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**Building and Utilizing Physical
Infrastructural Capacities in Africa**



EXECUTIVE SUMMARY

There is general consensus on the importance of physical infrastructures which enable and foster efficient operations and sustainable development of national economies, fair and equitable distribution of products, services and other amenities among various peoples and areas of a country or region. If well planned, carefully targeted, efficiently priced and operated, and well maintained, infrastructural systems can play an important role in reducing poverty, increasing equitable distribution of economic opportunities, reducing rural-to-urban migration pressures, as well as minimizing pressures on the environment. Efficient infrastructures boost national competitiveness within the world economy. At the regional level, inter-connection of infrastructures is a necessary condition for integration of national markets and industries to facilitate increased intra-African trade.

The physical infrastructure components considered in this document are: (a) transport, which includes roads, railways, ports and harbours, shipping, multimodal systems, air, rural and urban transport; (b) communications, namely posts, broadcasting (radio, television), telecommunications (telephones, telex, fax, satellites) and computer information networks; (c) energy production (wood plantation, hydro-, geothermal, solar and wind plants, coal mines, oil and gas fields), transport, transmission, distribution and utilization equipment; and (d) water supply capacity including dams, distribution networks, sanitation systems, irrigation schemes and transboundary river basin organizations.

The expansion and utilization of Africa's physical infrastructural capacity must conform to the relevant programmes of Agenda 21 of the United Nations Conference on Environment and Development (UNCED 1992) and the African Common Position on Environment. In order that the provision of adequate and appropriate physical infrastructures will not contribute to environmental degradation, the environmental factor must be included in all infrastructure development programmes.

With regard to the current status of the physical infrastructures, the poor economic performance experienced by many African countries since the early 1980s has greatly reduced the level of gross investment and maintenance expenditures in many countries. The result was that countries were unable to sufficiently preserve, modernize and expand the capacity of infrastructure, equipment and services. Furthermore, because of the economic crisis, national economic and sectoral policies did not often respond to the changing environment. Consequently, the physical infrastructure and services in Africa have remained underdeveloped compared to the other developing regions of the world.

In parallel with the physical constraints, facilitation of inter-State flows continue to be hampered by excessive regulations as well as the application of non-uniform procedures and regulations. Although a number of multilateral agreements have been signed, most of them are either non-uniform with limited coverage, or had been only partially ratified.

There is clear evidence that the rate of capacity utilization of existing infrastructure in Africa is very low even though the existing capacity is insufficient to support sustainable economic development. There is widespread deterioration of installed capacity to the extent that some are not operable and therefore require extensive rehabilitation and in some cases rebuilding. This is the case for roads, railways, ports, airports and some training institutions. In the telecommunications sector, the Pan-African Telecommunications (PANAFTEL) network is testimony to grossly under-utilized infrastructure investment. The implication therefore is that priority should be given to increasing capacity utilization, to be subsequently followed by capacity expansion.

There is a general consensus that the constraints in African infrastructure capacity development cannot be addressed by investment alone, but equally, require policy changes and institutional reforms. The primary constraints to faster and sustainable expansion of these systems are implementation capacity and domestic resource mobilization; external financing, although clearly very much in need, is not the most serious constraint.

The objective of this paper is to present to the Conference, in a concise manner, a framework agenda for concerted action by African countries and their partners in the development of Africa's physical infrastructure capacity in the 1990s. It draws upon existing regional programmes in Africa, such as the second United Nations Transport and Communications Decade in Africa (UNTACDA II), as well as relevant experiences in other developing regions of the world to propose an action programme for Africa.

The three main themes, namely human resources, financial resources and regional cooperation constitute the principal action for building and utilizing Africa's physical infrastructure capacity. A general indication as to how these can be developed is given in the framework of future action.

The Conference is called upon to consider and adopt this action programme as concrete steps to be taken at national level by the relevant organs, at the subregional level by the intergovernmental organizations (IGOs) and at the regional level by United Nations agencies, financial institutions and, in particular, the ECA secretariat. The choices to be made by the governments will be in the context of national political priorities.

I. INTRODUCTION

1. There is general consensus on the importance of physical infrastructures which enable and foster efficient operation and sustainable development of national economies and fair and equitable distribution of products, services and other amenities among various peoples and areas of a country or region. If well planned, carefully targeted, efficiently priced and operated, and well maintained, infrastructural systems can play an important role in reducing poverty, increasing equitable distribution of economic opportunities, reducing rural-to-urban migration pressures, as well as minimizing pressures on the environment. Efficient infrastructures boost national competitiveness within the world economy. At the regional level, inter-connection of infrastructures is a necessary condition for integration of national markets to facilitate increased intra-African trade.

2. The Abuja Treaty (1991) establishing the African Economic Community is a logical response to the need for regional cooperation and integration in Africa as the fundamental basis for achieving sustainable development of the continent. The protocols which have been drafted as steps in implementing the Treaty include that on transport and communications, along with energy, fuels, water and sanitation systems, and river basin entities, form the physical infrastructure the development of which is a *conditio sine qua non* for economic integration of the continent.

3. Recent studies on world competitiveness have identified education and infrastructure to be the most critical factors in economic competition, and investment in these sectors form the basis for future competitiveness.¹ Together with the market structure, these are the foundation for future growth of the other economic sectors such as agriculture, mining and manufacturing, which produce goods for trade. In the current development environment where telematics has made all factors of production, including natural resources, easily traded among nations, only the educated workers and the physical infrastructures are unique to the country.

4. However, having an educated human capital and good infrastructure are necessary but not sufficient conditions for development; these must be accompanied by the institutional framework for their efficient utilization and development.

5. African countries have long recognized the critical role of infrastructure in the development of the continent. As early as 1963, Article II of the Charter of the Organization of African Unity (OAU) adopted in Addis Ababa at the first Summit of Heads of State and Government stipulated that member States should coordinate and harmonize their policies on economic co-operation, including water, energy, transport and communications. This provided African Governments with a common platform for tackling these problems at the regional level.

6. Over the years ECA, together with OAU, the African Development Bank (ADB), the World Bank as well as other United Nations agencies have developed several regional programmes for the development of infrastructure in Africa. The regional approach to developing integrated transport and communications led to the proclamation of the two United Nations Transport and Communications Decades in Africa (UNTACDA I and II), the first of which was implemented during 1978-1988 and the second is to be implemented during 1991-2000. Similarly the Mar del Plata Action Plan (MPAP) of the United Nations Water Conference (UNWC) of March 1977 outlined a programme covering the whole spectrum of activities for the integration, development and management of water resources.

¹ See UBS International Finance: "Competition Among Nations"; Autumn 1993, a publication of the United Bank of Switzerland.

7. The Lagos Plan of Action (LPA) of 1980 more sharply defined the areas of focus for regional cooperation in Africa and called upon member States to take action in formulating specific plans for the development of these sectors which provide crucial support to agriculture, the foundation of Africa's economic development. Since 1980, several strategies and programmes have been developed to accelerate progress in the development of physical infrastructures in concert with other socio-economic development programmes. The above constitute the priority programmes which, if implemented, would provide sufficient infrastructure capacity to support Africa's economic development.

8. The development of infrastructure capacity has two aspects which are inter-linked: physical infrastructural investment and human and institutional development. It is clear that the physical infrastructural capacity can only be expanded on a sustained and sustainable basis if the human and institutional capacities are fully developed.

9. Finally, it should be stressed that the expansion and utilization of Africa's physical infrastructural capacity must conform to the relevant programmes of Agenda 21 of the United Nations Conference on Environment and Development (UNCED 1992) and the African Common Position on Environment. Access to markets, reduction of physical and psychological distance between rural and urban areas by efficient infrastructure and services improves rural development and contributes to the alleviation of rural poverty and consequent environmental degradation. On the other hand, the construction and operation of infrastructures can have detrimental impacts on the environment which should be minimized or mitigated. Thus, the environmental factor should be included in all infrastructure development programmes.

10. The physical infrastructure components considered in this document are: (a) transport, which includes roads, railways, ports and harbours, shipping, multimodal systems, air, rural and urban transport; (b) communications: posts, broadcasting (radio and television), telecommunications (telephones, telex, fax and satellites) and computer information networks; (c) energy production and distribution networks: wood plantations, hydro-electric power, geothermal power, solar and wind plants, coal mines, oil and gas fields, as well as the transportation, transmission, distribution and utilization equipment; and (d) water supply and sanitation systems including dams, distribution networks of pipelines and reservoirs, waste-water treatment plants, irrigation schemes, and trans-boundary river basin organizations.

11. The objective of this paper is to present to the Conference of Ministers, in a concise manner, a framework agenda for concerted action by African countries and their partners in the development of Africa's physical infrastructure capacity in the 1990s. It draws upon existing regional programmes in Africa, such as UNTACDA II, as well as relevant experiences in other developing regions of the World to propose an action programme for Africa.

12. Following this brief introduction, the next two sections present an overview of the current status of infrastructure development in Africa and its utilization. A framework for capacity building and utilization is then proposed, and finally a specific action programme deriving from it, is presented. It is to be noted that as a Conference document, this report is necessarily brief. The relevant background documents referred to are available for more details.

II. THE CURRENT STATUS OF INFRASTRUCTURAL CAPACITIES

13. Despite the substantial progress made over the past 30 years of concerted efforts by African countries, individually and collectively, Africa's infrastructure capacity is still deemed inadequate to support sustainable

development. Below are brief summaries of the major characteristics of each sector in terms of the physical infrastructure and the supporting human resource and institutional framework.

