of a lease but give the contractor the added responsibility of investments, which might well entail extension and expansion of capacity or replacement of fixed assets. Concession arrangements exist for railways, telecommunications, urban transport systems, and water-supply treatment. Côte d'Ivoire has a long-established and successful concession contract with a private water-supply company.

Efficiency
49. In many instances, one of the primary arguments for accessing the private sector is improved or extended management efficiency. Public enterprises and government services are said to suffer from overstaffing and low productivity. In theory, efficiency will be highest when an enterprise – public or private – strives to maximize profits in a competitive market under managers with the autonomy, capacity and motivation to respond to competition. In practice, public infrastructure enterprises have only recently begun to operate under these conditions. When Japan privatized its national rail system in the 1970s, one of the primary reasons was the desire to improve management efficiency. Structural problems found in the national government rail system included outside interference; obscured managerial responsibility; abnormal labour-management relations; and legal limitations that obstructed the scope of business. Ultimately, the structural problems were resolved by abandoning the system in favour of privatization.

Poverty

50. Most Governments feel obligated to protect and assist the most vulnerable populations within their jurisdictions. The relationship between infrastructure and poverty is critical, and infrastructure development and maintenance activities can be used to intervene directly on behalf of those afflicted by poverty. Efficiency of management and operations thus becomes vital when implementing programmes that will impact on the poor. Adequate budgetary allocations, removal of price distortions that support biases against the poor, and selection of appropriate standards and design are generally the most effective ways to ensure that infrastructure realizes its potential for fostering labour-intensive growth and helping the poor to participate in the growth process.

IV. GOVERNMENTS, TECHNOLOGY AND FOREIGN INVESTMENT

51. Governments, historically, have relied in varying degrees on foreign financing for infrastructure. Foreign investment can take the form of aid, loans, or direct foreign investment. External finance is used primarily to import needed equipment, especially in the electronic, power and telecommunications sectors. The need for and amount of external borrowing, however, often reflect the macroeconomic constraints of a developing country or an emerging economy. It is often used to finance local expenditures for construction, equipment and maintenance when public sector savings are limited. The Dominican Republic, for example, has a very heavy reliance on foreign funding, which financed 70-80 per cent of infrastructure expenditure in 1991.

52. Official development assistance (ODA) has increased steadily in recent years and, globally, has accounted for about $24 billion a year or 12 per cent of total infrastructure finance. There exists an increasingly wide range of foreign financing techniques for infrastructure, most of which seem to some extent to involve a government guarantee. The drawback, however, is that they
can be exceedingly complex, time-consuming and dependent upon the sophisticated negotiating capabilities of the host Government.

Incentives for foreign capital investment

53. A major incentive for foreign capital investment is a credible and stable macroeconomic and regulatory environment, coupled with strong commitments to growth. Argentina, Chile and Mexico have each benefited from this scheme. Guaranteeing of the potential for substantial returns (especially from telecommunications and electric utilities), rising market shares for infrastructure companies and growing investor confidence are also strong and proved incentives for investment. According to the International Finance Corporation, infrastructure equities have outperformed other stocks by a huge margin over the past 10 years.

Bilateral and multilateral responses

54. Bilateral and multilateral infrastructural investment conditions today tend to reflect the shift in the current aid policies of the donor countries. The total average of the Development Assistance Committee (DAC) of the Organisation for Economic Cooperation and Development (OECD) in two key infrastructure categories demonstrates the growth of economic infrastructure development compared with 20 years ago. For 1992, the DAC average of 19.4 per cent of total commitments was almost double that of the 1975 figure of 10.2 percent. Furthermore, when multilateral institutions are factored in, the figure for economic infrastructure development (27.7 per cent) is nearly three times as great today as it was 20 years ago, and slightly higher than the overall total for social and administrative infrastructure (25.5 per cent).

