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UNITED STATES TELECOMMUNICATIONS POLICY
IN
SUB-SAHARAN AFRICA
DETERMINANTS AND INITIATIVES

A REPORT TO THE
UNITED STATES AGENCY
FOR INTERNATIONAL DEVELOPMENT
* *
OFFICE FOR POLICY DEVELOPMENT
AND PROGRAM REVIEW

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UNITED STATES TELECOMMUNICATIONS POLICY
AND
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PROJECT COUNTRIES



PREFACE

This report to the United States Agency for International Development (USAID) concerns aspects of several telecommunication functions, policies, and organizations, focusing primarily on the circumstances surrounding telephone provision in Sub-Saharan Africa. It was decided, in consultation with a number of Agency Bureaus, that the African environment could most easily provide a wide range of financial and service performance levels, within the practical limitations of available time and geographic proximity. Moreover, it was felt that the African nations are dominant among those developing countries which most require assistance in this sector.

After reviewing the available project documentation and reports, 24 Sub-Saharan countries*, representing nearly two thirds of the region's population as well as an extensive range of other variables, were selected for observation and research (see map, opposite). The remaining countries of the region were considered according to the level of relevant data widely available. Between January and July 1984, I visited more than half of the selected countries, while deriving information on the others from extensive meetings with officials of multilateral organizations in Africa (PANAFTEL, ECOWAS, etc.). Additional information was added through my meetings with officials of the World Bank and the International Telecommunications Satellite Organization in Washington, D.C., the African Development Bank Group in Abidjan, the International Telecommunications Union

* Angola, Botswana, Central African Republic (C.A.R.), Congo, Ethiopia, Ghana, Ivory Coast, Kenya, Lesotho, Malawi, Mauritania, Mozambique, Niger, Rwanda, Senegal, Sudan, Swaziland, Tanzania, Togo, Uganda, Zaire, Zambia, and Zimbabwe (plus Egypt and Morocco).

in Geneva, and other multilateral agencies (as well as acquisition of their reports and documents). Much of the material provided to me for the report was done so on a restricted basis and thus, in many instances, the information has been included in generic form or else referred to as "country data." However, sources are always cited when possible. Except for the diagrams and maps, which were self-generated, the sources for the information used in the various Figures are: World Bank or African Development Bank project reports; individual country documents; the ITU's Yearbook of Common Carrier Statistics (Geneva: ITU, various years); and AT&T's The World's Telephones (Morris Plains, New Jersey: AT&T, various years). GNP and GDP-related statistics were taken from U.N. statistical year-books or the World Bank's World Bank Development Report (Washington D.C.: World Bank, various years). Some of the financial material in Part II is adapted from official documents, annual reports, and/or financial statements of the organization in question. Finally, it should be noted that where figures have been converted into U.S. dollars, one should allow for a degree of uncertainty produced by differing currency translations, and consider the converted figures estimates only.

I would like to take this opportunity to express my appreciation to USAID/PDPR for funding this research fellowship, and also to the many people in American Embassies and USAID Missions in Africa and Europe who assisted in this endeavor (particularly Dorothy Williams of USAID/Geneva, who gave helpful suggestions and did a magnificent job of typing this report). Gratitude is due also to the African countries that participated in gathering the necessary research materials, and to the very gracious

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and to the very gracious officials of the African Development Bank Group, the International Telecommunications Union, INTELSAT, the World Bank Group, and the United Nations agencies in Geneva. My special thanks, ne plus ultra, are directed toward Dr. Edwin Hullander and Dr. Edward H. Clarke of USAID, without whom this project would neither have commenced nor been completed.

Finally, it should be stated that, notwithstanding the generous contributions of many individuals and organizations, I alone bear responsibility for the opinions and conclusions of this report, and I recognize that they may not reflect the viewpoint of the United States Agency for International Development or any individual thereof.



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ACRONYMS AND ABBREVIATIONS

AFDB	African Development Bank
AFDF	African Development Fund
AFESD	Arab Fund for Economic and Social Development
AT&T	American Telephone and Telegraph Corporation
BADEA	Arab Bank for Economic Development in Africa
BDEAC	Banque de Developpement des Etats de l'Afrique Centrale
BDGL	Banque de Developpement des Etats du Grand Lacs
BOAD	Banque Ouest-Africaine de Developpement
C.A.R.	Central African Republic
CCCE	Caisse Centrale de Cooperation Economique (France)
CCIR	International Radio Consultative Committee
CCITT	International Telephone and Telegraph Consultative Committee
CFA	Commune Franco-Africaine
CIDA	Canadian International Development Agency
DEG	Deutsche Entwicklungsgesellschaft (German Development Society)
DOM/TOMs	Departements/Territoires Outre-Mer (French Overseas Dept./Terr.)
EADB	East African Development Bank
ECA	Economic Commission for Africa
ECOWAS	Economic Community of West African States
ECU	European Currency Unit (Equivalent \$0.76)
EDF	European Development Fund (EEC)
EEC	European Economic Community
EIB	European Investment Bank (EEC)
FCCD	Fund for Cooperation, Compensation, and Development (ECOWAS)
FRG	Federal Republic of Germany
GDP	Gross Domestic Product
GNP	Gross National Product
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
INTELSAT	International Telecommunications Satellite Organization
ITU	International Telecommunications Union
JICA	Japan International Cooperation Agency
KFAED	Kuwait Fund for Arab Economic Development
KFW	Kreditanstalt fur Wiederaufbau (Reconstruction Corporation)
NMDC	Netherlands Minister for Development Cooperation
NTF	Nigeria Trust Fund (AFDB)
OAU	Organization for African Unity
OECD	Overseas Economic Cooperation Fund (Japan)
OPEC	Organization of Petroleum Exporting Countries
PANAFTEL	Pan-African Telecommunications Network
PATU	Pan-African Telecommunications Union (OAU)
PCC	PANAFTEL Coordinating Committee
PD	Policy Determination
PDPR	Bureau for Policy Development and Program Review (USAID)
PPC	Bureau for Policy and Program Coordination (USAID)
RASCOM	Regional African Satellite Communications System
SADCC	Southern African Development Coordination Commission
SATCC	Southern African Transport and Communications Committee
SDR	Standard Drawing Right (Equivalent \$1.103)
S/T	Bureau for Science and Technology (USAID)
TCD	Technical Cooperation Division (ITU)
UAPT	Union Africaine des Postes et Telecommunications
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific, and Cultural Org.
UNTACDA	United Nations Transport and Communications Decade in Africa
USAID	United States Agency for International Development
USTTI	United States Telecommunications Training Institute

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INTRODUCTION

"Development is defined as self-sustaining action through which people improve their well-being, however they may define it. Development, thus, is a process. To be sustained, it must involve large numbers of people and take place throughout a national territory. For that to occur, the national space must be integrated in some way."

- The Telephone in the Organization of Space for Development 1/

The complex relationship between communications technologies and economic development has attracted ever-increasing interest during the past decade, particularly in the last few years. The continuing economic decline of many developing countries, despite the escalation of annual economic assistance to over \$30 billion, has contributed to pressures for different strategic responses from donors. Because telecommunications has garnered such a limited portion of past funding (USAID, for example, allocates less than 1 percent of its budget to the sector), many experts are pressing for a chance to implement the latest technologies as solutions to long-standing development problems.

The World Bank, supporting this shift in direction, describes telecommunications as the "central nervous systems of complex societies, transmitting information and commands between their various parts." 2/ Harold Innes, in his Empire and Communication, points out that the successful organization of elements of the British Empire "required a communications technology permitting messages to be easily transmitted over an entire area" under its control. 3/ But if telecommunications truly is the "central nervous system" of a society or even just one necessary form of national integration, then it would appear that the

sector would develop in step with other types of infrastructure as well as with the requirements of international trade and sound national economic and management policies. This, however, is the exception rather than the rule.

In Sub-Saharan Africa, the development of telecommunications services regularly lags behind that of other types of infrastructure, often to the extent of receiving a far smaller percentage of GDP as investment than it generates in income. This results from a general lack of awareness about the benefits of a healthy telecommunications operation, and a mistaken perception that these technologies have a lower intrinsic value than other kinds of infrastructure. In fact, according to an official of the African Development Bank, a recent informal survey of government officials by the Bank ranked telecommunications eighth as an investment priority, behind road construction, electrification, and airport expansion. Telecommunications gets low marks from African decision-makers because they are looking for investments with a "more immediate payoff," despite the long-term benefits accruing from improved communications. But perhaps more to the point, investment in telecommunications receives such a low priority because these technologies are hidden; hidden underground, on remote hilltops, and in the heavens beyond. On the other hand, a new dam or government building is an investment in public awareness -- promoting an oft-times dubious image of a government acting effectively in the national interest.

In order to rectify this imbalance between the advantages of telecommunications and its low perceived value, some level of outside intervention appears to be required. Unfortunately, consensus is lacking among the experts. At least three general, and quite different, categories of thinking on the matter have been identified:^{4/}

--"Restrictive": This view focuses on the lack of strong evidence of worthwhile economic benefits, and particularly on the belief that those benefits which may exist redound disproportionately to the advantage of groups which least need them, namely urban populations or governmental and economic elites.^{5/} Other arguments in support of this view are that telecommunications: is capital intensive in labor intensive developing societies; has only an indirect role in the development process; and is "political dynamite" which would lead alternately to democratization, revolution, or the creation of a highly centralized police state.^{6/}

--"Market-Response": This view argues for intervention in order to meet "demonstrated demand," and to provide access to technology, if cost-effective, to assist in both meeting demand and providing "minimum telephone access to more provincial areas."^{7/}

--"Activist": The third view suggests, in the words of Kenya's Phillip Okundi, that "telecommunications development in a country is vital in its total economic and social progress."^{8/} Several advocates of this line of thinking point to the very high correlation between GNP per capita and telephone density. Others see telecommunications as "almost automatically bound to produce new ... linkages between previously unconnected people and individuals" and to promote "social and economic development, irrespective of other measures taken."^{9/} They argue for extensive assistance in improving the quantity and quality of domestic and international telecommunications services through capital flows, technical assistance, and project development.