A. Physical infrastructure

14. In general, the poor economic performance experienced by many African countries since the early 1980s has greatly reduced the level of gross investment and maintenance expenditures in many countries. The result has been that countries were unable to sufficiently preserve, modernize and expand the capacity of infrastructure, equipment and services. Furthermore, because of the economic crisis, national economic and sectoral policies have not often responded to the changing environment. Consequently, the physical infrastructure and services in Africa have remained underdeveloped compared to the other developing regions of the world.

15. In parallel with the physical constraints above, the facilitation of inter-State and, sometimes, even intra-State traffic flows continues to be hampered by excessive regulations as well as the application of non-uniform procedures and regulations. Although a number of multilateral agreements have been signed, a recent review by ECA revealed that most of them are either non-uniform with limited coverage, or had been only partially ratified.

16. The following is a brief overview of the status of the major infrastructure components:

1. Energy

17. The energy infrastructure spans the entire range of installations and systems for the production, collection, extraction, harnessing and converting natural primary energy resources into energy supplies for distribution and delivery to users. Africa possesses abundant energy resources, but these are unevenly distributed between the subregions and among countries. These resources essentially comprise of biomass, coal, petroleum, natural gas, hydro, geothermal, solar and wind energy endowments.

18. In 1991, the continent's proven reserves of the various primary energy resources were estimated as follows: annual wood growth - over 722 million tons; petroleum - 8.6 billion tons (equivalent to 60.4 billion barrels); natural gas - 9,779 billion m³; coal - 61 billion tons, mostly located in the Southern African subregion; and hydro-electric power - over 25 per cent of the world's gross potential. In addition, there exists reasonable potential in Africa for biogas, ethanol and crop residues as sources of energy.

19. Access to adequate, secure and sustainable energy services for heating, cooling, cooking, motive power, lighting, etc., is essential for life and the efficient operations and utilization of all other infrastructure systems. But the physical infrastructures for efficient supply and utilization of energy sources have yet to be developed to levels that assure energy services for sustainable development. Compared with other developing regions, per capita energy consumption is extremely low. If this factor does not account for Africa's under-development relative to the other regions of the world, then it contributes significantly to it. With 12 per cent of the world population in 1990, Africa accounted for less than 4 per cent or 303 million tons oil equivalent (MTOE) of world energy consumption.

20. As with most other services, there is a strong bias in favour of the urban areas in the supply of energy, compared to the rural areas. There are currently only a few inter-State energy grids in Africa which are operational. For electricity, inter-connections exist in the subregions: in Southern Africa - between Zaire and Zambia and among Zambia, Zimbabwe, Botswana, Mozambique, Namibia and the Republic of South Africa; in Central

Africa - among Zaire, Congo, Burundi and Rwanda; in West Africa - between Nigeria and the Niger, and among Côte d'Ivoire, Ghana, Togo and Benin; in Eastern Africa - between Uganda and Kenya.

2. Transport

21. Road transport accounts for the majority of Africa's freight and passenger movements, however, its costs are high, generally estimated to be 2.5-3 times higher than those in other regions. The high cost is due mainly to poor road conditions, but the efficiency of the mode could be substantially improved by proper maintenance of vehicles, greater availability of spare parts, improved access to commercial credit, reduced government regulations on market entry, privatization of parastatal trucking companies, facilitation and improved management of the fleet.

22. An analysis of country networks shows that the extent of deterioration of existing roads is staggering; due to lack of maintenance, about half of the paved and up to 80 per cent of graded roads are in poor to fair conditions. The case of rural feeder roads is even worse: up to 85 per cent are in poor condition. There are various explanations for this sad state of the roads, but the net effect is that an estimated US\$49.0 billion is needed over the next ten years in order to rehabilitate 100 per cent of the paved, 70 per cent of graded and 50 per cent of rural roads, in addition to \$7.8 billion required for routine maintenance in order to bring them to a good standard. It is evident that these amounts are beyond reach under current economic conditions.

23. Poor rural roads and lack of transport services for personal travel and agricultural products still pose serious problems. African countries still face two major gaps in rural transport: the first is the existence of inadequate and poorly maintained rural and feeder roads connecting villages and farming areas to each other and to market centres. The second gap entails the poor and inadequate rural transport services caused by lack of intermediate means of transport and appropriate infrastructure for their use, leaving the carrying of goods in rural areas almost entirely dependant on animal or human portage. The effectiveness and sustainability of past programmes for rural road development have been hampered by the lack of a coherent policy framework and institutional focus for planning, funding and maintenance.

24. Although urban transport plays a very important role in the economies of African nations due to the fact that a significant proportion of economic activities takes place in the principal cities, its performance is however, characterized by inadequate supply of public service, lack of facilities for non-motorized travel, poor physical planning, heavy traffic congestion in the large cities and high accident rates. While some cities have managed to keep pace with road network needs, others continue to suffer from chronic inefficiency, lack of capacity and heavy backlogs of rehabilitation and maintenance. The highly subsidized government-owned bus fleets still play a major role in the provision of urban transport.

25. Regarding railways in Africa, these cannot accurately be described as a system since they are fragmented, with three different major gauges (1.0, 1.067 and 1.435 m) which, with the exception of Eastern and Southern Africa region, do not inter-connect. In all cases, the railways run from the interior to sea ports, a reflection of their origin as a transport mode designed for external trade purposes. Since the attainment of independence by most African countries in the 1960s, the only railway line built to link two countries has been the TAZARA between the United Republic of Tanzania and Zambia.

26. The total network of African railways was 57,712 km in 1991, giving a density of 1.7 km/1000 km² on the average, compared to Europe with an average of 400 km/1000 km². Most of the lines are of light rail and are therefore unsuited for fast and heavy traffic. Moreover, there is general deterioration due to

maintenance problems. Recently efforts have been made to introduce management contract plans in an attempt to improve the operations of this vital mode.

27. Africa's share of world shipping is less than one per cent. The merchant fleet capacity amounts to about 7 million tons, less than 2 per cent of which are container ships, the majority being conventional general cargo ships. Although the average age of the African merchant fleet is fairly close to the international average of 13 years, most of the recent fleet investment is in old-fashioned break-bulk vessels.

28. With regard to ports and harbours, the 1980s was a period of rapid expansion in Africa; total berthing capacity for ocean-going vessels increased fourfold, from 150 to 600 berths in the 80 largest ports. There was substantial investment in the construction of unitized and bulk terminals to meet the demand of technological changes in shipping.

29. However, the African sea-ports are still beset with low output, high operating and maintenance costs, and generally poor quality of services to users. The World Bank recently reported that the costs of providing and maintaining port facilities in Africa are generally higher per dollar of GNP than in other ports of the world, despite the low salary levels. Cargo-handling rates in many ports are among the lowest in the world, even in modern, well-equipped terminals, while at the same time port tariffs are very high compared to those of other regions offering similar services.

30. While multimodal transport has developed rapidly in industrialized countries over the last 10-15 years due to containerization, many African countries have been slow to grasp the advantages of containerization and its impact on distribution and logistics systems. The fact that only three countries, Malawi, Rwanda and Senegal, have thus far ratified the International Convention on Multimodal Transport since its adoption in 1980, clearly reflects lack of movement on the part of Africa. Similarly, only Egypt, Morocco, Senegal and Tunisia are signatories to the Hamburg Rules on multimodal transport operations.

31. Thus, a considerable percentage of containers entering Africa terminates at the ports and the cargo is moved inland in break bulk, thereby sacrificing most of the advantages of containerization. Stripping containers in the ports contributes to congestion, adds to handling costs, and increases damage and pilferage of goods. Furthermore, progress in establishing inland container clearance depots (ICD or dry ports) and the implementation of the necessary institutional mechanisms to permit the speedy transit of containers has been slow.

32. African airlines, with the exception of Air Afrique which is a subregional airline jointly owned by 10 countries, are mostly small State-owned enterprises with poor profitability. The total regional fleet consists of about 600 aircraft of various categories, including old and outdated versions with very high operating costs. The airlines are currently taking steps to modernize their fleet. However, they face serious financial constraints in a fiercely competitive global economic sector that is in the throes of rapid deregulation resulting in severe pressures on operational profits.

33. The air transport network is mostly north-south oriented, with the intra-African connections poorly developed; only approximately 50 per cent of the possible links between African countries are operated. Often, a passenger wishing to travel from Addis Ababa to a Central African city has to travel first to Lagos or Abidjan in West Africa only to return to Central Africa. The problem of poor flight connections between African cities is due to the lack of a system of hubs for efficient connections within and between African subregions. Most of the 163 regular and alternate aerodromes identified by the International Civil Aviation Organization (ICAO) for the development of air services need maintenance, rehabilitation and expansion. Most of the airports are

antiquated or too small and lack the necessary air control equipment to handle modern aircraft and increased traffic. Airport facilitation is generally poor and legislations are not adapted to the needs of the new markets.

3. Communications

34. Telecommunications development in Africa remains the slowest in the world with a total of 5.7 million main lines for an average density of 0.91 main lines for 100 inhabitants in 1991, compared to over 30 lines/100 population in North America. This already inadequate availability of telecommunications is further aggravated by the inequitable distribution in favour of the urban areas which account for the bulk of service, while the rural areas with the majority of the population account for most of the economic production.

35. The Pan-African Telecommunications Network (PANAFTTEL), which was initiated in 1971 to provide terrestrial connection between every neighbouring country in Africa, is virtually completed, with only a few key missing links in the Central African subregion and the Horn of Africa. Unfortunately, the high capacity backbone of PANAFTTEL in which much has been invested over the years is grossly under-utilized. It is expected that the newly established Regional African Satellite Communications System (RASCOM) Organization will improve connectivity within the region and increase the exploitation of the PANAFTTEL.