55. Individual countries like the United Kingdom, Spain, Italy and Austria have shown the greatest increase in commitment to the development of economic infrastructure, while New Zealand, Switzerland, the Netherlands and Japan have shifted their priorities towards the area of social and administrative infrastructure.

56. By individual sector, in 1992, the area of economic infrastructure transport and communications received a slightly higher share of investment (7.6 per cent) than that of energy (5.5 per cent). In the areas of social and administrative development, the share devoted to increasing water access (14.3 per cent) was by far the largest of the total DAC average of 21.1 per cent, and over twice as great as the share devoted to public administration and planning (6.1 per cent).

57. World Bank activity in the areas of economic infrastructure (34.9 per cent) and social infrastructure (34.0 per cent) was divided almost equally in terms of the two concentrations. The Bank averages, however, were significantly higher than the respective overall DAC averages of 14.3 per cent and 21.1 per cent for these two areas. By individual sector, the Bank's contributions were, also, much larger. The 14.0 per cent devoted to transport and communications and the
17.6 per cent for energy were well above the DAC averages and higher than those of many individual donors. The same was true in the areas of public administration and planning (5.5 per cent) and water development (18.7 per cent).

**Tied aid**

58. Bilateral assistance does present one conspicuous problem that particularly affects infrastructure. Often there is full or partial tying of aid, or aid that is linked contractually to the purchase of goods and services from donor countries. In recent years between two thirds and three quarters of ODA to infrastructure has been fully or partially tied. By contrast, less than 20 per cent of ODA going to areas other than infrastructure is tied. The bulk of all bilateral assistance in countries like the United Kingdom (90 per cent) and the United States (82 per cent), is linked to some conditions of contractual tying of goods.

**Private international investment**

59. Policy reforms during the 1980s were encouraging to international firms seeking to do business in developing countries and operating often in association with local companies. Advantages of these partnerships lay not only in the firms' management expertise and technical skills, but also in their credit standing and ability to finance investments in developing countries. Construction conglomerates have been especially responsive to new incentives. Innovative toll-road construction and independent power projects are examples of activities where conglomerates have the opportunity to take an equity interest.

60. In recent years, there has been an explosion in international flows of long-term private capital to developing countries, the most popular instruments being foreign direct investment and portfolio flows. To finance operations and expansion, Argentina has placed both its national telecommunications and telephone enterprises in American and Asian bond markets. Private sponsorship has inspired rapid growth in infrastructural investment. Aggregate private investment is currently about $15 billion a year or roughly 7 per cent of the $200 billion being spent annually on infrastructure in developing countries.
Joint ventures

61. Shared ownership and control of infrastructure through foreign participation can be a means of introducing external capital and know-how. One example of this involved Air France and Czechoslovak Airlines (CSA). A partnership agreement was signed in 1992 giving the foreign group headed by Air France a 40 per cent share in CSA. Air France is providing assets in kind as well as technical expertise, and the deal will give both airlines new access to routes and markets. Such joint ventures have the potential to develop private sector participation in infrastructure entities where even a minority interest by the foreign private partner is attractive because of particular commercial advantages - in this case, access to other central/eastern European markets. However, minority stakes will be an interesting proposition only when the public enterprise is basically sound, and the foreign partner can have sufficient confidence in the Government's behaviour towards the enterprise.

62. Another type of joint venture is seen in the area of railways, where a private or mixed company contributes capital for new investment, with part of the returns obtained through the right to develop real estate owned by the railroad. Examples of this arrangement (sometimes called "development gain") are found mainly in developed countries and Hong Kong, and have been under consideration in Thailand. There are also cases of joint ventures by railway and telecommunication companies for combined use of rail right of way for the laying of cables. The railway provides the land and enjoys a return through some share in the telecommunications company's revenues. In urban water-supply/sewerage networks and road networks, there can also be benefits from mixed use of land right of way for the laying of pipes and maintenance works.