While there is a certain degree of merit to each of these perspectives, both the restrictive and activist views appear extreme, particularly in reference to Sub-Saharan Africa. First, there is some recent evidence that increased telephone density produces a measurable (albeit small) economic shift in favor of the poorest segment of the population.^{10/} Secondly, in a set of circumstances where the existence of telecommunications is marginal (and demand is suppressed), the very lack of services is often enough to sustain good economic performance, in proportion to the capital added to the system. If this were not

true, it is highly doubtful that telecommunications would hold the vaunted place that it does in the capital markets and with development banks. Telecommunications is a proven generator of healthy returns if properly managed and maintained. Finally, capital intensiveness is probably not a good enough reason, in seclusion, for development agencies to write off a particular investment; the same could be said of electrification or high-tech agriculture. As to "political dynamite," while significant change is possible as a result of an increase in the number of telephones, penetration would have to be fairly widespread (and this might be fifty years down the road in the case of Africa), and even then would have to outweigh positive economic considerations.

On the other hand, excessive devotion to communications technology, in the hope that it can singlehandedly (or otherwise) cure the multifarious ills of a developing society, is an error of great consequence. If telecommunications is not to end as another false development "messiah," it must be applied to specific problems, in careful measure, and with realistic expectations. Until used more widely in development, one cannot be assured that each technology will perform identically in different economic, social, and physical climates or that benefits will percolate evenly throughout a society.

It appears, indeed, that the majority of the international development community has begun to join forces behind a variation of the more pragmatic market-response orientation. The ITU (and its Technical Cooperation Div.), the World Bank, the African Development

Bank, the interested multilateral organizations and development banks in Africa, and several of the larger Western development agencies support, to some degree, increased levels of loans and/or assistance towards improving communications networks. A report by the World Bank on Sub-Saharan economic development best outlines the moderate strategy:

"Sub-Saharan African governments and aid-supplying countries should give higher priority to the rapid development of telecommunications services, and particularly, to the buildup of sound organizations for running them through training and management assistance. It is especially rare in this field that manufacturer-generated projects, involving simple supply of equipment and provision of directly related technical training will on their own constitute a valid form of foreign assistance. A broader approach aimed, above all, at developing local capabilities is essential. Highest priority should go to expanding domestic local and long-distance telecommunication networks, to be complemented as soon as possible by the upgrading and the expansion of intercountry facilities." 11/

This strategy should not only permit gradually improved services and benefits, but will also allow a realistic period for practical expertise to grow and mature. Only then can overall financial performance and economic contributions be calculated and a determination made about a wider application of resources to the sector.

Of course, the economic benefits accruing to the countries assisted may not be the only motivating factors for increased funding. Many Western governments are fascinated by the virtual assurance that nearly all funds committed to telecommunications development will be returned to their respective economies. This would occur naturally, as there is an almost total lack of African equipment producing facilities, telecommunications policy experts, and skilled technicians. Thus the needed personnel and equipment, and even

the wire, must usually be imported. This often acts as a subsidy to state-controlled telecommunications enterprises, particularly in France and the United Kingdom.

And in Japan and Sweden, for example, development assistance is used indirectly as a mechanism to boost telecommunications equipment market share and thereby employment.

Other arguments can be made for extending additional support for telecommunications. Perhaps the most important is the prospect of improved development project management. The ability to make more frequent, more timely, and less troublesome contacts with both scattered project sites and home country officials is inherent in a smoothly operating and expanding communications network. Telecommunications should ease the burdens of time-consuming travel,

delays in conducting routine business by letter or cable, and wasteful budget outlays for stop-gap communications devices (walkie-talkies, very-high frequency radios, etc.) A further attraction at a time when development assistance expenditures are coming under increasing pressure and scrutiny is that telecommunications project funding, unlike most other development investments, comes equipped with a domestic constituency: the equipment producers, their employees, and their allies in related high technology industries.

It seems inevitable then that, fueled by pressure from independent experts, bureaucracies, and industry, communications will become an even greater focus for future directions within the donor governments and development agencies. This is evidenced in the United States by the recent publication of a Policy Determination (PD-10) on development communications by USAID.^{12/} The document sets out new guidelines for the uses of communications in U.S.-sponsored development programs.

Of particular interest in the context of this report are the following excerpts:

-- USAID will: "support the fuller application of communications technologies in U.S.-assisted development programs"; "seek to assist developing nations in using these technologies as tools in their own development programs and in making

informed consumption and investment choices among these technologies;" and "make use of these technologies to reduce costs, extend services and information, and increase the effectiveness of projects it supports in all sectors."

- "The priority for AID will be 'development communications' defined as the application of existing communications technologies and media to problems of development. AID will also give attention to 'communications development,' defined as the development of new or additional communications infrastructure and capacity."
- AID will "limit direct investments in communications infrastructure development and will concentrate instead on technical assistance designed to ensure that infrastructure projects are effectively implemented and utilized."
- AID will "support private sector investment and entrepreneurship in communications-related activities. As communications capacities expand and diversify, a wide range of commercial services may emerge, both supplying goods and services to communications system and adapting the communications capacity to new purposes."

As these excerpts indicate, the document is one that takes a positive stance on most future developmental applications of communications technology. While the PD limits direct investment in infrastructure, it is evidently not ruled out. A major USAID investment of this type is the major telecommunications expansion project in Egypt, one of several examples financed through the Economic Support Fund (although this would not be considered official development assistance). The PD also specifies that USAID "make selected additions" to infrastructure "as needed to facilitate project objectives," a policy which should permit equipment to be funded in many types of situations (e.g., outreach, research and design, institution-building, etc.).

Besides infrastructure, the guidelines promote a strong emphasis on technical assistance for equipment selection, recruitment and training of local staff, and the strengthening of management, administrative, logistic, and planning systems. One result of this type of assistance will be the familiarization of local decision-makers with U.S. products and processes (a tactic that European governments have made use of for some time). Similarly, AID's encouragement of private enterprise and entrepreneurship will enhance U.S. recognition in a competitive market environment.

In effect, the USAID Policy Determination is a statement of general support for applications of communication technology that closes off few options for the future. It recognizes, implicitly, that the importance of communications (particularly telecommunications) is great enough to warrant a governmental effort to establish a U.S. development communications "presence" in the developing countries.

But in order to facilitate U.S. involvement, the present status of telecommunications services and finances in each region (in this case Sub-Saharan Africa) must be analyzed and understood. With this necessity in mind, three objectives for this report were formulated:

- (1) To describe African telecommunications generally, its functional organizations, and the circumstances of the successful or unsuccessful operation of these organizations;
- (2) To discuss the activities of interested multilateral institutions and their future involvement in applications of communications technologies to development; and

- (3) To summarize the involvement of the United States and some other Western countries as well as their business interests in this field and the results of their activities.

Together, these make up the determinants of future United States policy application in the Sub-Saharan telecommunications environment and lead, in conclusion, to a number of suggestions for initiatives within the USAID framework which should also be applicable, in many respects, to the developing world at large.

I. TELECOMMUNICATIONS IN SUB-SAHARAN AFRICA

"Development of [telecommunications] services should receive higher priority than in the past: quality and quantity are grossly inadequate in most [African] countries.... Lack of speedy and accurate telecommunications systems is hampering growth in all sectors, prodigiously wasting managerial talent, and unnecessarily straining transport systems. Despite the dispersion of their populations, which would argue for more reliance on telecommunications, Sub-Saharan African countries ... have lower telephone densities, and the rate of growth in the number of telephones has been much lower ... than in low income South Asia."

- The World Bank
Accelerated Development in
Sub-Saharan Africa 13/

A functional Sub-Saharan telecommunications network is a vision unfulfilled. Although a latent potential exists for many types of economic and social benefits (see Annex 1), it is suppressed by a lack of resources and by widespread operational inefficiency. These negative factors denote a woefully inadequate level of service provision. In Figures 1 and 2, telephones and telephone density in Sub-Saharan Africa are contrasted with penetration in other areas of the world. The statistics make plain the African dilemma. Although it comprises well over 8 percent of the world's population, Sub-Saharan Africa lays claim to less than 0.3 percent of its telephones. This means that fewer than 5 of every 1000 people have a telephone. That is only half the current level in Asia, which includes the mammoth populations of China and India (each with more than double Africa's entire citizenry). Other developing areas of the world have telephone densities as much as fifteen times greater, while in the industrialized world as a whole, penetration is higher by a staggering 8750 percent, and soars to a level nearly two-hundred times greater than Sub-Saharan density in individual countries.