36. As a result of the very rapid technological advances in telecommunications, African countries are striving to modernize their systems, at great cost, in order to remain plugged into what has become a global network. Many telecommunication organizations are installing digital technologies and providing enhanced services in order to remain competitive. Furthermore, the industry is undergoing restructuring aimed at liberalization in response to market forces.

37. In terms of informatics, which depend on the telecommunications networks, Africa is still far behind the rest of the world. While computer networks are growing at a tremendous pace in other areas where until recently they were relatively rare, Africa accounts for less than one percent of present global spending on informatics and information technology. For instance, Africa is a nascent participant in the area of computer networking which is growing at a tremendous pace worldwide. With the exception of a few banks and large enterprises, Africa is generally not connected to the worldwide banking networks (e.g., SWIFT), the credit card information networks (Visa and American Express) the trade and fiscal information networks (including SYDONIA and EDIFACT promoted by the United Nations) and the air transport reservation networks (such as SABRE).

38. Within Africa, there are substantial differences between regions in electronic networking. In this field, three countries stand in the forefront - South Africa, Tunisia and Egypt. The technical assistance from South Africa has come with a spill-over of development into Zimbabwe, Zambia and Mozambique, which are far in advance of most other countries in the region. Following the southern lead, there is now substantial activity in Kenya, Uganda and Ethiopia. In the latter case, this is in great measure because of the initiatives of ECA's Pan-African Development Information System (PADIS) project. The Réseau informatique d'ORSTOM (RIO) project of the French public scientific research organization, Office de la recherche scientifique et technique (ORSTOM), has provided connectivity for much of French-speaking West Africa. Despite its resources, however, Nigeria has been almost totally absent from these initiatives.

39. In the area of mass communication, significant progress has been attained through radio and television broadcasting. While the current level of 177 radio receivers per 1000 population is the lowest in the world, the UNTACDA II target for the year 2000 of 200 radio receivers/1000 population is within reach. As regards television, the average ownership is 36 sets/1000, compared to the world average of 155 sets/1000. In terms

of coverage, the median is 60 per cent of area and 25 per cent of population for radio. The corresponding figures for television coverage are both under 5 per cent.

40. The present postal network in Africa consists of 32,000 permanent post offices, giving a density of one post office/20,000 inhabitants, a long way from the standard of 1/6,000 inhabitants set by the Universal Postal Union (UPU). The introduction of express mail service (EMS) in many countries in the late 1980s has arrested the decline in postal traffic which averaged 2 per cent per annum in the early 1980s.

4. Water and sanitation

41. In the field of water resources, efforts have been made in line with the recommendations of MPAP which emphasized water resources assessment activities to obtain greater knowledge of the quantity and quality of surface and ground water resources and monitoring to guide the management of these resources. Unfortunately, the meteorological and hydrological services which are responsible for basic assessment activities have suffered serious deterioration in the past decade partly due to inadequate maintenance.

42. The importance of sediment and water quality observation is recognized, but network development and operation are hampered by lack of equipment, logistic support and laboratory facilities. Ground water data collection networks are restricted to large cities and irrigation schemes, but not all countries have appreciated the need for systematic monitoring of these resources.

43. Regarding water supply and sanitation, member States had committed themselves to bring about significant improvement in the standards and levels of services by the end of the International Drinking Water Supply and Sanitation Decade (IDWSSD, 1981-1990). While an impressive number of people were served, it is evident that results have fallen short of expectations. The coverage in water supply and sanitation in urban areas is 77 and 79 per cent, respectively and for rural areas the corresponding figures are 26 and 17 per cent. The situation in rural areas is particularly unsatisfactory.

44. The major difficulties in achieving greater success in water supply and sanitation include the high rate of population growth, rural to urban exodus, inefficient maintenance and operation of systems and facilities and inadequate policies. The provision and expansion of domestic and municipal water supplies have therefore been inadequate, systems have been inefficient with high wastage and lack of accountability making the systems unsustainable and unreliable. The net result is that the unserved population keeps on increasing since expansion cannot keep pace with population growth.

45. Despite overall improvements, serious food problems persisted in Africa for over two decades since 1970. Because 93.5 per cent of the cultivated area is under rainfed agriculture, fluctuations in the production of food and other agricultural products can largely be attributed to the erratic variability of rainfall in most of the continent, in addition to other structural constraints. Irrigation, therefore, has the potential to contribute significantly towards the boosting of agricultural productivity, food security and self-sufficiency in Africa.

46. The Food and Agriculture Organization of the United Nations (FAO) has estimated that, in 1982, in the sub-Saharan African subregion the total irrigated land was some 5 million hectares, the largest proportion of this being in the Sudan, Madagascar and Nigeria. Mali, the United Republic of Tanzania, Zimbabwe and Senegal together accounted for only 10 per cent. Of the total area, 2.1 million ha had been developed by governments, mostly under major modern agricultural schemes; 2.4 million ha were by traditional methods and the remaining 0.5 million ha were modern private sector developments. In contrast, in Egypt and Morocco in the North African subregion, the bulk of irrigation is classified as modern.

47. Currently emphasis is on rehabilitation and expansion of old schemes which, because of improper management, have not made the contribution to food production expected of them. This is particularly the case with schemes in Botswana, Burkina Faso, Ghana, Kenya and Somalia. In the North African countries, particularly Egypt, considerable efforts are being made to improve the efficiency of irrigation water utilization in view of the steadily increasing pressures exerted by increased demand from all the riparian countries sharing the Nile Valley juxtaposed against the obviously inelastic supply from the river.

B. Human resources and institutions

48. The insufficiency of human resources and an ineffective institutional framework are most often cited as the major problems faced in the development of physical infrastructure and services in Africa. This is due to the fact that policies for the development of human resources and institutional capacities were often unclear, inconsistent or even non-existent, resulting in lack of employment stability conducive to the accumulation of experience among the indigenous skilled personnel and, ultimately, leading to brain-drain.

49. The traditional response to the human resource problem has been to train more staff either locally or to organize training programmes abroad, in the technical institutions of the developed countries, often with financial assistance in the form of scholarships on a bilateral aid basis. Generally, over the last three decades since most African countries attained independence, a substantial share of Africa's human resource needs has been met by relying on foreign experts, mostly under bilateral and multilateral technical assistance programmes. The net result of this traditional approach has been that, after all this time, Africa still suffers from insufficient indigenous human capacities for the sustainable development of its physical infrastructures and to efficiently provide the related services. Therefore, the logical question that begs an answer while contemplating future directions is: What went wrong?

50. A brief look at African training institutions reveals that many specialized institutions have been created at national, subregional and regional levels in various fields of infrastructures. Furthermore, the national universities do produce engineers and managers who ought to be capable of developing and managing the infrastructures and services in Africa.

51. These institutions, however, share several problems in common which have prevented them from developing fully. The three most critical problems have been: acute financial constraints; managerial inadequacies; and low staff morale, due to poor working conditions, lack of prospects for career advancement, and poor pay that often is not enough to cover families' cost of living let alone compare with the remuneration and prospects of similarly qualified professionals in other regions of the world. This last factor leads to instability in the institutions' staff, as qualified staff are constantly siphoned off to the private sector and as some join the brain-drain. Many technical institutions were created with substantial financial support from external donors and their existence depends crucially on the continuation of such support. Another category of institutions are those which were originally conceived for operations within the context of regional and subregional cooperation and integration but, invariably, ended up being supported only by the host country and, consequently, became under-utilized. ECA has been examining how such institutions can be restructured, consolidated and rationalized, with a view to reducing their overall operating costs, increasing their contribution to regional and member States' development objectives, thereby increasing their survival prospects.

52. If a census were taken of the number of Africans who have been given technical training in the past in different areas of infrastructure and related services within Africa as well as overseas, it would reveal that trained human resources ought not to be a major problem hindering the efficient development and utilization of physical infrastructures in the region. Where then are these experts?

53. A partial answer to this question has been given above in examining the problems besetting African technical institutions: many of the experts have, for one reason or another, left the sectors for which they were trained in search of better employment opportunities, for instance, within the domestic commercial enterprise sector; some are attracted to other African countries where the pay and other working conditions are better and the cost of living is lower; and many highly qualified Africans have left to seek employment in other regions of the world, especially Europe, North America and the Middle East. The reasons for these losses include mis-allocation, under-utilization and even unemployment of skilled human resources due to the derailment of the development process in African countries since the early 1980s, as well as the politicisation of the civil service and even of the technical areas of the economy and, last but not least, declining pay in real terms. A 1993 ECA report² cites estimates of the order of 70,000 high-level trained professionals (scientists, engineers, medical doctors, academics, etc) who were officially resident and employed in the European Union in 1984, and an additional 10,000 in the United States of America, from the sub-Saharan African subregion alone. The cost to Africa of the loss of these human resources is estimated at \$4 billion annually.

C. The institutional setting

54. The bulk of infrastructure development and service operations in Africa are government-owned and, in many cases, operated as State monopolies. There is nothing unusual in this - it is the historical pattern the world over. The 1990s, however, brought pressure for change towards free-market operations and an increased role for private sector agents not only in Africa but in all other regions of the world. Thus many aspects of infrastructure operations are being increasingly deregulated and liberalized with more operational autonomy being given to public enterprise corporations, commercialisation of some of their operations, restructuring and privatization of non-strategic functions - all of these reforms being aimed at checking the growth rate of the public sector and increasing private sector participation. Nowhere are these world-wide structural adjustments more felt than in the sector of physical infrastructures and related services, where State-run or -regulated monopolies have historically predominated.