Technical cooperation

63. The principles adopted by DAC in 1991 have established new directions for donors with respect to finding more effective ways of assisting recipient countries to develop their own long-term solutions to infrastructural problems. Some of these key principles are: (a) to set strategic objectives of technical cooperation in long-term capacity-building, (b) to put greater emphasis on the role of developing countries in the planning, design and management of technical cooperation, (c) to encourage "ownership", that is to say, responsibility and control of technical cooperation programmes and projects at all stages, (d) to emphasize the key importance of sustainable development and self-reliance in long-term institution-building, (e) to take into account the new recognition of private sector needs for technical cooperation, and (f) to stress the need to pay greater attention to the costs and cost effectiveness of technical cooperation activities. Instilling these principles at the beginning of infrastructure activity will contribute not only viability but sustainability as well.
Impact of technology

64. The conventional perspective about the monopolistic nature of many infrastructure activities is derived from the exclusive availability of rapidly ageing technologies. Those technologies have evolved considerably in recent years and stimulated a prevalent spirit of competition. New technology in thermal power generation makes it economical to produce power on a much smaller scale than before. Institutional changes can separate power generation from transmission and distribution with the distributing entity having more of a monopolistic position.

65. Technological innovations in telecommunications also allow more competition by making possible the provision of different types of services by a number of companies. New communications and information technologies (C&IT) are improving transportation system efficiency, reducing the costs of waste materials management, and providing more services with less physical disruption through the use of fibre optics.

66. Furthermore, the tremendous progress in the last two decades in developing decision-making tools and database systems has helped infrastructure services that are complex and management-intensive, such as railways, to enhance their capacity to operate competitively. Other developments like metering for water and other utilities and mechanisms for road pricing have also allowed more marketlike operations.

67. However, technological change is still treated as an exogenous development. A modern approach would be to integrate technological innovation into all the development processes, particularly at the enterprise level, for research, planning, production, marketing and administration. Because competitive markets are now seen as one of the most effective ways of increasing the productivity of infrastructure, technological innovation should be directed towards the goal of increasing all aspects of enterprise activity.

V. ECONOMICS OF ALTERNATIVE CHOICES AND FUNDING DECISIONS

68. The principal sources of financing infrastructure activities are tax revenues and government borrowings. Whether the borrowing is from official sources or the private sector, it is backed by a Government's full faith and credit and powers to tax. The process of pricing together financial packages for infrastructure projects is complex; and for better or worse, "learning by doing" within specific standalone projects seems to be the preferred method of increasing experience and capacity. Now that Governments are shifting from the role of infrastructure provider to that of facilitator, private entrepreneurs and lenders are likely to take a more direct role in developing financing packages and other important decisions.

Assessing the current system

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69. The main advantage of the current system is that Governments themselves are potentially the most creditworthy entities. They are able to borrow at the lowest rates, thus making financially possible infrastructure projects that might not otherwise be practical. However, cheaper available credit carries with it the possibility of inefficiencies if financial discipline is relaxed. Also, their being creditworthy does not imply that Governments have unlimited access to resources.

70. Over the past decade there has been a sharp reduction in proportional government investment and spending on infrastructure. The primary reasons for this are poor delivery of services, inadequate managerial performance, pricing irregularities, and macroeconomic results. In the Philippines, for example, public investment in infrastructure fell from 5 per cent of GDP in 1979 to less than 2 per cent by 1989.

71. International donor policies and practices have also reinforced distortions in recipient countries. The trend has been for donors to focus on financing new physical construction rather than on maintaining or improving existing infrastructure. Continued imbalance between construction and maintenance as well as reduced levels of spending on infrastructure is not sustainable over the longer term. Alternatives designed to increase investments and cost effectiveness need to be sustainable.

Advantages of market competition

72. Competition among even a few rival infrastructure providers carries the potential to lower costs and prices, with the additional advantage of limiting the risk of monopolies. All new entrants and potential rival suppliers can be allowed to provide services, with the market ultimately deciding a provider's profitability. Potential competition is most effective when new participants have limited sunk market-entry costs. This provides a greater opportunity to recover investments by selling assets when the decision is made to withdraw from the arrangement. A good example of an undertaking that is encouraging competition while building private sector capacity is the Zimbabwe Second Highway Project.