FIGURE 1

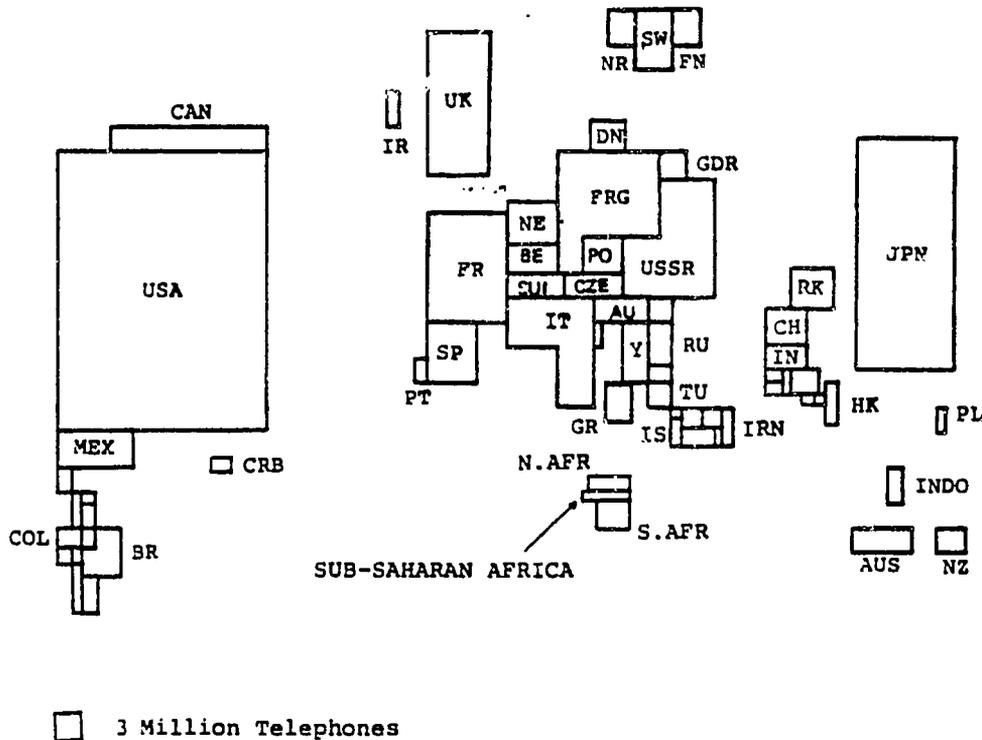
TELEPHONES IN THE WORLD, 1982

REGION	Telephones		Population		Telephones Per 100 Population
	Millions	Percent	Millions	Percent	
<u>Industrialized</u>					
UNITED STATES	181.9	34.2	230	5.2	79.08
CANADA	16.8	3.2	24	0.5	70.00
JAPAN	61.2	11.5	118	2.6	51.86
ISRAEL	1.4	0.3	4	0.1	35.00
OCEANIA	10.4	2.0	23	0.5	45.22
EUROPE	203.6	38.3	801	18.0	25.42
SOUTH AFRICA	3.3	0.6	29	0.6	11.37
Industrialized Total	478.6	90.1	1,229	27.5	38.94
<u>Developing</u>					
SUB-SAHARAN AFRICA ^a	1.6	0.3	369	8.3	0.44
ASIA ^b	20.9	3.9	2,339	52.3	0.89
MIDDLE EAST ^c	6.1	1.1	182	4.0	3.35
LATIN AMERICA ^d	24.2	4.6	352	7.9	6.88
Developing Total	52.8	9.9	3,242	72.5	1.63
WORLD TOTAL	531.4	100.0	4,471	100.0	11.86

- a) Excludes South Africa, its homelands & administered territory.
- b) Including Afghanistan and Pakistan; excluding Japan.
- c) Including N.Africa, Arabia, and Iran; excluding Israel.
- d) Including Central and South America, Mexico, and the Caribbean.

FIGURE 2

MAP OF TELEPHONES IN THE WORLD, 1982



But before one begins to think of Sub-Saharan Africa as some hopeless monolith, it should be clarified that the region is nothing of the sort. In fact, Mauritania in the north is geographically closer to Brazil than it is to Mozambique. Ethiopia is closer to India than it is to Senegal. The jungle and the equatorial rainforest of Central Africa can have no greater antithesis than the vast expanse of the Sahara or the rugged terrain of the Great Rift Valley. Population ranges from more than 90 million in Nigeria to less than 1 million in nine other countries. GNP per capita varies by more than 3400 percent. And as if these differences were not enough, numerous political and language barriers further divide the continent.

Telecommunications tend to be no less heterogeneous. Telephone density (see Figure 3), growth, investment, demand, and other variables differ to a tremendous degree. But what creates these disparities within Africa? And what causes the gap between the level of Sub-Saharan telecommunications and that of other areas, both developing and industrialized? In order to answer these questions, the system of service provision in Africa must be broken down into its component parts and its problems described.

Management and Control

The telecommunications organizations in Africa are a legacy of the colonial era. Indeed, up into the late 1970's, French and British interests still owned large portions of some African communi-

FIGURE 3

SUB-SAHARAN AFRICA
POPULATION, GNP PER CAPITA, AND TELEPHONE DENSITY

<u>Region/Country</u>	<u>1982 Population (Millions)</u>	<u>1979 Telephones Per 100 Population</u>	<u>1982 Telephones Per 100 Population</u>	<u>1982 US\$ GNP Per Capita</u>
Sub-Saharan Africa	369.4	0.43	0.44	
Seychelles	0.1	8.96	11.86	1,800
Mauritius	0.9	3.53	4.68*	1,270
Zimbabwe	7.2	2.90	3.28	870
Swaziland	0.6	1.87	2.20*	760
Gabon	0.7	2.02	-	3,810
Botswana	0.9	1.32	1.76	1,010
Djibouti	0.4	1.21	1.60	480
Sao Tome & Principe	0.1	0.80	1.50	370
Kenya	17.4	1.05	1.25	420
Zambia	5.8	1.06	1.16	600
Ivory Coast	8.5	0.93	1.03	1,200
Congo	1.7	0.98	1.01*	1,110
Senegal	5.9	0.87	0.71	430
Cape Verde	0.3	0.58	0.56	340
Ghana	11.8	0.65	0.56	400
Angola	7.8	0.69	0.52	340
Tanzania	19.1	0.47	0.51*	280
Cameroon	8.7	0.51	-	880
Gambia	0.6	0.51	-	370
Malawi	6.2	0.46	0.50	200
Uganda	13.0	0.44	0.47	220
Mozambique	12.5	0.42	0.46	220
Comoros	0.4	0.41	0.45	320
Madagascar	9.0	0.38	0.42*	330
Liberia	1.9	0.50	0.39	520
Lesotho	1.4	0.46	0.38	540
Togo	2.7	0.44	0.37	380
Sudan	19.2	0.33	0.36	380
Somalia	4.4	0.35	-	280
Equatorial Guinea	0.3	0.35	-	180
Ethiopia	32.0	0.27	0.32	140
Sierra Leone	3.6	0.32	-	320
Benin	3.6	0.32	0.29	320
Guinea-Bissau	0.8	0.28	-	190
Mauritania	1.6	-	0.27	460
Nigeria	87.5	0.21	-	870
Cen. African Rep.	2.4	0.23	0.20	320
Guinea	5.6	0.18	-	300
Niger	5.7	0.15	0.17	330
Chad	4.5	0.16	-	110
Bourkina-Fasso	6.3	0.14	-	240
Burundi	4.2	0.13	0.12	230
Zaire	29.8	0.19	0.09	210
Mali	6.9	0.10	-	190
Rwanda	5.3	0.09	0.09	250

cations entities. In most instances, though, the organizations are controlled by Africans who know only the structure inherited at independence. This outmoded system of organization most often includes joint operation with the postal service, fragmented domestic and international operations, and domination by the central government.

Joint operation with the postal service in most countries results in extreme inefficiency. Among the more serious problems is the practice of diverting funds from telecommunications surpluses to postal subsidies. This procedure robs the telecommunications operation of desperately needed funds for capital investment. Moreover, the requirements of the two services differ widely with respect to the necessary number of staff for each, the level of personnel training and salaries, types of technology and maintenance, and financing (e.g., rates of return, operating ratios, debt load, etc.). Although there are several surface similarities between the two (i.e., natural monopolies, service to an infinite number of points, domestic and international responsibilities), the primary reason they remain united in most countries is simply one of inertia.

There is also no particularly good reason for the total separation of domestic and international operations (and this is almost always the case in Francophone Africa). This method of organization prevents the high-profit international services from contributing (even indirectly) to the development of the lower-profit domestic network. It also obstructs proper

decision-making in the areas of rates, internal finance, and provision of rural services (e.g., domestic satellite usage).

Perhaps the most grievous management and organizational difficulty, though, is over-regulation by the central government. A World Bank official has pointed out that numerous inefficiencies manifest themselves as a result of governments:

- Prohibiting or restricting competition, investment, and salary increases in the sector;
- Changing the senior management of the organization for political reasons or purposes;
- Placing authority for determining telecommunications investment with central planners or civil servants unfamiliar with the needs of the system; and
- Diluting the autonomy needed to "respond to changing market conditions" and meet demand. ^{14/}

In some African countries, control is so tight that the telecommunications entities are even barred from keeping their own accounting books. These and other examples of over-regulation have the effect of making the telecommunications organization a relatively undesirable place to be employed, diminishing financial and service performance, causing unreliability and inconsistency in budgets and investment levels, and creating a merry-go-round of feckless administrators lacking devotion to or accountability for the long-term success of the system, who in many cases are nothing more than political cronies.

Effective management is further eroded as entities cling to simple objectives and standards of the colonial era that are gone forever. Where, once, the need for developing telecommunications was to exert localized political control and to protect isolated economic interests, the requirements today are far broader and more complex. For the colonial administration the telecommunications "network" consisted of one or two lines running into the interior and several dozen connections in the largest city. Today a network must serve thousands of subscribers and usually several dozen communities outside the capital. Before independence, international service meant one, usually unsatisfactory, link with the imperial overlord. Now the telecommunications administration must set up links with a significant portion of the world's 165 nations, while simultaneously participating in several multilateral communications organizations. Fierce local competition between international equipment manufacturers, which would never have been allowed by a colonial administration, pressures African management into making irreversible, expensive decisions that they are little equipped for by training. As responsibilities multiply, middle-level management is overwhelmed by tasks beyond their capacity to perform, a lack of clear chains of command to superiors and between divisions, and extremely low morale among the technical and operating staff (see below).

All of these inefficiencies become more threatening to the organization as time passes. Without professional and consistent leadership, the problems transmit themselves to the subscriber in the form of deteriorating service, causing further management disarray, and perpetuating a cycle of structural vitiation.