55. The less than satisfactory experience of the early privatizers of public and infrastructural services, for example in the United Kingdom and Argentina, is that the efficiency gains which should translate into lower costs of services to consumers and industry, are not likely to be realized unless determined efforts are made to break up monopolies. Conceptually, this can be done by separating the ownership functions over physical infrastructural systems from the provision of associated services. This is based on the reasoning that while the physical system may have to be operated as a natural monopoly - for example, a road system, an electricity grid or a telephone network - competition can and should be organized among providers of the related services in order to keep costs down. Where this is not feasible, strong regulatory watch-dog institutions must be set up to curb monopoly powers of the new private sector-based operators of physical infrastructures, to force them to steadily raise productivity and to check the rate of growth of the cost of services to consumers, while on the other hand, balancing the legitimate need for a reasonable rate of return which will not only satisfy shareholders but also ensure steady capital investment in the extension and modernization of infrastructures and related services. Note that even where the separation of physical systems from the provision of services is technically feasible, competent regulatory institutional mechanisms are still required to ensure that the costs of entry and exit are not prohibitive, to prevent the formation of cartels among operators and to minimize negative externalities.

² ECA: "Magnitude and causes of brain-drain in Africa with special reference to academic staff in African universities"; December 1993.

56. With regard to the specific question of privatization, the United Nations Development Programme (UNDP) has pointed out what they have called "privatization's seven sins"³ to be avoided if this fundamental structural reform is to contribute positively to broad socio-economic development objectives. These sins encompass the concerns raised above as well as additional social equity considerations which are crucial to popular support for such reforms.

57. The severe financial squeeze on African countries, as a result of deteriorating economies, which brought tough conditionalities attached to badly needed external assistance [e.g., structural adjustment programmes (SAPs), economic recovery programmes, etc.] has exerted pressure for reduction of public financial support to State-operated infrastructure services. These pressures are especially felt in rail and air transport, ports, telecommunications, water supply and power generation and distribution. Consequently, African countries are faced with the difficult task of restructuring these operations on commercial lines, to grant operational autonomy to public enterprises that it chooses to retain (including freedom to set capacity targets, prices, wages and size of labour force), to divest themselves from functions not considered strategic, to spell out explicitly the objectives and goals which must be achieved by the strategic but non-commercial operations remaining in the public sector and the formulae for the calculation of subsidies. Examples in Africa of the successful granting of autonomy in the infrastructures sectors are telecommunications in Botswana, ports in the Gambia and the deregulation of airlines in Nigeria.

III. CURRENT UTILIZATION OF EXISTING INFRASTRUCTURES AND THE REQUIRED RATES OF EXPANSION OF CAPACITIES

58. There is clear evidence that the rate of capacity utilization of existing infrastructure in Africa is very low even though, to start with, this capacity is insufficient to support sustainable economic development. There has been widespread deterioration of installed capacity to the extent that many facilities require extensive rehabilitation and, in some cases, total rebuilding. This is the case for roads, railways, ports, airports and training schools. In the telecommunications sector, the PANAFTEL network is testimony to grossly under-utilized infrastructure investment. Similarly there are problems with water supply and sanitation facilities, irrigation schemes and dams, as well as with energy generation and distribution systems.

59. The following is a brief review of the current rate of capacity utilization in each of the infrastructure sectors. As the results of the analysis in the previous section point to the similarity of the situation among all countries, a generalized sectoral approach is therefore adopted.

A. Energy

60. Crude oil production in Africa was about 327 million tons in 1990, but much of the refinery capacity was inadequate, obsolete, and unsuitable for the production of the various required products. Much of the demand therefore was satisfied through imports.

61. Most African countries operate a combination of hydro and thermal generating plants to meet domestic electricity demand and, in a few cases, electricity is imported from neighbouring countries which have excess supply from hydro plants. Installed hydro-electric power generating capacity by 1990 was about 2,850 MW in North Africa, 4,135 MW in West Africa, 1,399 MW in East Africa, 3,631 MW in Central Africa and 5,948 MW in Southern Africa (excluding the Republic of South Africa). In many countries, electricity supply is

³ UNDP: "Human Development Report 1993"; Oxford University Press, 1993; pp. 49-51.

commonly disrupted on a daily basis, either as a result of inadequate maintenance, fuel supply shortages, or diminished water flows during droughts.

62. Natural gas demand and consumption are constrained by inadequate production and distribution infrastructures to the extent that only 46 per cent of the gas produced in the oil fields is utilized commercially while the rest (54 per cent) is flared in the air. Of the 1990 production of 66 MTOE (million tonnes of oil equivalent), up to 44 per cent was exported, mainly to Europe.

63. In the case of coal, a major constraint to its use in Africa is the high cost of land transport. Consequently, demand is limited to a few thermal electric generating plants in the Southern African subregion. If efficient technology and adequate infrastructure were installed to convert coal into clean energy so as to avoid the harmful environmental effects of coal, demand for coal and need to expand production infrastructure would arise.

64. About 70 to 85 per cent of the energy needs in sub-Sahara Africa are met from wood, the production of which is largely on local small scale. In spite of the importance of this energy source and the environmental impacts of deforestation, countries are only just beginning to think through conservation policies. It is imperative to make steady progress towards greater domestic fuel efficiency, adopt sustainable practices for forest resource management, as well as policies promoting other energy sources to reduce in future the share of energy demand that is met from the forest resource.

65. The average rate of energy consumption per capita in Africa is estimated to have been 0.7 kW equivalent of commercial energy per annum in 1970 (including about 0.4 kW from non-commercial energy sources). Different approaches have been applied to project plausible growth rates of energy use in the developing regions of the world, Latin America, Africa, and Asia, notably, the physical quality of life index (PQLI) - based on a simple arithmetic average of infant mortality, life expectancy, and the literacy rate as measures of well-being each assessed on a scale of 1-100. The correlation between the rate of energy use and this measure of well-being indicates that a PQLI of about 90 corresponds to 1.0-1.2 kW per capita per year, and there is a slow-down in the rate of increase of the PQLI with greater energy use.

66. An alternative assessment of potential energy demand has been constructed⁴ for a hypothetical developing country on the basis of a comprehensive evaluation of the energy consumption patterns of Western Europe in the 1970s, excluding space heating, which is not a necessity in the typical African country. The calculation also incorporates two fundamental assumptions: (a) that future energy production, distribution and end-use technologies would be more efficient, and (b) the shift from traditional energy sources and conversion technologies to commercial energy forms (i.e., electricity, liquid and gaseous fuels) would be accompanied by increased energy efficiency. Based on this calculation, a rate of energy use of about 1.0 kW per capita per year should be sufficient. This would meet the residential energy requirements, plus those of the commercial, transportation, manufacturing, agricultural, mining and construction sectors associated with increased economic activity and a much higher standard of living than at present.

⁴ This section on the estimation of Africa's pent-up energy demand and the desired rate of growth of energy supply capacity is based on the work of José Goldenberg, Thomas B. Johansson, Amulya K.N. Reddy, and Robert H. Williams: "Energy For Development"; World Resources Institute; September 1987; particularly Chapter IV - Energy for Basic Needs and More; pp.47-56.

67. On the basis of these two approaches, Africa's "pent-up" demand for commercial energy is of the order of 0.7-0.9 kW per capita per year, including the need to drastically reduce households' dependence on wood fuel which is a major reason for deforestation and environmental degradation. Assuming a concerted programme to attain a rate of energy consumption of 1.0 kW per capita per year over a 15-year period between 1995 and 2010, and taking into account a population annual growth rate of 3 per cent, energy supply capacity has to grow at a rate above 7.7 per cent. If the target is extended to the year 2020, the minimum rate of capacity growth is 6.5 per cent. This amply illustrates the magnitude of Africa's energy problem.

B. Roads and road transport

68. The poor state of roads, small fleets and the generally poor condition of the vehicles greatly constrain the capacity utilization of this most dominant mode of transport. It results in increased time as well as high transport costs. In the case of international traffic, road transport services continue to be hampered by a cumbersome regulatory environment, lack of intermodal services, inadequate interface and problems with border crossings and inspections all of which result in delays, high overheads and very high costs. Even where rural road infrastructure exists, the services rendered are unreliable and infrequent and in most cases only available for hire at high rates which rural folk cannot afford.

69. A fundamental problem, which should easily be remedied perhaps with adequate policy incentives coupled with market expansion through regional integration, is the absence of industrial enterprises manufacturing transport vehicles based on technology appropriate to the local economic, socio-cultural, climatic, and relief conditions of African countries and which could be sold at an affordable price. In South Asia, China, and in South-east Asia (until recently) bicycle-based technology played a significant role in providing affordable and relatively fast means of human and goods transport. The World Bank has coined the term "the missing middle"³ to draw attention to the pathological lacuna between low and high technology in African transport, agriculture and industry sectors. This lack of appropriate technologies tailored to the scale of operational needs and the stage of development tends to raise operating costs and to retard the rate of growth.

C. Urban transport

70. Public transport services in African cities are mainly provided by buses and taxis. Very often a large proportion of these services is furnished by small private operators. However, in most cities of over 1 million inhabitants, there is usually one large bus operator, owned by the public sector. In almost all cities, the large bus companies have been unable to meet the growing demand for transport services due to their inability to run efficient and financially viable operations. Productivity in public sector operations is low compared to the private sector. The proportion of public sector vehicle fleets in daily operations is about 40-75 per cent, whereas large private operators utilize about 80-95 per cent of their fleets. With the exception of a handful cities such as Cairo, African mega-cities have yet to even contemplate the problem of designing mass urban transit systems within the context of a coherent policy on industrial, commercial, and human settlement zoning; mass transportation; energy; and pollution control.