73. Direct competition in infrastructure is a relatively new concept, but the results justify the emphasis on competition. Consistent evidence of efficiency gains as a result of enhanced competition comes mainly from the United States. After years of regulation the United States has introduced a number of major deregulatory initiatives. In virtually all sectors, greater competition has led to lower prices or to better services for consumers. Efficiency gains, new technologies, and improved business practices have led to sustained profitability.

Applying commercial principles to infrastructure management

74. Improving the effectiveness of infrastructure providers is critical. It can be done by applying three core instruments to promote commercial principles...
within public sector operations: (a) corporatization, which establishes a quasi
independence of public entities and insulates infrastructure enterprises from
non-commercial pressures and constraints, (b) explicit contracts between
Governments and managers involved in infrastructure services and (c) a pricing
strategy designed to ensure cost recovery.

Budgetary allocations: deficiencies and advancements

75. In many developing countries, the process of reconciling intended
infrastructure development objectives with the basic process for allocating and
controlling public funds for capital investment and recurrent operations is
often exacting and inconsistent. In Uganda, for example, the budgetary process
largely replicates historical allocations and does not allow for increased
emphasis on particular activities or the phasing out of others. In Cameroon,
Nepal and Zambia, transport sector allocations have emphasized the construction
of new roads over the urgent priority of maintenance or rehabilitation of
existing networks.

76. Flexibility and adaptability to changing circumstances are two key elements
in improving the equitable allocation of resources. In several East Asian
countries, government decision-making of a more intermediate nature is now
practised. In Malaysia, Singapore, and Taiwan, Province of China, authorities
focus on directing public expenditures and actively cooperating with a strong
private sector. Formal plans are indicative rather than prescriptive.

77. Decisions on expenditure allocation within infrastructure sectors as well
as across sectors need to be guided by consideration of the country's underlying
development goals, and to show particular respect to the environment and
sustainable development. Governments need to be fully acquainted with
externalities when deciding between new construction and maintenance, and
regional preferences under rural and urban conditions. Allocating expenditures
to different activities on the basis of social rates of return is one pragmatic
approach to establishing priorities.

Domestic finance and institutional framework

78. Despite the growth in the area of privately financed infrastructure,
Government will continue to be a priority source of financing. The principal
issues in the domestic financing of infrastructure are public and private sector
finance distribution; joint financing; the role of informal finance; and
appropriate techniques of financing such as taxes, loans, user fees, leases,
management contracts, and franchises.

79. On the institutional side, the key issue is the assignment of
infrastructure provision responsibilities among different jurisdictions
(national, state, municipal) which must be appropriately matched by the
assignment of revenues. In order to ensure that fiscal decentralization does
not adversely impact on the availability of minimum service levels of
infrastructure, efficient and equitable revenue-sharing arrangements along with
the optimal mobilization of local tax potential are necessary.

**Financing and pricing**

80. Financing capital expenditures for infrastructure through borrowing is essential to ease the cash-flow problems of large investments. Individual financial institutions specializing in capital investment have been set up in many developing countries to provide credit for infrastructure projects, most commonly to municipalities. To date, such arrangements have generated mixed results.

81. Besides borrowing, Governments have available a variety of instruments for infrastructure finance that include user charges, taxes, earmarking (see below), loans, franchises, concessions, leases and management contracts.

82. An important issue is the role of the ordinary people – namely, the specific users, or the taxpayers in general – who will ultimately pay for infrastructure projects. A useful guideline is that wherever feasible, user-cost pricing should be exploited to finance infrastructure investment as a primary source. Such pricing can match financing with effective demand, ensure a steady source of revenue for maintenance and improvements and recover costs from those who benefit from the use of infrastructure. User tariffs also lend themselves to fine-tuning to reflect differential demand factors like peak and off-peak loads and congestion pricing.