Financial Regulation and Planning

The problems with management overlap into financial regulation and planning. Here, however, the central government looms even larger, since foreign exchange for the purchase of new equipment is the lifeblood of an expanding communications network. Each year, the telecommunications organization must lobby for foreign funds against much stronger opponents, such as the armed forces. The result is that telecommunications investment often receives a far smaller percentage of hard currency than needed for growth.

The effects of this lack of foreign currency are most apparent when important projects are deferred or cancelled (in nine recent AFDB telecommunications projects, foreign exchange usually comprised more than half of the investment required). The network is further affected since foreign exchange is needed for the purchase of spare parts.

Because of the relationship with the central government, the telecommunications entity cannot use its superior returns and profitability to attract capital or credit from outside sources. When loans are arranged by development banks, the rate of interest is contingent upon the credit-worthiness of the central government, which drives up the repayment costs of the telecommunications organization. And in many instances, central government planners misinterpret the value of generally healthy surpluses of local currency, and turn these surpluses into arguments against the need for increased treasury allocations.

On a broader scale, countries with a smaller population or per capita income (including almost all of Sub-Saharan Africa) have a limited and suppressed market for telecommunications services. Since they cannot normally profit from economies of scale, their costs are relatively high, necessitating extraordinary revenue generation. However, because most governments are politically geared towards the primary users of telecommunications services, rates are restricted and thus debilitate economic performance. The telecommunications entity often reacts by hiking the prices of less regulated peripheral services (installation, drop charges, equipment rental, etc.) and by cutting back supposedly non-essential functions (maintenance, planning, collections, marketing, etc.) These actions act as a barrier to new subscribers (suppressing revenue growth)

and decrease efficiency (reducing net income and subscriber satisfaction). Financial experts, if there are any employed by the entity, are seldom acknowledged (let alone given veto power) by administrators. Financial controls are disregarded or eliminated if they interfere with the political objectives of the government. Once again, a cycle of deteriorating service is born out of administrative and regulatory inefficiency.

Planning functions are less developed and even more abused. Many, if not most, African countries have no permanent planners or planning departments. Several planners, provided and paid for by the ITU in a few countries, have reported to the author that their ability to analyze trends is drastically impaired by the lack of historical traffic and telephone data and the mismanagement of financial records. Long-term planning is made nearly impossible by unreliable or inconsistent budget allocations, rate increases, and operating requirements.

When enough information does exist, analysis tends to be at a quite elementary level; for example, calculating the effects of a yearly revenue increase/decrease of 10 percent. Moreover, once a plan is developed, it is infrequently updated or reassessed. Also, planning in the telecommunications sector rarely includes discussion of other domestic economic forces competing for development assistance or foreign currency. This want of a broader scope

diminishes the plan's usefulness in determining overall strategy.

This endemic inability to obtain sufficient foreign currency resources, independently enter the capital and credit markets, and develop realistic financial and development plans, seriously hinders growth, financial performance and efficiency in the telecommunications organizations.

Financial Results

In the Sub-Saharan countries, financial performance is negatively affected by the difficulties in management, regulation, external finance, and planning mentioned earlier. A further serious problem, however ironic, is the misinterpretation of the very profitability of most telecommunications entities.

While most entities generate some net operating income, the amounts and manner in which it is generated are weak. In Figure 4*, recent financial results show about three-quarters of the selected countries with positive net operating income. Other statistics, however, indicate that these results are misleading. Operating ratios, or operating expenses as a percentage of revenues, are often used in financial analysis to demonstrate the strength or weakness of the ultimate operating result. The following are commonly accepted gradings for operating ratios:

* Note: Several non-African countries are provided for reference in some Figures.

FIGURE 4.

1982 TELECOMMUNICATIONS ORGANIZATION FINANCIAL RESULTS
IN SELECTED COUNTRIES

Country	Revenues (US\$xlmillion)	Operating Expenses (US\$xlmillion)	Net Operating Result (US\$xlmillion)	Operating Ratio	Operating Expense Per Line (US\$)
TANZANIA ^c	41.40	10.04	n.a.	0.24	244.8
MAURITANIA	1.01	0.26	n.a.	0.25	65.0
ZAMBIA ^a	43.24	11.95	5.51	0.28	341.4
ANGOLA	9.13	3.37	5.03	0.37	91.1
MALAWI	13.63	6.36	4.55	0.47	454.3
ETHIOPIA	33.82	17.39	3.86	0.51	225.8
SENEGAL	38.12	20.55	6.12	0.54	1,027.5
IVORY COAST ^b	43.65	23.96	11.21	0.55	630.5
MAURITIUS ^a	4.30	2.83	1.17	0.66	101.1
KENYA	75.23	50.40	9.02	0.67	572.7
ZIMBABWE	59.25	39.81	12.96	0.67	390.3
TOGO	6.67	4.77	0.07	0.72	596.3
SUDAN	10.56	8.11	1.06	0.76	172.6
MOZAMBIQUE	17.49	13.89	0.31	0.79	385.8
GHANA ^c	60.89	51.91	8.42	0.85	1,441.9
ZAIRE	9.17	7.98	Negative	0.85	295.5
LESOTHO	1.28	1.14	0.13	0.88	379.6
BOTSWANA	9.67	9.09	Negative	0.94	1,010.0
SWAZILAND ^a	4.54	6.36	Negative	1.21	1,060.0
C.A.R. ^a	1.24	1.98	Negative	1.59	990.0
CONGO	n.a.	n.a.	n.a.	-	-
NIGER	0.83	n.a.	n.a.	-	-
RWANDA ^b	3.32	n.a.	n.a.	-	-
UGANDA	n.a.	n.a.	n.a.	-	-
Others:					
THAILAND	222.47	62.39	84.90	0.28	124.3
MALAYSIA ^a	282.59	103.13	108.04	0.36	123.4
PHILLIPINES	241.40	99.59	25.44	0.41	128.5
SWITZERLAND	1,906.82	883.41	247.32	0.46	177.5
EGYPT	131.82	65.09	22.72	0.50	136.5
FRANCE	7,778.13	3,929.07	339.60	0.51	133.8
INDIA	777.27	410.40	244.65	0.53	135.9
UNITED STATES ^a	65,104.80	34,175.90	7,482.60	0.55	187.9
PERU	152.96	101.32	61.65	0.66	195.2

a 1981
b 1980
c 1979

0.40 - 0.50	Excellent
0.50 - 0.60	Good
0.60 - 0.65	Average
0.65 - 0.70	Below Average
0.70+	Poor to Unacceptable

A lower operating ratio is considered superior because it leaves enough room for other expenses (especially capital expenditure). A higher ratio squeezes other types of expense to an unreasonably low level and/or forces borrowing for non-investment purposes. Only a third of the countries shown can be considered excellent or good, while nearly half are poor or unacceptable*. Almost no countries outside of Africa have comparably high operating ratios (all other regions and almost all other countries, including those in low-income Asia, fall into the good-average categories).

There is also literally nowhere on earth with operating expenses as high per line as Sub-Saharan Africa. Even countries with equally large operating staffs, such as Egypt and India, keep their expenses per line well below \$200. The African countries shown average nearly \$600 per line, with several soaring over \$1000 per line. This, along with other factors, helps keep the operating ratio high and batters the profitability of most entities.

One final measure of past performance is the level at which revenues and expenses grow in relation to each other. Figure 5 shows that while revenues and operating expenses both rose quickly in the developing countries over a five-year period, in several of the

*Note: While an operating ratio below 0.40 is technically superior, it is possible that such a figure reflects a cash drain on the entity (where investment is low) or else an indication that an abnormally small amount is expended for salaries and/or maintenance.

INCREASES IN OPERATING EXPENSES AND REVENUES
(5 Year Average)

<u>Country</u>	<u>Period</u>	<u>Revenue Yearly % Increase (Compound)</u>	<u>Revenue Yearly % Increase (Compound)</u>	<u>Ratio</u>
Ethiopia	1977-82	17.7	42.8	0.4:1
Lesotho	1976-81	17.3	34.7	0.5:1
Togo	1977-82	28.6	29.4	0.9:1
Zimbabwe	1977-82	30.4	29.4	1.0:1
Angola	1975-80	35.8	30.1	1.2:1
Swaziland	1976-81	50.0	35.0	1.4:1
Tanzania	1976-81	46.1	32.1	1.4:1
Malawi	1977-82	22.5	13.6	1.7:1
Kenya	1977-82	44.7	25.1	1.8:1
El Salvador	1977-82	20.6	22.7	0.9:1
Colombia	1976-81	32.6	29.7	1.1:1
Uruguay	1976-81	47.2	42.6	1.1:1
Philippines	1977-82	18.8	15.9	1.2:1
Malaysia	1976-81	21.5	17.5	1.2:1
Indonesia	1976-81	36.2	22.8	1.6:1
Papua New Guinea	1977-82	18.4	9.6	1.9:1
United States	1977-82	12.0	13.7	0.9:1
Japan	1977-82	5.2	5.3	1.0:1
Switzerland	1977-82	3.8	3.5	1.1:1
France	1977-82	17.6	14.5	1.2:1

African countries operating expenses grew significantly more quickly. When the ratio between the two is 1.0:1 or below, operating expenses will begin to pre-empt a larger and larger share of revenues, driving up the operating ratio. This is far more significant in a developing African country than in an industrialized country (where ratios are also relatively low) both because operating ratios are far lower in industrialized countries than in Africa and because (growth-related) capital expenditure requirements are much lower as well.

The three measures of financial performance described above serve to illustrate that decisions and expectations cannot be based on income generation alone. Too many telecommunications administrators and government civil servants make the mistake of assuming "all's well" with an entity posting a positive operating result when, in fact, the system which produced the result is financially unhealthy.

Investment and Growth

Investment and growth are interrelated, and are at the same time contingent upon good planning and financial performance. As the African countries have been substantially less successful in their operations than those countries elsewhere in the world, their levels of investment and growth are also inferior.