³ The World Bank: "Sub-Saharan Africa: From Crisis to Sustainable Growth"; 1989 - A long-term perspective study; p.29.

71. Targets have been agreed upon for UNTACDA II*, for the period 1991-2000, in the sector of roads and transport, *inter alia*: (a) the construction of 15,000 km of classified main roads; (b) the rehabilitation of 200,000 km of rural roads, as well as of (c) 85 per cent of paved roads; 40 per cent of unpaved roads and 25 per cent of rural roads; (d) the reduction of road transport service costs by 10 per cent; and (e) the reduction of road accidents by 25 per cent.

D. Railways

72. The rate of utilization of the existing capacity of African railways is generally very low: less than 25 per cent for the rolling stock and under 50 per cent for the central workshops. The major reasons for this low level of capacity utilization include: lack of interconnection of various railway systems which result in each system establishing its own workshops and rolling stock; poor investment planning resulting in over-capacity; lack of cooperation among various countries with the resulting duplication of facilities; poor facilitation at borders; and generally poor management of available resources, including maintenance of equipment.

73. In the railways sector, the UNTACDA II targets are, *inter alia*: (a) railway traffic to increase at annual rates of 3 and 2 per cent respectively, for freight and passenger services; (b) increasing the availability of locomotives to at least 70 per cent of the projected total fleet and a reduction of 50 per cent in the rate of break-down; (c) increasing passenger car productivity by 30 per cent; (d) reducing the cost of railway transport per km by 30 per cent; and (e) at least 25 per cent of the existing track to be partially or totally renovated.

E. Maritime shipping, ports and multimodal transport

74. The overall rate of utilization of African merchant fleet averages 58 per cent: 42 per cent for conventional cargo vessels and 69 per cent for oil tankers and bulk carriers. The corresponding international averages are 82, 60 and 93 per cent respectively. For shipyard repair facilities, less than fifty percent of the capacity is utilized because most merchant fleet operating in Africa (including African fleet) prefer foreign shipyards which offer better services at lower, usually subsidized rates.

75. Many ports have excess capacity for handling conventional cargo, while there is need to expand container handling facilities. However, the main constraints in port facility utilization do not arise from lack of physical infrastructure and equipment, but from weak institutional and managerial capacities. The institutional constraints arise from the fact that the majority of ports are owned by governments and operated by port authorities which are often not autonomous and operated on a profit-making basis which would spur efficiency. Similarly, the organizational structures for management in most ports have remained unchanged for decades and no longer respond to current market demands.

76. Multimodal transport depends more on the combined utilization of the various transport modes but there has been a lack of subregional cooperation which can foster efficient use of capacities since the cargo base of each country may be very limited. Subregional cooperation is also important in reference to implementation of efficient trade and transport facilitation measures and to the development of heavy infrastructure projects such as the building of ICDs.

* ECA: "UNTACDA II: The Second United Nations Transport and Communications Decade in Africa (1991-2000)"; October 1992.

77. It is known that high demurrage fees and subsequent penalties for delays of containers which are applied by container companies cannot be met by many African multimodal transport operators (MTOs). Consequently, many containers are returned empty to avoid losses as a result of demurrage payments to container owners; thus, capacity is lost as a result of artificial shortage of containers. ECA has prepared guidelines for repair and maintenance of containers, but many African countries cannot implement the recommendations because they are not signatories to the relevant conventions related to container repair and maintenance. This results in the return of damaged empty containers instead of repairing them for onward loading.

78. The targets set under UNTACDA II include: (a) to increase significantly the level of ownership and control by African countries of shipping of competitive tonnage adapted to the requirements of African trade; (b) to increase the productivity of African seaports and reduce the time both ships and cargo spend in ports; (c) to increase the length of navigable inland waterways and the number of inland ports, as well as to increase the fleet plying inland waterways; and (d) at least 25 countries to take measures to increase containerisation of their national trade by 5 per cent annually.

F. Air transport

79. The aircraft fleet utilization is generally low, with daily utilization ranging from one hour to ten hours, while the world average is about 13 hours. Similarly, airport and aerodrome facilities are used for only a few hours a day or even a few days a week. The national and regional training centres are also under-utilized. The reasons for the low capacity utilization include: lack of co-operation among airlines and countries in granting traffic rights; the poor financial situation of the airlines and countries; poor management; preference for training abroad instead of utilizing African training facilities, etc. Thus, the major problem in this mode of transport appears to be managerial inefficiency rather than capacity constraints.

80. In this sector, the targets agreed for UNTACDA II include: (a) to maintain the operating cost of African airlines in the neighbourhood of 10 per cent of the world average; (b) to improve the African air traffic network by increasing frequencies between pairs of cities, reducing flight time, coordinating and rationalizing flight schedules; (c) to replace existing fleet of aircraft; and (d) to improve airport infrastructure so as to reduce accidents and incidents associated with deficiencies of airport infrastructure, installations, facilities and services.

G. Telecommunications

81. One of the anomalies in the African telecommunications industry is the low rate of utilization of the installed capacity, while at the same time, there is a high level of unmet demand. The high-capacity PANAFTTEL backbone, which was designed for the analog microwave technologies of the 1970s and 1980s, with 960 channels between neighbouring countries, has never been fully utilized. At national level, the local exchanges and transit centres operate at an average of 50 per cent, while the registered demand is twice the installed capacity. The low level of capacity utilization in the face of high unmet demand implies an imbalance in investment; high capacity switches and transmission without sufficient local network; or high imbedded investment in analog equipment in the past while current demand is towards digital technology, thus necessitating additional investment. The poor maintenance of installed equipment reduces availability and utilization.

82. The regional electronic networking capacities are still small as indicated in the section on current status. The problem in this area is therefore not the utilization of existing capacity but, rather, the building of capacity.

83. The targets set in UNTACDA II for the expansion of capacity in this sector are, *inter alia*: (a) to increase telephone penetration to attain an African average of 0.72 line/100 population (with specific feasible

targets set for different subregions); (b) to increase the number of direct exchange lines at annual rates ranging from 5 to 10 per cent, depending on existing capacity; (c) to substantially improve the quality of services as measured using a number of indicators; (d) to attain a productivity level of 50 employees per 1000 lines; and (e) to establish direct links between neighbouring countries, improve intra-African interconnectivity, and increase intra-African traffic growth accompanied with a reduction in tariffs.

H. Postal services

84. Although there is little statistical information on the subject, it is generally considered that African postal services are poorly equipped. The poor infrastructure and outdated equipment, coupled with transport problems, constrain the capacity of the postal system from meeting present demands.

85. Under UNTACDA II, it is envisaged to (a) increase the density of the postal network to 1 establishment/10,000 people; (b) increase the number of post office boxes to 1/1000 people; (c) increase EMS services at a rate of 20-50 per cent annually; and (d) reduce loss and damages within the postal system to less than 10 per cent.

I. Radio and television broadcasting

86. The targets set for the period 1991-2000 in this sector include: (a) to achieve a minimum of 200 radio receivers/1000 people; (b) to achieve radio broadcasting total coverage in all national territories; and (c) to attain availability of a minimum of 40 television sets/1000 people.

J. Water supplies and sanitation

87. Most African water supply and sanitation facilities and irrigation schemes are often used to the maximum available capacity. This capacity, however, is reduced by significant leakage (as high as 30 percent) from pipelines and reservoirs due to poor monitoring and maintenance. Some water facilities and irrigation schemes have been abandoned for reasons including lack of proper maintenance and bad management. Facilities should therefore be refurbished and rehabilitated in order to increase capacity. There is evidence that some water development projects which were implemented based largely on political decisions have not efficiently provided the desired services. This is particularly true in the case of dams, some of which were over-designed or which were merely prestige projects (white elephants). On the other hand, some dams which were built without adequate studies were under-designed and, consequently, their economic lives were short.

88. Networks for water quantity and quality assessments are inadequate and generally in a state of serious deterioration. Since technical data and information are required for planning purposes, it is essential that these networks be rehabilitated.

89. Despite the enormous efforts African countries are making to restructure institutions and strengthen laws on water resources, several problems still persist. Most countries still lack overall policies and central coordinating mechanisms for water resource utilization, control of waste/effluent discharges, land degradation and conservation, and consequently water resource issues continue to be handled by several national agencies with little coordination between them.

90. According to a recent report of the United Nations Secretary-General,⁷ "More than 25 per cent of the people in Africa have no access to safe water supply, and more than 40 per cent do not have adequate sanitation. Under such conditions, the lack of coverage expected by the year 2000 becomes alarming. The newly reported figures for rural water supply, representing about 59 per cent of the total rural population of the region, also indicate a lower coverage than had been initially reported (35 per cent as against 42 per cent). By contrast, the percentage of rural inhabitants with adequate sanitation appears to be higher (33 per cent against 26 per cent)." As regards the urban areas, existing water supply and sanitation systems are under tremendous pressure because of explosive rates of urban population growth of the order of 5-10 per cent per year, outstripping the meagre resources currently being applied to maintain and extend these infrastructures.

91. Faced with such bleak statistics of the status of access to water supplies and sanitation in Africa, and in view of the fundamental role that safe water supplies and adequate sanitation are known to play, as components of a healthier environment, in reducing the spread of disease, the magnitude and urgency of the challenge to achieve the Mar del Plata Plan of Action targets is obvious.

K. Irrigation systems

92. The construction and rehabilitation of irrigation systems for smallholder agriculture should be an important infrastructural development priority in African countries. Agricultural production is the backbone of the African economy, and yet it remains dependent on the highly uncertain climatic patterns of rainfall, with irrigation taking place on only 6 per cent of the cultivated land. Although about one-third of the continent is too dry for any rain-fed crop production, an irrigated hectare of land could yield as much as 3.5 times that of a rain-fed hectare.