83. The nature of pricing (that is, tariffs or user charges) and incentives created by financing schemes can have an important effect on the efficiency of infrastructure investment, internal sustainability, and productive delivery of services. As an overall objective, tariff revenues should be sufficient to cover operating costs, debt service, depreciation, and administrative costs. In many cases, however, the tariffs charged are not sufficient to cover even variable costs. The use of a two-part tariff structure can help meet both efficiency and financing objectives. This alternative involves a fixed component covering the marginal cost of providing access to the service network, and a variable part based on the volume of consumption of a particular service. Other approaches include a method of pricing in which higher prices are charged to the users whose demand is most price-inelastic. Rising block pricing (higher rates for larger volumes used) and congestion pricing (higher rates for services with higher demands) are also attractive options.

84. One of the most popular schemes is the build-operate-transfer (BOT) arrangement. Many projects considered essential could not have succeeded without BOT financing, because Governments did not have the budgetary resources or the borrowing capacity. A good example is investment in power projects in the Philippines. However, in all infrastructure projects the host Government or its agent (for example, the central bank) must be able and willing to provide some mechanism to assure foreign investors that they will be authorized to convert local currency earnings into foreign currency as and when required and that the return will not be unduly adverse. Pakistan, for example, used an
exchange risk insurance scheme operated by a central bank for its HUB river project.

Earmarking of taxes

85. Earmarking is currently a major issue in infrastructure finance. It refers to the budgetary practice of assigning revenues, from specific taxes or groups of taxes, to specific government expenditures which may also be supplemented by revenues from other sources. Earmarking has several advantages: It applies the benefit principle of taxation and provides a direct link between costs and benefits. It offers a mechanism to overcome resistance to taxes. It assures taxpayers that taxes will be spent in their locality. It insulates infrastructure funds from legislative and political vagaries. In addition, it provides assurance of greater stability and continuity of funding, as well as swift execution of projects and essential maintenance. The successful experience of the Road Fund in Ghana typifies the net advantages of earmarking. At the macrolevel, earmarking can help to insulate infrastructure in the event of macroeconomic adjustment programmes.

86. The argument against earmarking posits that it undermines the principle of a unified budget designed to allocate revenues without a one-to-one correspondence between taxes and benefits. It might conceivably lead to a misallocation of resources for earmarked uses at the expense of non-earmarked uses and hamper effective budgetary control and generally infringe upon executive discretion. Earmarked funds are also said to promote an "enclave mentality" on the part of the managers of such funds and could conceivably lead to overinvestment in specific sectors, as in the case of gasoline taxes for highways in New Zealand which resulted in a consequential reduction in earmarked funds. Like any other technique, earmarking has its uses and abuses; however, the abuses can be controlled through periodic review and efficiency audits.

Institutions and instruments for resource mobilization

87. In many countries, specialized development banks are a conduit for funds used in infrastructure projects, especially for such municipal infrastructure as water and solid waste protection. Such institutions can complement a municipality's local taxes and central government transfers, and can cover fluctuations in expenditure or prevent large shifts in revenue requirements. Colombia's experience with its municipal credit is a success story; however, an effort in Argentina to create a new lending institution dedicated to the water sector failed.

88. Certain pragmatic principles have emerged. A specialized institution is justified if the value of its business warrants it and if the technical and managerial capabilities are available. Specialized infrastructure intermediaries could play a catalytic role in capital market development. In Mexico, a specialized infrastructure bank is looking to broaden its activities consistent with the greater privatization of municipal infrastructure.
Private sector management contracts

89. For existing infrastructure facilities, there are three advantages as regards transferring a broad range of operations and maintenance to the private sector. This in turn frees up limited, overstretched staff and resources for other responsibilities. A management contract signed for the power company in Guinea-Bissau demonstrates that management contracts can work where many performance agreements have failed. The advantages are as follows:

(a) Performance agreements retain all decisions in the public sector, but use the private sector philosophy of increased accountability of employees and managers. The Republic of Korea, for example, added explicit performance-based incentives for both managers and employees;

(b) Management contracts transfer to private providers the responsibility for managing an operation such as a port or power utility. The key to this arrangement is the signing over of key functions to the contractor. Management contracting works best when a contractor is granted significant autonomy in areas of decision-making, and compensation is based, at least in part, on performance. France has been successful in its water-supply and sanitation sectors for years with a management approach;

(c) Service contracts transfer to private providers the responsibility for delivering a specific service at lower costs or obtaining specific skills or expertise lacking in the public sector. A public water company in Santiago encouraged employees to leave the company and compete for service contracts. The result was large productivity gains.

Incentives

90. Contractual arrangements like those described above offer several incentives: Competition between multiple providers is fostered; contracts can be renewed on a motivational basis in which specific aspects of performance are a consideration, generally within the frame of one to three years; bidding is more competitive and contracts can be structured so that the provider assumes the risk of operations for, say, 10 years, or both the operational and investment risk on a 30-year contract.

VI. INFRASTRUCTURE AND THE ENVIRONMENT

Addressing environmental concerns

91. Environmental concerns are key elements in countries' infrastructure policies and agendas. In many cases, the high cost of meeting environmental standards has triggered the greater involvement of the private sector for the purpose of relieving the strain on public financing. Innovative and traditional approaches to environmental protection may now compel changes in the management of public infrastructure and how it is paid for. Such objectives can be

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achieved more easily in the private sector by establishing a conventional market
nexus between users and suppliers and by giving those responsible for
infrastructure direct recourse to private finance. Additionally, most
environmental concerns have been met by the establishment of norms and
standards, reinforced by legal sanctions.

92. By the mid-1980s, it was alarmingly evident that externalities of
infrastructure development had taken their toll on the environment. Negative
environmental impacts often resulted from a failure to take account of
interdependencies among infrastructure sectors. Underinvestment in sewerage
relative to water-supply in many places has led to harmful contamination of
water reserves, exacerbated flooding, and reduced health benefits from water
investments.

93. A major problem affecting infrastructure and the environment, particularly
among developing countries, has been the absence of effective mechanisms for the
coordination of operations. If regional environmental planning is to be
practical, countries need flexible management frameworks. Santiago and Mexico
City have established special organizations for planning the pollution reduction
strategies that were to be implemented by line agencies for the wider
metropolitan areas.

94. In many developing countries, environmental agencies are limited in their
response to programme initiatives because of the lack of a qualified staff.
Oftentimes they must rely on private sector firms and consultants contracted to
carry out public sector mandates. In response to this problem, several
countries in Latin America utilize non-governmental financial foundations and
institutes to undertake both policy analysis and resource management.

95. Besides minimizing costs while gaining the large benefits of participation,
indigenous institutions that have a history of managing natural resources can
also be particularly useful when decisions involve land use. Local voluntary
institutions and non-governmental organizations prove valuable because of their
ability to reach rural poor. They work best when they compliment the public
sector, and often serve a valuable watchdog function. High priority should also
be given to increasing the influence of government units that specialize in
participation, to hiring public professional staff trained in the social
sciences, and to providing institutional incentives for participation.

96. Another solution is to provide opportunities to solve problems at the local
level. This can prove cost-effective, particularly with newly industrialized
and rapidly growing countries. In the 1960s (when it was still a middle-income
country), Japan, so as to maximize policy implementation, established a national
policy framework through laws, then negotiated agreements at the local level
among polluting industries, local authorities, and citizens groups. The
Government allowed flexibility in the setting of emissions levels and the
promotion of self-regulation.

97. Environmental management now extends to all functions of governmental
activity. The institutional response has included developing legislation and administrative structures, providing needed skills, ensuring funding and donor coordination, and implementing decentralization and devolution. This response is reinforced by the setting of priorities, the coordination of activities, conflict resolution, and the creation of responsible regulatory and enforcement institutions.