Figure 6 shows the telecommunications investment of 21 Sub-Saharan countries in 1982. The African investment average of 0.15% of GDP is niggardly even when compared with the average of just under one-half of one percent in the industrialized countries,

FIGURE 6

1982 TELECOMMUNICATIONS INVESTMENT IN SELECTED COUNTRIES

Country	Telecommunications Investments (US\$millions)	Telecommunications Investments Per Capita (US\$)	GDP (US\$millions)	Telecommunications Investments % of GDP
African:				
BOTSWANA	8.1	9.00	790*	1.03
KENYA	35.2	1.95	5,340	0.66
SWAZILAND	2.6	3.71	590*	0.44
ZAMBIA	14.2	2.37	3,830	0.37
LESOTHO	1.1	0.79	300	0.37
SENEGAL	8.1	1.35	2,510	0.32
ETHIOPIA	12.7	0.39	4,010	0.32
IVORY COAST	22.6	2.54	7,560	0.30
ZIMBABWE	13.6	1.81	5,900	0.23
ANGOLA	5.2	0.65	2,741	0.19
MAURITIUS	1.3	1.44	940*	0.14
CONGO	2.6	1.53	2,170	0.12
NIGER	1.9	0.32	1,560	0.12
MALAWI	1.1	0.17	1,320	0.08
TOGO	0.5	0.18	800	0.06
TANZANIA	2.7	0.14	4,530	0.06
SUDAN	5.0	0.25	9,290	0.05
CENT. AFR. REP.	0.1	0.04	660	0.02
GHANA	2.9	0.24	31,220	0.01
MOZAMBIQUE	0.4	0.03	2,842	0.01
ZAIRE	<0.1	<0.01	5,380	<0.01
MAURITANIA	n.a.	-	640	-
RWANDA	n.a.	-	1,260 ^a	-
UGANDA	n.a.	-	8,360 ^a	-
Others:				
PERU	1,833.4	105.37	21,620	8.48
MALAYSIA	1,744.0	120.28	25,870	6.74
PHILLIPINES	1,677.7	33.09	39,850	4.21
EGYPT	210.0	4.74	26,400	0.80
SWITZERLAND	673.1	105.17	96,370	0.70
UNITED STATES	19,458.0	84.05	3,009,600	0.65
FRANCE	3,295.3	60.58	537,260	0.61
MOROCCO	53.9	2.66	14,700	0.37
INDIA	524.6	0.73	150,760	0.35
HUNGARY	64.0	5.98	20,710	0.31
THAILAND	1,088.9	22.45	36,790	0.30

* Estimate
a 1981

Data Sources: United Nations, Statistical Yearbook (New York 1983); World Bank, World Development Report 1984 (Washington, D.C. 1984); International Telecommunications Union, Yearbook of Common Carrier Statistics (Geneva 1984); and African Development Bank and country data.

which consist of stabilized, slow-growing networks. In comparison with other developing areas, Africa's level of investment is considered unacceptable. Latin America invests approximately 1.33 percent of their total GDP, while the Asian countries invest, on average, 0.93 percent of their GDP (between 6 and 9 times higher than Sub-Saharan Africa). An equally noteworthy comparison, with developing networks of the past, indicates a rate of investment ranging from 4 to 9 percent in the industrialized countries during the 1950's and even as high as 12 percent in Japan in 1964.^{15/} Several countries in Latin America and Asia match or exceed these levels of investment, but none of the Sub-Saharan countries come even within striking distance. An additional, parallel measure, per capita telecommunications investment is often thousands of times higher in individual countries of other developing regions.

While the overall level of investment is unhealthy, it is even more regrettable to note that as many as one third of the countries listed invest a smaller percentage of GDP in telecommunications than is generated in the form of operating income. Thus, in an absurd phenomenon, cash is actually drawn out of the telecommunications entity and transferred to other sectors of the economy.

It is no wonder, then, that telephone growth in Sub-Saharan Africa is far below growth in the world's other developing regions. In Figure 7, a summary of growth over a 10-year period for all of the world's regions and a breakdown of growth in

FIGURE 7

10 YEAR WORLD TELEPHONE GROWTH

Region/Country	Period	Telephones at End of Period (x1000)	Average Growth Rate Per Year (%)	Region/Country	Period	Telephones at End of Period (x1000)	Average Growth Rate Per Year (%)
Sub-Saharan Africa ^{a/}		<u>1,636.2</u>	<u>6.8</u>	North America ^{b/}	1973-81	198,694.0	4.1
Botswana	1973-82	16.6	24.4	Europe ^{c/}	1973-82	203,645.0	8.2
Seychelles	1974-82	8.3	21.8	Japan	1973-82	61,208.0	8.2
Nigeria	1971-80	149.2	18.3	Latin America ^{d/}	1973-82	24,235.0	14.7
Sao Tome & Principe	1975-81	1.5	18.1	Middle East ^{e/}	1973-82	6,132.0	16.8
Swaziland	1976-81	13.2	13.4	Asia ^{f/}		<u>19,198.9</u>	<u>13.0</u>
Djibouti	1973-82	6.4	13.4	S. Korea	1973-82	5,158.0	45.4
Ivory Coast	1973-80	87.7	12.3	Malaysia	1973-82	836.6	28.4
Rwanda	1973-80	4.6	12.0	Singapore	1973-82	852.0	26.7
Kenya	1973-82	216.7	11.7	Brunei	1973-81	22.0	22.8
Niger	1973-82	9.8	11.6	Indonesia*	1973-82	669.3	16.8
Somalia	1970-79	11.3	11.3	Philippines*	1973-82	775.6	14.4
Tanzania	1973-81	96.5	11.2	Bangladesh*	1973-79	104.0	14.2
Zimbabwe	1973-82	236.2	11.1	Nepal*	1973-82	17.4	14.0
Mauritius	1973-81	42.2	10.8	Hong Kong	1973-82	1,948.0	12.6
Angola	1975-81	40.3	10.0	India*	1973-82	3,019.0	11.0
Gambia	1973-79	3.2	10.0	Thailand*	1973-82	502.4	10.8
Lesotho	1973-79	5.3	9.3	Pakistan*	1973-81	358.0	10.5
Malawi	1973-82	31.0	9.3	Papua New Guinea*	1973-82	50.5	7.0
Bourkina Fasso	1973-79	8.6	8.9	Sri Lanka*	1973-82	105.8	6.6
Congo	1973-81	17.3	8.7	China*	1974-82	4,712.0	5.7
Cameroon	1972-78	36.0	8.7	Afghanistan*	1973-80	31.7	4.7
Ethiopia	1973-82	100.8	7.3	Burma*	1973-79	36.6	4.1
Uganda	1973-82	61.6	7.2				
Comoros	1973-80	1.8	7.1	*Low-Income Asia		10,382.3	8.0
Togo	1973-82	10.0	5.5	Low-Income Asia except China & India		2,651.3	12.1
Chad	1973-79	6.5	5.0				
Zambia	1973-82	67.2	4.7	a/ Total of 41 Sub-Saharan countries below			
Senegal	1970-79	38.7	4.5	b/ United States and Canada			
Ghana	1973-79	66.5	4.4	c/ 28 European countries (incl. the USSR)			
Benin	1973-80	10.3	4.3	d/ 25 Latin American countries (incl. Mexico and the Caribbean)			
Madagascar	1973-81	38.2	3.8	e/ 17 Middle Eastern countries (incl. N. Africa and Iran, excl. Israel)			
Sudan	1973-82	69.0	3.0	f/ Total of 17 Asian countries below			
Liberia	1974-79	7.5	2.7				
Burundi	1973-80	4.9	2.0				
Mozambique	1973-82	57.4	1.5				
Cape Verde	1975-82	1.7	1.4				
Sierra Leone	1974-79	10.5	1.4				
Mali	1970-79	5.7	1.0				
Guinea	1973-79	9.5	0.9				
Centr. African Rep.	1973-81	5.0	(0.3)				
Zaire	1973-82	27.2	(4.4)				

individual countries in Africa and Asia is provided.

The regional growth rate of Sub-Saharan Africa is strikingly low when compared with the three other developing areas, even more so when one considers its equality with or inferiority to the growth rates in the several industrialized, high density regions. In the case of low-income Asia, growth is nearly 20 percent higher per year, and with China and India omitted, growth is almost 80 percent above Sub-Saharan Africa's.

While it is obvious that higher growth rates will increase telephone density more quickly, the retarding effects of low growth go beyond expectations and are not always immediately apparent. To help explain this phenomenon, Figures 8 and 9 have been provided. A group of eight hypothetical countries, A-H, each begin with the same level of population but with varying levels of telephone density (0.1/100 to 70/100 -- roughly representing the world's range of telephone penetration). The uniform goal in each country is to add 1 telephone for each 100 citizens over a period of ten years (0.1 to 1.1, 0.2 to 1.2, etc.), while population grows at a steady three percent (the approximate rate of increase projected for Sub-Saharan Africa). The compound growth rates resulting for each hypothetical country can be identified on the graph in Figure 9. One sees that a country beginning with a low telephone density requires a pace of growth which increases almost geometrically as density decreases, while those with a higher need a growth rate only slightly higher than population growth.