93. The technical potential to substantially expand the area under irrigation is much greater than what exists. In the Sahel, for example, an FAO study (1975) indicates that in that subregion there are approximately 14 million ha of irrigable land. This is 20 per cent of the total arable land. For a start, irrigation capacity could be increased through rehabilitation of existing schemes, dams, wells and borehole facilities. In view of the well-known environmental, political, social and economic problems (including their very high capital costs and relatively low rates of return) which have been experienced from large-scale irrigation projects in Africa as well as in other regions of the world, priority should be shifted to integrated small-scale projects designed and operated on the basis of environmental sustainability and cognizant of the reality that water is perhaps the scarcest resource in Africa. Africa's agricultural producers should be assisted to apply appropriate technologies geared towards the conservation of water (including safeguarding it from contamination from agricultural runoff) and the maximization of yields.

94. The few trans-boundary basins (Lake Chad, the Gambia river, the Senegal river, the Niger, the Nile river, the Kagera basin) face physical, political, socio-cultural, and financial problems. Serious efforts should be made to coordinate and strengthen national and subregional policies, promote planning and programmes for the development and efficient utilization of Africa's scarce water resources.

⁷ "Water Resources: Progress in the Implementation of the Mar del Plata Action Plan and Agenda 21 on Water-Related Issues". Report of the Secretary-General; 21 December 1993; presented to the Committee on Natural Resources, second session, 22 February to 4 March 1994.

IV. A FRAMEWORK FOR BUILDING AND UTILIZING PHYSICAL INFRASTRUCTURAL CAPACITIES IN AFRICA

95. The conclusion drawn from the above analysis is that the greatest constraint in Africa's infrastructure is the low level of utilization of existing capacity, even though the existing capacity itself is inadequate at national, subregional and regional levels. The implication therefore is that a balanced approach to improved utilization and selective expansion of capacity is required. Completion of critical missing links coupled with efficient operations would increase the over all rate of utilization of the physical infrastructure.

96. There is consensus that the constraints in African infrastructure capacity development cannot be addressed by investment alone but, equally, require policy changes and institutional reforms. The primary constraints to faster and sustainable expansion of these systems are implementation capacity and domestic resource mobilization; external financing, although clearly very much in need, is not the most serious constraint. Recent reports by ADB not only show that there exist facilities for supporting infrastructure development, but that African countries are not drawing all the resources allocated for these sectors. Similarly, the Secretariat of the African, Caribbean and Pacific Group of States (ACP) reports that some financing facilities, especially for regional programmes, still remain unused from Lomé II and III allocations!

97. The UNTACDA II programme provides the broad consensus framework which was jointly prepared by all the partners for the development of physical infrastructures and efficient services in transport and communications sectors. This is amply indicated by the sectoral targets cited in the preceding section. It illustrates the fact that the development of Africa's physical infrastructure capacity on a sustainable basis depends on the triad: human resources; financial resources; and regional co-operation. First and foremost, adequate human resources are required in order to internalize and consolidate any development. Indigenous capacity is required to innovate, develop and manage this development. Consequently, programmes of human resource and institutional development must be devised and action plans agreed upon. Such action may necessitate institutional reforms and restructuring.

98. Secondly, sustainable development must be built on a strong foundation of domestic resources; external resources can only be used to supplement domestic efforts. As such, mechanisms must be devised for the generation and management of domestic resources encompassing the development of efficient financial intermediaries for the mobilisation of savings as well as levying adequate user-fees which reflect the replacement cost of physical infrastructures and encourage their efficient utilization. In this regard, appropriate market structures should be established to encourage private sector participation.

99. Regional cooperation forms the third aspect in that integration of individual national infrastructure and services into a regional system would require close co-operation between neighbouring countries in a subregion and between the various subregions. For instance, river and lake basin projects such as dams would require close cooperation between the riparian countries. In view of Africa's political geography, with 53 countries (including the Republic of South Africa) most of which are small in terms of territory and/or population, a critical mass to achieve economies of scale requires subregional and regional co-operation and integration.

100. These three themes, namely human resources, financial resources and regional co-operation, provide the framework for proposing areas of action for building and utilizing Africa's physical infrastructure capacity. Each theme is further elaborated below and key issues arising from it are identified.

A. Human resources and institutional development (HRID)

101. Most studies on the development of transport and communications system and in the water resources field in Africa indicated that the poor performance of these sectors is mainly due to insufficient human skills and inappropriate institutional frameworks. A general analysis of the factors constraining human resources and institutional development and the performance of the transport and communications sector which was carried out during the nine subregional and regional workshops and seminars organized by ECA in collaboration with UNDP, ICAO, the World Bank, the International Labour Organisation (ILO), the International Telecommunication Union (ITU), the United Nations Conference on Trade and Development (UNCTAD) and the International Maritime Organization (IMO) as part of the HRID programme identified some key factors. Surveys and studies carried out in the water sector by ECA, UNDP, ADB, the World Meteorological Organization (WMO), the World Health Organization (WHO), the United Nations Environment Programme (UNEP), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and other institutions identified similar key factors. Finally, the outcomes of the two seminars for senior African energy officials jointly organized by ECA and the World Bank's Energy Development Institute (EDI) on energy policy planning and the environment also identified the need for institutional reforms in the energy sector. These factors may be grouped as short-comings in human resource development, training, management and policy and institutional reforms.

1. Human resource development

102. Many problems are linked to the development of human resources, but studies undertaken very recently put emphasis on the following areas for developing human resources: improving the productivity of the staff; better planning for and utilization of personnel; constant assessment of the performance of the workers to ensure career development; and staff motivation. The necessary environment for proper management should also be established. Finally, a more appropriate programme of technical assistance should be designed and implemented. In this regard, external development partners and African countries should avoid perpetual dependence on expatriates.

2. Training

103. Training programmes and courses should be in line with the objectives set out in the national plans for manpower development and should form an integral part of a genuine management tool which could also include career and staff development appraisal plans. In this regard, some subregional institutions should be selected as technical centres to train human resource specialists as well as instructors.

3. Management

104. Africa should stress the managerial issues and needs, especially in view of the rapid advances in technology. Managers should be adequately trained, selected on the basis of competence, and they should be given sufficient autonomy to achieve operational targets if they are to keep up with global changes in the industry. In this regard, the problem lies in clarifying the relation between the government, on the one hand, and the semi-autonomous public sector institutions and public enterprises, on the other.

4. Policy and institutional reforms

105. In order to improve the performance of the infrastructure sector in Africa, there is a strong need for policy and institutional reform. All the studies, seminars and workshops organized in Africa during the last five years on the performance of the transport and communications sector as well as the water resources sector

recommended that long term remedial measures for the improvement of performance should be based on policy and institutional reforms linked to the restructuring of existing institutions and enterprises. There is need to restructure the current parastatal institutions in order to put them on a commercially sound footing and to decide what functions and services should be turned over to the private sector through privatisation. In this regard, the regulatory function of the government should be separated from operations.

106. The HRID programme in transport and communications provides a framework for implementing these actions and similar initiatives should be developed for water and energy components. Similarly, the development, maintenance and management of small-scale and medium-scale irrigation facilities are key to national food security and sustained national food self-reliance by alleviating the devastating consequences of drought. Consequently, better utilization and management of water resources and the establishment of low-cost irrigation schemes would be essential institutional requirements for enhanced infrastructural capacities for irrigation.

B. Mobilization of resources

107. Physical infrastructures are financially costly to develop and maintain. The report⁸ prepared within the framework of UNTACDA II on the mobilization of resources for the development of transport and communications in Africa recommended that African countries should devote in the order of 5 per cent of GDP for investments in transport and communications. In this regard, \$251 billion was estimated as the financial resources required for the period 1992-2001. Out of this total amount, 64 per cent or \$166 billion should be mobilized from domestic sources, leaving 36 per cent (\$85 billion) to be sought from external sources. Other components of physical infrastructures are likely to be correspondingly costly.

108. The capital investments required to achieve the goals of clean water and adequate sanitation for all by the year 2000 are estimated in the order of \$20 billion annually world-wide of which \$5 billion per annum is Africa's requirement. These figures assume the application of appropriate technologies and are about half of other estimates which predicated on the utilization of more advanced technologies. For the energy sector, it is estimated that Africa needs to invest \$28 billion over the next 10 years in order to achieve the 5 per cent annual growth in energy supply which is required to sustain economic growth at an annual rate of 4-5 per cent and taking into account the rate of growth of demand for commercial energy due to the rapid rate of growth of urban populations.

109. In order to meet the herculean challenge of setting in motion the development of physical infrastructures, African countries must work out an economically sound strategy for the sustainable funding of this development.

1. Mobilization of domestic resources

110. The mobilization of domestic resources is the most reliable means for the sustained development of African infrastructures.

⁸ ECA: "Impact study of the macro-economic and financial environment in the development of transport and communications in Africa"; October 1992.

111. The strategy for domestic resource mobilization should be based mainly on the following principles⁹ - structural reforms aimed at boosting fiscal revenues's share of GDP as well as to plug leakages in the disbursement of public resources; re-organizing spending priorities to coincide with long-established development objectives; policy incentives to increase the savings rate of households and enterprises; promotion of the development of efficient, sound and well-regulated financial intermediary institutions and capital markets; and mechanisms to collect user-charges on infrastructures levied on the basis of at least recouping replacement costs. With regard to public sector reforms, efficient management of parastatals and public enterprises in the infrastructure sector is definitely a means of mobilizing domestic resources for the development of the sector while reducing public subsidies.