98. In many developing countries, top priorities must be given to environmental impacts on health, safety and productivity. National environmental action plans are proving useful tools for setting priorities. They promote the most efficient use of limited resources. Burkina Faso offers a good example of the effectiveness of a national plan. The setting of priorities and formulating of policies on the basis of informed analysis address a state of affairs where all countries are faced with multiple environmental policies.

Environmental awareness

99. The advantages of technology are obvious. However, the negative environmental impacts of the communications infrastructure, for example, may not be so conspicuous. Current environmental concerns relate to solid waste generation and to potentially negative impacts caused by increased transport demands. Consumer equipment in the communications and international telecommunications industries, with its short product life, carries the potential to contribute significantly to solid waste creation. A number of noteworthy trends associated with the communications industry demonstrate the distinctive effects of new and emerging technologies on the environment.

100. Recent past experiences support the position that participation of the private sector and emulation of its management practices have been effective in checking some of the negative externalities of infrastructure activities. Developing countries have the advantage of drawing on the experience of developed countries to avoid the consequences resulting from protracted environmental damage. These lessons must be factored into any policy or action plan whether it utilizes the private sector or maintains public control.

101. Perhaps the greatest challenge not only to the communications industry but to developers and beneficiaries of new technology as well is to ensure that social problems do not escalate. One concern is that advanced technologies will increase potential worker exploitation in newly industrialized countries and in middle-income countries facing industrialization.

The rural perspective

102. Infrastructure development has made a generally positive impact on rural areas. However, the external effects of large-scale projects in the transport, power, and water areas on rural areas and the environment have not been as strong as on urban areas. A study of two similarly poor villages in India, for example, illustrates the differential impact infrastructure has had on rural living standards. A large-scale irrigation project brought one community into a
canal network while leaving its more highly elevated neighbour unirrigated. Although the irrigated town became more cultivated and more institutionalized, its normal way of life was relatively unaffected. In contrast, the village without access to the canal was compelled to adjust its way of life significantly in order to capture the indirect economic benefits from the irrigation projects. Consequently, it was forced into a more proactive role that integrated and utilized additional sectors of infrastructure. The external impact on the environment, though nowhere near as great as that on urban areas, was more extensive than on the town that had been irrigated.

103. Rural area transport-related improvements have a larger initial impact than power-related improvements, as feeder roads can help rural farmers to market their crops more widely, and can also improve inter-rural communication. Later, power cannot only promote more efficient on-site processing for agricultural products, but also increase the possibility of establishing rural sites for industrial enterprises.

The urban perspective

104. Urban populations and the number of large cities are increasing steadily in developing countries. This development is accompanied by new and complex environmental problems. By the year 2000, 21 cities will have more than 10 million inhabitants and 17 of these megacities will be in developing countries. The most critical area of concern is the impact of the urban pollution resulting from inadequate water, sanitation, drainage and solid waste services, poor urban and industrial waste management, and air pollution on urban populations. These problems are a direct result of inadequate or limited access to basic environmental infrastructure and services.

105. Pollution from urban wastes and emissions, loss or destruction of natural and cultural resources, and exposure of urban populations to man-made hazards are problems caused in large part by lack of public and political awareness, inadequate governance, inefficient and inadequate economic and regulatory policies, and insufficient knowledge and information. Three primary areas of concern are sanitation and sewerage, municipal solid waste, and urban transport.

106. Municipal solid waste collection and disposal remain a persistent problem for local government. Although most municipal governments spend between 20-50 per cent of their operating budgets for solid waste services, typically only half of the urban households benefit from collection services. Lack of the most basic solid waste services in crowded low-income neighbourhoods is a major contributor to high morbidity and mortality among the urban poor.