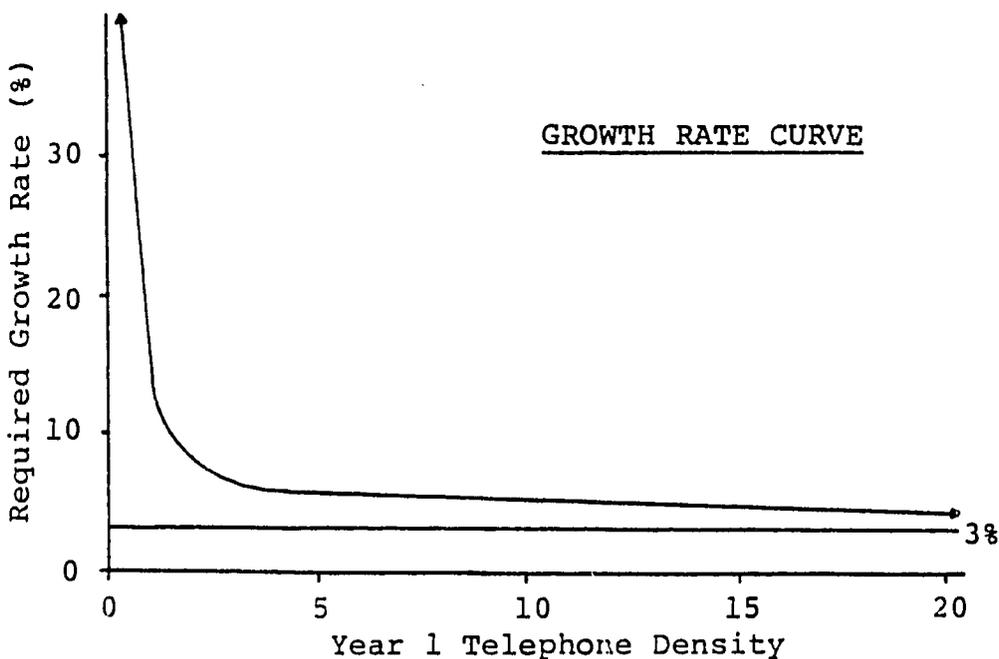
HYPOTHETICAL ANNUAL GROWTH RATES

Population, Year 1 = 5,000,000

Population, Year 10 = 6,523,866 (3% Growth)

	<u>Year 1</u> <u>Telephone Density</u> <u>(No. of Telephones)</u>		<u>Year 10</u> <u>Telephone Density</u> <u>(No. of Telephones)</u>		<u>Annual Percentage</u> <u>Growth Rate</u> <u>Required (Compound)</u>
A	0.1	(5,000)	1.1	(71,763)	34.4
B	0.2	(10,000)	1.2	(78,286)	25.7
C	0.5	(25,000)	1.5	(97,858)	16.3
D	1.0	(50,000)	2.0	(130,477)	11.2
E	2.0	(100,000)	3.0	(195,716)	7.8
F	5.0	(250,000)	6.0	(391,432)	5.1
G	30.0	(1,500,000)	31.0	(2,022,398)	3.4
H	70.0	(3,500,000)	71.0	(4,631,945)	3.2

FIGURE 9



If the growth rates and telephone densities of the regions and countries shown in Figure 7 are plotted on the growth rate graph, one finds that all of the regions other than Sub-Saharan Africa are growing at or better than the rate required to increase penetration by 1 percent over ten years. Of the individual African countries, less than a quarter are growing at an equivalent rate, and an even greater number are experiencing negative real growth (i.e., below population growth). In Asia, on the other hand, fully half of the represented countries grow above their required growth rates, and not one of them underwent negative growth.

The upshot of these growth and investment data is that the communications networks in Sub-Saharan countries are expanding at a far too sluggish pace, and in a shocking number of cases are actually contracting. To put this more dramatically, if population and numbers of telephones grow at their current pace, Africans will not achieve a telephone density of 1/100 until the year 2005, and it will not add a full percentage point of penetration until 2016 (see Annex 2).

Staff & Training

The number of staff employed in Sub-Saharan telecommunications entities is uniformly high, and their level of training uniformly low. The average number of telecommunications employees for each 1000 telephones

(see Figure 10) is 43, against approximately 6/1000 in North America and 9/1000 in Europe. The range in Sub-Saharan Africa of 23-191 (mean = 119/1000) compares very unfavorably with the range in Latin America of 9-42 (mean = 26/1000) and the range in Asia of 8-107 (mean = 58/1000). Much of the reason for the relatively higher levels of staffing is due simply to the smaller size of the developing country network, which limit the advantages of scale economies. Some observers claim that the high staff density results from the use of manual or step-by-step exchanges, but a World Bank publication refutes this contention by pointing out that "in the United States, until recently, almost 40 percent of the local plant still consisted of the most labor-intensive step-by-step local exchange equipment," at the same time maintaining a staff ratio of 5 per 1000 telephones.^{16/}

There are two supplementary realistic explanations for the remarkably high staff figures in Sub-Saharan Africa. First, the level of salaries in Africa for both operating and technical positions is extremely low. A relatively generous salary figure for an operator is about \$50/month, while middle-level technicians and administrators rarely receive more than \$150/month. In several countries, telecommunications workers face a monthly decline in real wages (Ugandan employees, according to that country's former PTT Director, have suffered a real decrease of almost 85 percent since 1977). As a result, the staff of the telecommunications entity sustains high turnover and low

NUMBERS OF EMPLOYEES AND RATIO OF EMPLOYEES
TO TELEPHONES IN SELECTED COUNTRIES

<u>Country</u>	<u>Number of Telecommunications Employees</u>	<u>Technical Staff (%)</u>	<u>Employees Per 1000 Telephones</u>
African:			
ZIMBABWE	5,630	42.1	23
SWAZILAND	299	67.6	23
SEYCHELLES	212	n.a.	26
MAURITIUS	1,117	78.5	27
IVORY COAST	2,879	49.2	33
TANZANIA	3,131	37.0	33
SENEGAL	1,396	n.a.	33
KENYA	7,461	13.5	34
ZAMBIA	2,356	57.0	35
MOZAMBIQUE	2,123	59.1	37
DJIBOUTI	244	47.1	38
UGANDA	2,410	45.1	39
ANGOLA	1,757	n.a.	44
SUDAN	3,137	72.2	46
ETHIOPIA	4,869	32.0	48
BOTSWANA	940	27.7	57
TOGO	604	25.9	60
GHANA	5,450	n.a.	82
MAURITANIA	374	47.9	85
RWANDA	518	30.7	112
SAO TOME	166	32.5	118
CENTRAL AFR. REP.	640	54.7	128
SIERRA LEONE	1,398	47.1	133
ZAIRE	4,796	22.7	177
NIGER	1,878	n.a.	191
CONGO	n.a.	n.a.	-
LESOTHO	n.a.	n.a.	-
MALAWI	n.a.	n.a.	-
Others:			
SWITZERLAND	16,647	59.4	3
UNITED STATES	963,360	47.9	5
FRANCE	162,383	44.4	6
MOROCCO	5,223	64.2	20
PERU	11,960	n.a.	23
THAILAND	15,282	37.5	30
MALAYSIA	29,810	68.2	36
PHILIPPINES	29,358	43.2	38
HUNGARY	59,000	n.a.	44
INDIA	258,187	n.a.	86
EGYPT	52,362	12.9	92
CHINA	504,100	30.1	107

morale and requires a larger number of less experienced personnel in order to operate. Second, telecommunications organizations in Africa are notorious breeding grounds of nepotism and patronage. In one example, a former official of the Office Nationale des Posts et Telecommunications Zairois told the author that at least half of the employees working in that organization have no job description and actually spend their time sleeping in offices of the administration building. Also, a telecommunications lending officer of the African Development Bank contends that in Sub-Saharan countries, an average of four to five people do the job of each worker in an industrialized country. This contention is supported by the extraordinary levels of operating staff in Sub-Saharan Africa (see Figure 10). In nearly half of the selected African countries, operating staff comprises more than 60 percent of total staff, and ranges up to 87 percent. The Sub-Saharan average compares very unfavorably with the average of about 50 percent operating staff in industrialized countries.

An additional malady of African telecommunications staff is their level of training. Since most countries have no planning department, there is a lack of training and employment planning. A much larger percentage of employees are unskilled than in other regions. Thanks to low morale and salary

levels, the entity has difficulty recruiting talented prospects for overseas training. And because of untrained administrators and financial officers, divisions are thrown into disarray and the entities become dependent on foreign personnel. The World Bank publication mentioned above reports that "dependence on foreign staff has on occasion led to unnecessary over-staffing at the most senior levels and to acute personnel crises in several countries, sometimes resulting in the virtual collapse of telecommunications operations." ^{17/} And yet, despite this, Sub-Saharan telecommunications entities continue to devote a miniscule portion of their budgets to training unless pressured by development banks or other lenders. They in turn are only too likely to send temporary experts and consultants into a country to evaluate problems and make recommendations, filling and then reopening huge organizational and operational gaps.

Equipment and Maintenance

Inadequate investment, low growth, and insufficiently trained staff slowly but surely erode the performance of telecommunications equipment in Africa. The average age of switching equipment, telephone apparatus, and cabling is well above its average age in industrialized countries and most developing countries in other

regions. More than a quarter of Sub-Saharan exchanges are manual, while only about 2 percent are electronic. In several countries, equipment purchased in the World War II era is still being used. Crossbar switching equipment acquired in the 1950's and early 1960's is the foundation of many networks. When one realizes that the average operating life of such equipment is estimated to be fifteen years, the poor service quality in Sub-Saharan countries becomes more understandable.

Of course, not all of the equipment in Africa is so antiquated. Yet the newer equipment is perhaps worse for Africa than the old. Because most of the officials charged with acquiring equipment are unfamiliar with the technology, they have relied on the manufacturers to make purchasing decisions for them. Inevitably, the manufacturers in many instances have chosen to "dump" their most obsolete and/or least popular equipment in those countries. The Deputy Director of the ITU's Technical Cooperation Division asserted in our interview that many African administrations, to avoid facing up to their real dilemmas, invest in "black magic boxes" that the vendors claim will "solve all of their problems." These "solutions" are, for the most part, nothing but chimeras and, more often than not, lead to the retirement of relatively new, but useless equipment.