112. Evidently, a profound revolution in political economy sweeping the world is conferring a greater role on private sector agents as prime movers of development and the market (largely free though still requiring some judicious but highly competent regulation) as the principal allocation mechanism of scarce resources. African countries must begin to explore the possibilities of joint partnership between the State and public sector agents - domestic and foreign direct investors - in the development of segments of physical infrastructures (e.g., telecommunications, roads, electricity grids, etc) and the supply of associated services. The crux which has to be resolved is what rate of return and guarantees would entice the prospective private sector partners, how the two sets of partners should share the investment risks that are involved, and how revenues could be tapped from the infrastructure projects to meet the rate of return expected by the private partners. One method which has been applied in some fast-growth economies, such as those of South-east Asia, is the so-called "build, operate, and transfer" (BOT). In this type of partnership, a private business consortium raises capital and invests in infrastructural segments or facilities and is allowed, in return, to collect revenues from user-charges based on a formula agreed upon in negotiations with the government. After a prescribed number of years, the facilities are transferred to public ownership. The applicability of such novel approaches in Africa should be given careful study.

113. Until recently, in most African countries, infrastructural user-charges have often been lower than the amortized capital costs and could not even meet maintenance expenses. Infrastructural services have therefore been subsidized from general public revenues. A striking example is water supply which, where available, is distributed almost free. In order to reverse this situation, the infrastructure sector should be viewed as a major resource-consuming economic sector and, therefore, not a free public service. Mechanisms have to be put in place to enable this sector to be self-supporting, that is, by generating resources to be ploughed back into extension, expansion, and modernization. Infrastructure investments must be managed with an eye on financial returns, just like in the case of commercial ventures.

2. Mobilization of external resources

114. Increased external resources should be sought from Africa's bilateral and multilateral traditional development partners but, in light of the increased role currently being played by private sector agents (including transnational corporations) as direct foreign investors, African countries should also contemplate strategies to mobilize foreign direct investment (FDI) resources.

⁹ See ECA: "Strategies for financial resource mobilization for Africa's development in the 1990s"; paper presented at the twenty-eighth session of the Commission/nineteenth meeting of the Conference of Ministers; April 1993; pp. 30-32.

(a) Official development assistance (ODA)

115. With regard to official development assistance (ODA), there is need to alter its priorities and composition away from financing structural adjustment programmes (SAPs) to channelling funds directly into the development of physical infrastructures and human resources. Perhaps as a sign of the marginalization of Africa, ODA support to African infrastructural development has declined from the levels in early post-independence years. Even UNDP has reduced its support to the regional programme in Africa in general, and to infrastructure development in particular. Similarly, private capital flows into Africa declined during the 1980s and show little sign of recovery any time soon. The infamous debt burden faced by all African countries has severely reduced the amount of resources which African countries can devote towards infrastructural development.

116. The above concerns notwithstanding, African countries must step up their drive to attract external financial resources as well as technology transfer towards the development of their physical infrastructures and related services. The following are some of the possibilities:

(b) Foreign direct investment (FDI)

117. Foreign direct investment flows to developing countries have increased at a rapid pace, reaching an estimated \$38 billion in 1992, a fourfold increase since the mid-1980s and a 50 per cent increase over the past two years. FDI is now the dominant form of resource flows to developing economies and a primary source of capital for low-income countries. Unfortunately, the share for Africa is very small, the top ten recipients being Latin American and South-east Asian countries. FDI flows have shifted from manufacturing to the infrastructure sector which accounted for 75 per cent of privatization transactions in the past ten years. For example, in 1993 the International Finance Corporation (IFC) increased its investment approvals for its own account in infrastructure projects to \$379 million, up 65 per cent from 1992.¹⁰ These include financing electricity generation projects in India, Turkey and the Philippines; telecommunications in Chile, Mexico and Philippines; and port projects in Argentina and Chile. The establishment by IFC in 1993 of the Mauritius Fund and the Africa Fund are examples of IFC's readiness for greater involvement in Africa. Africa should take the opportunity to develop closer relations with IFC with a view to promoting private sector investments in large infrastructure projects.

118. FDI contributes to the growth of the economy through various channels in addition to physical capital formation, notably, technology transfer, human capital development and the promotion of foreign trade. Another benefit of FDI is that foreign-owned firms may stimulate local productivity through backward linkages to service suppliers and the labour force. However, the above attractiveness of FDI notwithstanding, African countries must develop appropriate guidelines for FDI in order for its benefits to be fully realized. These should include the participation of national capital, joint ventures, limited non-recourse clauses in contracts, etc.

(c) Multilateral development banks

119. The emergence of the private sector as the engine of economic growth has also forced the multinational development banks, including ADB and the World Bank to re-examine the efficacy of their traditional *modus operandi*, having been set up to channel development resources solely through the governments of member States. The IFC, which was cited above, is the World Bank affiliate for private sector lending, and ADB established its Private Sector Development Unit in 1991.

¹⁰ International Finance Corporation: "Annual Report 1993".

120. In terms of the sector lending programmes of the development banks, the infrastructure sector in 1992 accounted for over 40 per cent of total lending of five major institutions (table 1).

121. The World Bank's new lending commitments to the sub-Sahara African subregion declined in 1993 by \$1.2 billion to just over \$2.8 billion, including a 14 per cent reduction in IDA credits. This followed Bank complaints about the poor record of resource disbursements which had resulted in a backlog of \$14 billion due to African countries' low absorptive capacity.

(d) Bilateral financial and technical assistance

122. After three decades of generally well-intentioned financial and technical assistance from the donor countries, agencies and institutions, available evidence shows that African countries did not benefit as much as was expected, judging from the low level of institutional, infrastructural, and human capacities necessary for development sustainability. Therefore, it is necessary at this juncture to thoroughly re-think the role and content of technical assistance and to set concrete targets by which to gauge its success in capacity building through the transfer of skills to adapt technology to African conditions to render it appropriate. In the same context, it is imperative that technical assistance increasingly utilizes locally available skills and expertise in all its operations involving technology transfer and adaptation. Lastly, priority should be given to capacity building within agreed national, subregional and regional frameworks. In all this, technical assistance geared towards sustained capacity building should be determined and managed jointly by African Governments and their development partners.

C. Regional cooperation

123. The regional cooperation dimension of physical infrastructure and associated services would, on the one hand, provide economies of scale which are essential for the development of critical capacities such as training for advanced level skills, and the joint local manufacture of inputs and equipment. On the other hand, economic integration requires the development and interconnection of physical infrastructure at the subregional and regional levels both for expanded markets, range and efficiency of services.

124. Regional cooperation by enabling uniformity, standardization and harmonization of policies, rules, regulations and procedures as well as the sharing of successful experiences in various modes and areas would substantially improve the development and effective utilization of infrastructural capacity and services. Such regional cooperation is particularly important in facilitation, sharing of experiences and manufacture of equipment. These aspects are briefly examined below.

1. Facilitation

125. Efficient and extensive utilization of all physical infrastructures and facilities all over the world and particularly at the international level or when more than one country are involved depends largely on the existence of sufficient facilitation of operations, procedures as well as legal and/or administrative services. Facilitation at the regional level therefore implies harmonization and standardization of rules and regulations, procedures and facilities to the maximum extent possible.

126. Accordingly, cooperation agreements need to give special consideration to standardizing requirements for insurance, transit rules and uniform documentation. This requires commitment by member States to ratify and implement the various instruments and protocols for inter-State facilitation within the framework of the Abuja Treaty.

127. In the energy and water sector, regional cooperation is essential for effective exploitation of trans-boundary river and lake basins and aquifers. In this respect, the economic, technical, political and legal contexts of agreements should be carefully and thoroughly studied since the commitment of signatory countries is required for successful operation of these common institutions.

2. Technical cooperation

128. Notwithstanding the many problems faced by African member States, there are indeed a few good experiences in joint ventures, subregional and regional training facilities and twinning arrangements, research and development institutes, and some multinational or subregional industries that have been quite successful and whose experiences should and ought to be carefully examined and shared within Africa. The sharing of these experiences should therefore be promoted and encouraged through the exchange of information as well as the increased use of African experts and consultants from those institutions, organizations and businesses that have demonstrated competence and acquired good reputation in their various areas.

V. IMPLEMENTATION STRATEGY

129. Many programmes have been drawn in the past but their implementation invariably fell short of expectations. The implementation of the framework for capacity building in the infrastructural sectors must take into account the lessons that have been learnt over the past and it must be predicated on the assumption that the African Governments and peoples have the political will to take bold steps in entirely new directions. The realization that sustainable development can only occur with adequate human, institutional and physical infrastructural capacity should provide the necessary spur for undertaking the proposed programme of action.

130. Within each of the physical infrastructural sectors that has been identified in this report, the strategy for implementing the framework agenda for capacity building should be drawn around the following three themes and their associated issues:

- (a) Theme 1: Human resources and institutional development;
- (b) Theme 2: Mobilization of resources; and
- (c) Theme 3: Regional cooperation.

131. Under each theme several policy options are presented based on issues which have been identified in previous sections. These form the basis for developing the action programme for implementation at the national, subregional and regional levels. These practical steps to enhance infrastructural capacities in Africa are summarized in tables 2 to 4.

132. As regards the timeframe for the implementation of this action agenda, it is recommended that work to translate the framework into concrete programmes and projects should get under way. The national, regional and international organizations which are involved should incorporate these activities in their work programmes.

133. The Conference of Ministers is called upon to consider and adopt this action programme as a set of concrete steps to be taken at the national level by the relevant organs, at the subregional level by the IGOs and at the regional level by United Nations specialized agencies, in particular, the ECA secretariat, the regional organizations (OAU and ADB), the World Bank and its affiliated institutions, other international financial institutions, as well as Africa's bilateral partners.