107. The inefficiency or lack of urban transport infrastructure and services is a major impediment to economic growth and urban productivity in developing countries. Increasing motorization, poorly operating public transport services and inadequate road maintenance contribute to congestion, road accidents, and air pollution. In many cities, these conditions lead to lost work and leisure time, increased fuel consumption, road accidents and air pollution.
108. To successfully preserve and protect the environment, each city needs to consider a process for determining the most appropriate mix of actions and investments that respond to its environmental and infrastructural priorities. When confronting problems, cities exhibit different degrees of awareness, political commitment, and capacity to mobilize resources. Any strategic approach to urban environmental planning and management needs to include (a) informed consultation in which rapid assessments are conducted, issues are clarified, key actors are consulted, political commitment is achieved, and priorities are set, (b) the formulation of an integrated urban environmental strategy that embodies long-term goals and phased targets for meeting goals, agreement on issue-oriented strategies and actor-specific action plans and (c) follow-up and consolidation in which agreed programmes and projects are initiated, policy reforms and institutional arrangements are solidified, the overall process is made routine, and monitoring and evaluation procedures are put in place.

109. Given the broad range of political problems and their causes, the necessity of priority-setting is obvious. Priority-setting involves evaluating the impacts of urban environmental problems and ranking them in terms of their effects on health, productivity, amenities, ecological values and equity. Efforts to establish environmental priorities by conducting rapid assessment and developing issue-specific action plans are under way in many cities. Assessments have been completed or are under way in Bombay, Colombo, Dar es Salaam, Manila, Mexico City, São Paulo, and Abidjan.

110. Emphasis needs to be placed on upgrading the coverage and management of urban infrastructure and services and increasing the efficiency and effectiveness of local investments in environmental infrastructure services. For example, water-supply management requires effective pollution control systems. Some cost-effective alternatives to conventional systems include pour-flush latrines, simplified small-bore sewers and the condominiumal system, which has been successful in Brazil. Improvements in solid waste collection should incorporate a comprehensive policy framework and strategic solid waste management plan that take into account all physical, technical, legal, institutional, financial, environmental, and sociocultural aspects of solid waste management. In the area of urban transport, apart from improving operational efficiency, urban transport authorities can promote efficient urban land use by including high-density, mixed-use development in central urban areas with several outlying high-density areas, all of which can be linked by an extensive public transport system. This approach has been adopted in Curitiba, Brazil.

VII. CONCLUSION

111. Environmental awareness is no longer a mere "slogan" in infrastructural development. Linkages between environmental quality and infrastructure provision show that infrastructure design is paying closer attention to both the impacts infrastructure can have on the environment and the consequences that...
environmental degradation is having on infrastructure. Increasing reliance is being placed on strategic planning and environmental assessment, by providing assessment information earlier in the planning process so as to ensure that infrastructure projects and policies do not have long-term negative environmental consequences. Also, there is increasing emphasis on favouring decentralizing environmental management by using pricing policies or other economic incentives to improve environmental conditions and to facilitate efficient provision of infrastructure services.

Three major conclusions that can be emphasized

112. First, the primary consideration in the development of any infrastructure policy must be the immediate and long-range effects that it will have on the environment, and its relationship to overall sustainable development. Concern for the environment should be at the forefront in the planning and implementation of any project. Attentiveness in the early stages will result in a considerable degree of cost effectiveness throughout the life of the project.

113. Second, infrastructure is a vital tool in the promotion of economic growth. With prescient planning, the resulting externalities (either by design or by chance) could result in additional benefits or a longer sustained life of the project, which in itself can be a benefit.

114. Finally, given the role that other multilateral organizations, like the World Bank, the International Monetary Fund, and the European Union, and major bilateral donors, currently play in infrastructure development, the United Nations must clearly identify and articulate its position on future infrastructural development. An area of immediate consideration is the management capacity of public sector entities in infrastructural development and sustainability. It is very important to reinforce and further integrate environmental concerns into the infrastructural development process, and this is a direct and exacting challenge.