It is not a simple task to keep this jumbled assortment of equipment in operating condition. One of the more unusual obstacles is the regular destruction or disabling of equipment in successful or attempted coups d'etat. Nigeria's central

telephone exchange was burned to the ground during Shehu Shagari's overthrow by the Nigerian Armed Forces, and other disillusioning examples abound. More commonplace are outages resulting from poorly insulated transmission cables; system congestion (see below); lack of spare parts; and deficient logistics (e.g., shortages of fuel supplies). Faults per line/year reach as high as 8 or more, and average more than ten times higher than in industrialized countries. Sometimes, technicians are completely occupied with the task of hooking up new subscribers, to the detriment of normal maintenance. In other cases, where maintenance is nearly non-existent and outages are very high (as in Ghana or Zaire), a parallel communications network, usually of high frequency radio equipment, is introduced. This, in turn, shrinks the subscriber base, deprives the network of revenue, and reduces the system's maintenance budget outlay -- yet another example of spiraling deterioration.

Supply and Demand

Despite the obsolete equipment and other inadequacies of the system, the demand for telecommunications in Sub-Saharan Africa invariably exceeds supply (see Figure 11). However, it would be a mistake to determine a system's needs based on the statistics shown. Because investment and growth are so low and the waiting times for service so unsatisfactory (usually two years and up), it requires a certain suspension of disbelief to actually apply for service. Thus, waiting lists do not reflect the magnitude of unsatisfied demand, having been distorted by the unexpressed

FIGURE 11

TELECOMMUNICATIONS SUPPLY AND DEMAND IN SELECTED COUNTRIES

Country	Telephones (x1000)	Main Lines (x1000)	Official Unmet Applications (x1000)	Total Demand (x1000)	Percentage of Satisfied Demand	Telephones Per 100 Population	Radio Receivers Per 100 Population
African:							
ANGOLA	40	37	n.a.	n.a.	-	0.52	1.9
BOTSWANA	17	9	2	11	78	1.76	8.9
C.A.R.	5	2	1	3	88	0.20	3.3
CONGO	13	7	n.a.	n.a.	-	0.81	6.1
ETHIOPIA	101	77	34	112	69	0.32	0.7
GHANA	67	36	16	52	69	0.56	10.5
IVORY COAST	88	38	8	45	83	1.03	15.5
KENYA	217	89	72	160	55	1.25	3.7
LESOTHO	5	3	1	4	74	0.38	1.9
MALAWI	31	14	2	16	91	0.50	2.5
MAURITANIA	4	4	0	4	97	0.27	6.4
MAURITIUS	42	28	18	46	61	4.68	22.3
MOZAMBIQUE	57	36	21	58	63	0.46	2.4
NIGER	10	7	1	8	88	0.17	2.0
RWANDA	5	3	1	4	87	0.09	1.8
SENEGAL	42	20	6	26	78	0.71	5.7
SUDAN	69	47	18	65	72	0.36	8.3
SWAZILAND	13	6	1	7	83	2.20	13.8
TANZANIA	97	41	29	70	58	0.51	1.9
TOGO	10	8	1	9	90	0.37	19.2
UGANDA	62	22	21	43	51	0.47	2.0
ZAIRE	27	31	n.a.	n.a.	-	0.09	0.5
ZAMBIA	67	35	18	53	67	1.16	2.2
ZIMBABWE	236	102	15	117	37	3.28	4.0
Others:							
EGYPT	567	477	629	1,106	43	1.30	13.6
FRANCE	29,373	19,327	186	19,513	99	54.13	33.0
HUNGARY	1,338	655	n.a.	n.a.	-	12.50	24.2
INDIA	3,019	2,295	593	2,888	79	0.43	3.3
MALAYSIA	836	585	189	774	76	6.10	11.9
MOROCCO	265	191	115	306	62	1.28	8.8
PERU	519	331	259	590	56	2.97	13.4
PHILLIPINES	775	481	132	613	78	1.54	4.3
SWITZERLAND	4,977	3,021	5	3,026	100	76.95	79.0
THAILAND	502	434	386	820	53	1.03	12.9
UNITED STATES	176,391	94,905	50	94,955	100	76.06	204.8
CHINA	4,712	n.a.	4	4,716	100	0.47	n.a.

desire for service of those who see no point in registering. In fact, the slowest growing networks are often the same ones indicating the highest satisfied demand and vice versa. In some respects the constraints on telephones are reflected in the penetration of radio receivers. Because radio ownership is basically unregulated, demand becomes solely a function of price. Thus radio penetration can be used as a relative yardstick to measure the effects of regulatory constraints. Indeed, the ten countries claiming the highest percentage of satisfied demand include eight of the bottom ten countries in terms of their radio receiver to telephone ratio.

The effects of the limited supply of telephones are also felt within the group already subscribing to a network. Since demand for telephone calling cannot be suppressed (i.e., one cannot be physically prevented from picking up the phone and dialing), the inadequate supply is manifested in the form of system congestion. Congestion results, for the most part, from insufficient equipment, equipment malfunction, misdials, and engaged (busy) telephones*.

*With respect to engaged telephones, an important distinction between African and industrialized networks exists, namely the "party line" (Zimbabwe's detailed and interesting presentation of the concept is presented in Annex 3). While the party line is sometimes in use, most telephone apparatus over the number of main lines in the industrialized countries comprise "extensions" (second or third telephones within a business or household). In many Sub-Saharan countries, on the other hand, these excess units are several individual subscribers connected jointly to a single line (thus, "party" line). In such a network, the busy tone often becomes the rule rather than the exception.

Technically, congestion is the final phenomenon in a series beginning with underinvestment in line capacity and over-estimation of successful first-try call completion, quickly followed by increasing traffic levels and unsuccessful call attempts. In a network experiencing congestion, the traffic level may be as much as 50 percent over capacity. And in many countries only a third of calls attempted are completed during peak usage periods. As mentioned earlier, rates for telephone service (high subscription charges and low call charges) are structured in a manner that narrows the revenue base, and discourages capacity expansion, while simultaneously encouraging higher traffic levels. The combination leads to a useless cycle of repeated unsuccessful attempts, continually increasing traffic load, and so on.

Service to Rural Areas

More than 80 percent of the Sub-Saharan population resides outside the major urban centers, yet they have access to only 12 percent of the region's telephones. The average urban area in Africa has a telephone density close to 75 times greater than the average rural area (see Figure 12). The economic and social consequences of such a disparity are compounded by parallel disparities in almost all of the other development sectors. Furthermore, the lack of services fuels the continuing process of urbanization.

COMPARATIVE TELEPHONE PENETRATION IN URBAN AND RURAL AREAS
OF SELECTED AFRICAN AND DEVELOPED COUNTRIES

Country	Rural Population %*	Telephones Per 100 Population**		
		National	Urban	Rural
Zimbabwe	76	3.28	13.10	0.60
Swaziland	8	2.20	6.40	0.80
Kenya	85	1.25	8.50	0.19
Zambia	55	1.16	2.30	0.20
Ivory Coast	58	1.03	5.40	0.01
Congo	54	1.01	1.90	0.12
Senegal	66	0.71	2.90	0.03
Angola	78	0.52	2.90	0.08
Tanzania	87	0.51	5.60	0.04
Cameroon	63	0.51	1.70	0.07
Gambia	50	0.51	0.60	0.40
Malawi	90	0.50	2.40	0.31
Uganda	91	0.47	3.30	0.13
Lesotho	87	0.38	11.00	0.13
Sudan	77	0.36	1.80	0.04
Ethiopia	85	0.32	2.00	0.02
Nigeria	79	0.21	0.90	0.02
Bourkina-Fasso	89	0.14	1.50	0.01
Burundi	98	0.12	1.90	0.04
Mali	81	0.10	0.50	0.02
<hr/>				
United States	22	83.73	86.05	81.73
Sweden	12	79.60	95.02	71.03
Switzerland	31	72.45	84.22	64.93
Canada	24	67.11	80.95	57.50
Denmark	15	63.61	80.96	52.90
Australia	11	52.58	58.53	39.57
United Kingdom	9	49.67	63.23	44.04
Japan	22	49.40	57.05	41.83
Germany (FRG)	15	46.31	63.85	39.73
France	21	45.88	83.46	40.94
Italy	30	33.72	49.07	25.09
Spain	24	31.00	57.67	23.93
U.S.S.R.	37	8.89	28.31	6.66

* 1982, Source: World Bank, World Bank Development Report 1984 (Washington D.C. 1984).

** National, 1982 except Swaziland, Ivory Coast, and Tanzania (1981), and Cameroon, Gambia, Nigeria, and Mali (1979). Urban/Rural, all 1978-1980, Source: ITU, Appropriate Modern Telecommunications Technology for Integrated Rural Development in Africa (Geneva, 1981), and Robert Saunders et al., Telecommunications and Economic Development (Baltimore, 1983).

Ironically, rural telecommunications has become a problem with too many solutions. Because the provision of such services is closely tied to the concept of assisting the poorest half of African populations, it stirs the least controversy with respect to funding among development intellectuals. However, the sanction of some degree of funding has simply spurred the genesis of dozens of suggestions for improvement, some practical and others not. The most promoted, and perhaps the most unrealistic, is the idea of boosting an African regional satellite into space. The cost of such a plan (including spares) is estimated to be between \$200 and \$300 million initially ("off-the-shelf") and upwards of \$4 million annually for the space segment only. When one considers that the annual total investment in all forms of African telecommunications is well under the one-time figure for a satellite and that existing international capacity is severely underused, the financing prospects are not good (let alone the fearsome political difficulties that would go along with a fifty or sixty country negotiating parley).