134. Development in different components of physical infrastructures has, of course, attained varying levels from one African country to another. Therefore countries will naturally attach different priorities and targets to building and strengthening capacities of specific infrastructural components. Countries will also make their choices within the context of national political and economic situations. What is important, however, is that a fresh impetus should now be given to the building and strengthening of all components of physical infrastructural capacities as a necessary condition for accelerating the rate of economic growth in Africa.

Table 1. Multilateral development banks lending to infrastructure sector, 1992

	Total lending	Energy		Transport		Telecommunicati ons		Urban		Water supply and sanitation		Total infra- structures	
	\$ billion	\$ billion	%	\$ billion	%	\$ billion	%	\$ billion	%	\$ billion	%	\$ billion	%
World Bank	21.7	4.04	18.6	2.11	9.7	0.43	2.0	1.38	6.4	0.91	4.2	8.87	40.9
African Development Bank	2.993	0.199	6.9	0.381	13.2	0.103	3.6	-	-	0.282	9.8	0.965	32.2
Asian Development Bank	5.109	1.388	27.5	0.965	19.1	0.186	3.7	0.177	3.5	0.187	3.7	2.903	56.8
Inter-American Development Bank	6.023	0.576	9.7	0.994	16.8	-	-	0.183	3.1	0.516	8.7	2.269	37.7
European Bank for Reconstruction and Development	1.580	0.211	16.5	0.068	5.3	0.302	23.6	0.067	5.3	-	-	0.648	41.0
Total	37.405	6.414	17.1	4.518	12.1	1.021	2.7	1.807	4.8	1.895	5.1	15.655	41.9

Source: Infrastructure Finance, Fall 1993.

Table 2

THEME 1: HUMAN RESOURCE AND INSTITUTIONAL DEVELOPMENT

POLICY OPTION	NATIONAL ACTION	SUBREGIONAL ACTION	REGIONAL ACTION
<u>Human resource development</u>			
(a) Stepped-up training and enhanced effectiveness of training	<p>Establish human resource development and training units and policies on each infrastructure operation.</p> <p>Determine training needs and available capacities at national level.</p> <p>Involve national experts (at home and abroad) universities and training institutes in research and policy development.</p>	<p>Include infrastructure research and policy development in programme of subregional training institutions (such as ESAMI, AFRALTI, AGRYMET - Centre régional de formation et d'application en agrométéorologie hydrologie opérationnelle or ESIE in electricity).</p> <p>Establish networking and exchanges, among training institutions (e.g., airline training schools in Ethiopia, Egypt, Nigeria, etc.)</p>	<p>Undertake regular analysis of emerging issues in infrastructure development and disseminate findings to member States to incorporate in their training programmes (ECA, ADB, OAU and African regional institutions implicated)</p>
(b) Better utilization of indigenous human resources	<p>Implement human resource policies that promote utilization of indigenous experts (e.g., domestic contractors and consultants),</p> <p>Establish transparent career development and incentive programmes in public infrastructure operations.</p>	<p>Develop subregional standards for licensing experts/technicians (such as pilots, hydrologists, operators, etc.) to promote cross-border employment</p>	<p>Develop human resource management programmes and assist interested countries to implement them.</p>

POLICY OPTION	NATIONAL ACTION	SUBREGIONAL ACTION	REGIONAL ACTION
<u>Policy and institutional reforms</u>	<p>Establish clear and consistent policy and regulatory framework for development of the sector including corporatization, commercialization, contract plans, lease arrangements and private sector participation.</p> <p>Implement ongoing sectoral programmes which were developed at the regional level.</p>	<p>Conduct seminars and workshops to disseminate findings from ongoing policy initiatives in member countries.</p> <p>Assist member countries implement policy and institutional reforms.</p>	<p>Assist interested countries develop the necessary policy and regulatory framework.</p> <p>Disseminate findings from and assist interested countries implement ongoing sectoral programmes (such as road maintenance initiative, human resource and institutional development programme, etc.)</p>

Table 3

THEME 2: MOBILIZATION OF RESOURCES

POLICY OPTION	NATIONAL ACTION	SUBREGIONAL ACTION	REGIONAL ACTION
<u>Mobilization of domestic resources</u>			
(a) Introduce/increase user charges	Select type of user charges for increased revenue generation (e.g., fuel tax, licence fees, tolls, water tariffs and charges, installation charges).	Harmonize inter-State charges (e.g., transit charges)	Undertake studies for countries interested in establishing systems
	Determine appropriate rates, devise collection mechanisms and establish procedures for allocation of increased revenues	Organize TCDC among various subregions and countries to share experiences	Organize workshops to share successful experiences and assist requesting countries establish systems
(b) Increased efficiency of fund use	Establish more rational, priority-based physical planning procedures	Disseminate case studies among member countries	Disseminate case studies of successful methods to countries
	Establish more effective appropriations and financial control procedures		Assist requesting countries to establish financial management systems (e.g., by use of national IPF from UNDP or ACP/EC allocations, use of TAF of World Bank and ADB)

Table 3 (Continued)

POLICY OPTION	NATIONAL ACTION	SUBREGIONAL ACTION	REGIONAL ACTION
(c) Earmarking revenues for infrastructure sectors	Determine level of funding to be regularly earmarked for each infrastructure sector	Disseminate experiences to participating countries	Develop rational mechanisms for earmarking revenues for infrastructure development
	Establish the necessary mechanisms to manage these funds		Assist participating countries establish appropriate mechanisms (e.g., using TAF from ADB, World Bank, UNDP, ACP or bilateral sources).
<u>Mobilization of external resources</u>			
(a) Promotion of private sector participation in infrastructure development and services	<p>Adopt clear regulations for programme of FDI in infrastructure</p> <p>Establish competent national teams for valuation of public assets before sell-off</p> <p>Establish financial intermediation mechanisms for private sector investment</p>	Implement subregional trade agreements to create viable markets for FDI (subregional IGOs)	Prepare models for valuation of public enterprises for privatization and undertake private sector assessments in pilot countries (IFC, World Bank, ADB, ECA, United Nations agencies)

Table 3 (Continued)

POLICY OPTION	NATIONAL ACTION	SUBREGIONAL ACTION	REGIONAL ACTION
(b) More use of loans from multilateral development banks	<p>Include infrastructure development in the National Priority Investment Programme (NPIP)</p> <p>Establish priority of infrastructure projects</p> <p>Prepare projects and submit to appropriate development banks and follow-up on their approval at all levels</p> <p>Strengthen national project implementation mechanisms in order to facilitate disbursement of funds from the banks</p>	<p>Identify priority programmes in the region.</p> <p>Establish mechanisms for efficient implementation of subregional projects (especially those funded by EC/ACP).</p>	<p>Assist countries prepare projects that meet bank requirements (ECA, ADB, etc.)</p> <p>Review NPIP with countries to ensure inclusion of key infrastructure projects (UNDP, ECA, ADB, etc.)</p> <p>Establish quick disbursement programmes in order to reduce backlog of undisbursed funds (World Bank, ADB, EC/ACP)</p>
<u>Use of financial and technical assistance</u>	<p>Revise current and future TA needs in line with policy reforms for sustainable development</p> <p>Negotiate transfer of know-how with donors including twinning arrangements</p> <p>Use national consultants and contractors to implement TA projects</p> <p>Use experts from other African countries whenever possible</p>	<p>Assist countries formulate framework for negotiations with donors.</p>	<p>Revise TA agreements to enhance Africa's capacity (financing institutions, UNDP, bilaterals)</p> <p>Include training arrangements to ensure transfer of know-how to Africa.</p> <p>Use African experts to implement TA projects (donors)</p> <p>Develop directory of African experts</p>

Table 4

THEME 3: REGIONAL COOPERATION

POLICY OPTIONS	NATIONAL ACTION	SUBREGIONAL ACTION	REGIONAL ACTION
<u>Facilitation</u>	<p>Adopt and implement simplified procedures</p> <p>Set up national facilitation committees to identify problems, formulate national facilitation policies and oversee their implementation</p> <p>Adopt, sign, ratify and implement relevant existing international/ African instruments for facilitation</p>	<p>Monitor progress in implementation of simplified procedures</p> <p>Set up intercountry facilitation committees to diagnose problems and develop subregional facilitation programmes</p> <p>Organize workshops on the use of existing international/African instruments for facilitation</p>	<p>Design simplified procedures for facilitation and organize workshops</p> <p>Set up regional forum for discussion of facilitation issues</p> <p>Prepare training programmes on the use of existing international/African instruments for facilitation</p>
<u>Technical cooperation</u>	<p>Identify problems and formulate policies on technical cooperation</p> <p>Identify key areas with potential benefits beyond the country's borders (e.g., power generation, manufacture of equipment and spare parts)</p> <p>Develop national information systems and developmental research programmes</p>	<p>Diagnose national problems and formulate subregional policies on technical cooperation.</p> <p>Mobilize and coordinate joint use of existing resources in the subregions</p> <p>Coordinate the national information systems and research findings</p>	<p>Promote and encourage technical cooperation</p> <p>Undertake regional studies on the identification of key training needs, industries, skills, potential for joint ventures for the development of infrastructure</p> <p>Facilitate the exchange of information through institutions such as ECA/PADIS</p>
<u>Implementation of regional projects and programmes</u>	<p>Implement national components of projects and protocols of the Abuja Treaty</p>	<p>Assist member countries implement national components of regional projects/protocols</p>	<p>Assist countries implement national components of regional projects/protocols</p>