Another idea in the same vein is an earth station plan proposed by experts connected with the European Space Agency, which would put a small dish in most larger villages. If one estimates a need for about 30,000 earth stations (one for every ten African villages), a conservative estimate as to cost would be about \$3 billion (30,000 x \$100,000*). Aside from considerations of cost

* Average cost per earth station is taken from an ITU report 18/; lower estimates generally assume bulk purchases (whereas actual purchases would probably be spaced over a long period), no recovery of research and design costs, and no charges for transportation to site or installation.

the major technological leap required in terms of power provision and voice/data transmission quality make the small earth station an idea whose time has not yet come. (see also UAPT below)

There are, in fact, some reasons to restrain a full-scale move into rural telecommunications investment (but not precluding a more measured involvement):

- Rural operating (primarily maintenance) and transmission costs are higher and usage lower than in urban areas. Thus, operating expenditures will climb as return on investment declines, making access to financing more difficult.
- While economies of scale are limited in urban Africa, they are nearly non-existent in rural Africa.
- Current service quality and financial performance are, in general, so poor that priority should be given to stabilizing and improving standards, investment, and growth in existing networks.

A final, and critical, dilemma is that the frenzied external interest in rural telecommunications had obviated the need, in the minds of many Sub-Saharan policy-makers, for creative and perhaps less technologically glamorous means to wider service.

International Service

International telecommunications, while inadequate, is often slightly better than domestic telecommunications. This stems in many instances from the earlier described organizational separation of the two types of service; the high profits from overseas calls (as much as 100 percent return) permit a somewhat higher level of investment and maintenance expenditures (however, investment

rarely meets the need for additional long distance circuits and/or transponder capacity).

International services are delivered by two distinct methods, satellite and terrestrial links. Generally, the former provides the profits and the latter, the problems. There are however, some difficulties at the satellite end. First, a majority of African countries use only the INTELSAT Atlantic Ocean satellites (27/42), while about one-fifth use only the Indian Ocean satellites (Botswana, Burundi, Djibouti, Madagascar, Rwanda, Somalia, Zambia). Only seven countries have access to both types of satellite. For the countries without access to both (and those countries making a large number of calls to them) a multiple hop is required, which reduces transmission quality and ease of connection, and at the same time drives up access charges. A second problem is the uneconomic use of satellite earth stations. Sub-Saharan Africa has a total of 174 stations (of which 39 are INTELSAT Standard A (30m), 25 are Standard B (11m), and 110 are non-standard), or an average of 4 per country (1 per 2 million population). By comparison, Sweden, Denmark, and Norway, with 17.5 million people, and a tremendously higher traffic level, share just one earth station located in Sweden. ^{19/} Even considering the political problems in the region, these purchases are simply wasteful and (like their often showy international airports) appear to be motivated primarily by a need for prestige. This plethora of stations entails the expenditure of hundreds of thousands of dollars for each year's additional management and upkeep, when about one-tenth the number would be sufficient.

The problems of the terrestrial network, though, are far more dreadful. For more than twenty years, the ITU and others have been trying to build up the African inter-country links, with meager success. Today there are still 30 Sub-Saharan countries (of 39) without direct communications across at least one of their borders* (see the map in Annex 4). This results in such absurd call connections between neighboring countries as the following:

- Khartoum(Sudan) - Addis Ababa(Ethiopia) through London/Rome;
- Lusaka(Zambia)-Harare(Zimbabwe) through Sweden;
- Libreville(Gabon)-Brazzaville(Congo) through Paris;
- Kampala(Uganda)-Bujumbura(Burundi) through Brussels/Nairobi;
- Kinshasa(Zaire)-Luanda(Angola) through Brussels/Libson.

Perhaps the saddest example is that a call from Accra, Ghana to Lome, Togo -- a distance of 100 miles -- travels first through London and Paris for a total trip of over 7000 miles (with access charges to match). Too often, even existing links are disregarded and calls continue to pass through the European capitals because tariff and exchange arrangements between the users have been ignored or because pressure has been brought to bear against their use by European administrations not eager to lose the access revenues. Some progress has been made by the ITU in planning and surveying additional lines (see Annex 5), but the funds needed to complete a comprehensive network and the desire (at both the African

*Includes these 34 frontiers: Mali-Mauritania, Niger-Mali, Niger-Chad, Chad-Sudan, Sudan-Ethiopia, Ethiopia-Somalia, Somalia-Kenya, Guinea-Bissau-Guinea, Guinea-Senegal, Ivory Coast-Guinea, Ivory Coast-Mali, Ivory Coast-Ghana, Ghana-Togo, Ghana-Bourkina-Fasso, Nigeria-Niger, Cameroon-Nigeria, Chad-Cameroon, Central African Republic-Chad, C.A.R.-Sudan, C.A.R.-Zaire, C.A.R.-Congo, C.A.R.-Cameroon, Gabon-Congo, Kenya-Sudan, Uganda-Sudan, Tanzania-Burundi, Tanzania-Malawi, Tanzania-Mozambique, Zimbabwe-Botswana, Zaire-Zambia, Angola-Zaire, Angola-Zambia, Angola-Congo, Gabon-Cameroon.

and European levels) to dispense with the anachronism of trans-hemispheric call connections have not been forthcoming.

Overview

Sub-Saharan Africa's communications deficiencies, as described above, are almost overwhelming in their pervasiveness and complexity. Among the most damaging defects, apparent in all but a handful of cases, are:

- 1) Organizational weakness and inadequate management stemming from improper sector definition, fragmentation of operations, and obsolete procedures and objectives;
- 2) Oppressive regulation by the central government, which includes: restrictions on sector competition, investment, and salaries; insufficient autonomy; disregard for normal business practices; intervention in technical decision-making; and politicizing senior management;
- 3) Insufficient allocation of financial resources to the sector;
- 4) Lack of scale economies in most individual countries because of small populations and per capita incomes;
- 5) A serious shortage of planners in combination with mismanaged or non-existent records, and the consequent inability to produce financial and development plans;
- 6) Weak financial performance, including high operating expenses per line and operating ratios;
- 7) Meager and/or inconsistent levels of sector investment, in many instances less than the income generated internally;
- 8) Torpid rates of telephone rates of telephone penetration growth (averaging 6.8% per year), including a high percentage of countries with contracting telecommunications sectors;

- 9) Tremendous numbers of employees per thousand lines of which a relatively small percentage are technicians;
- 10) Insufficiently trained staff and overreliance on consultants and expatriates;
- 11) Outdated and/or inappropriate equipment, often retired before or well after the completion of normal service life, as well as extremely poor maintenance;
- 12) Undersupply of connections to the population at large, and undersupply of capacity to subscribers;
- 13) Concentration of services and capacity in (and sometimes on routes between) major cities;
- 14) Inefficient international service and lack of direct intra-continental connections.

In every one of these fourteen component areas, Sub-Saharan Africa is the weakest of the world's regions, which largely explains the penetration gap between it and the other developing areas. Within Africa, there is a high correlation between higher performance in the various operational measures and higher telephone density. In the case of five "leading" indicators (Investment, Growth, Operating Ratio, Staff Ratio, and Rural Service), those countries appearing more than once among the top ten performers are: Swaziland(4), Kenya(4), Zambia(4), Zimbabwe(4), Ivory Coast(4), Angola(3), Senegal(3), Malawi(2), Mauritius(2), Botswana(2), and Seychelles(2). These include 8 of the top 10 countries in terms of telephone density (and all 11 are in the top twenty). Those countries repeating among the bottom ten in the five areas are: Zaire(4), Central African Republic(4), Sudan(4), Ghana(3), Mozambique(3),

Togo(3), Burundi(2), Rwanda(2), Sierra Leone(2), Mali(2), and Tanzania(2). These include 7 of the bottom 10 telephone densities (9 of 11 are in the bottom twenty).

There are several other points, relevant to inter-African service disparities, to note:

- Island republics are consistently represented among the best performing telecommunications entities. Because they have little or no other means to maintain contact with scattered territories and nearby mainland countries, they are forced to give the telecommunications sector higher priority.
- Several countries with large populations (such as Kenya, Nigeria, Ethiopia and Tanzania) perform somewhat better in operating areas than in other measures as a result of limited scale economies.
- Members of the Communité Franco-Africaine (CFA) and the "Rand Zone" (South African currency area) are often among the top ten or so countries in the various indicators. This is because their currencies are freely convertible on the exchange markets, allowing these countries, in effect, to purchase equipment and services without export generated finance or hard currency loans. This ability brings acquisition more closely in line with needs. (Note: This does not apply for the most part to the five landlocked CFA members. Their subsistence economies along with other problems outside the sector make this advantage essentially irrelevant.)
- Geographically, the southern African countries perform consistently better as a group than other areas. This results from their relationship (overt and otherwise)

with the South African economy and transport system, and the consequent need for a higher level of telecommunications. Other relatively strong areas are the oil-exporting west/southwest coast between Nigeria and Cabinda (Angola) and the inland access nations (i.e., with important trade brokerage and port facilities) of Senegal, Ivory Coast, and Kenya.

- Countries with telecommunications entities reorganized as corporations (such as Kenya, Zambia, Zimbabwe, Botswana and Angola) have superior levels of performance as a result of increased autonomy and responsibility, leading to more efficient levels of investment, growth, staff, planning, etc.

In about 80 percent of the region, though, the status of telecommunications organizations, policies, and services is so unsatisfactory as to make it questionable if the situation can be significantly improved (or the deterioration reversed) in anything less than several decades by the countries themselves. It seems clear enough that these countries have been able to make little headway in either creating an environment for efficient and profitable operation, meeting demand, acquiring and using appropriate technology, serving all segments of their populations, or enabling effective communications with fellow Africans. If the bureaucrats and politicians were to become as worried about telecommunications as the generals seem to be, the networks might quickly be transformed. Failing that, it appears that future initiatives (and particularly financing) will have to spring from agencies outside the individual African countries. It is to these "external" forces that the report now turns.

II. EXTERNAL INFLUENCES ON SUB-SAHARAN TELECOMMUNICATIONS

The many external actors in the telecommunications sector of Sub-Saharan Africa have shaped it in their image as much, if not more than, the Africans have shaped it themselves. The colonial powers were, of course, the first of these influences; the multinational corporations, the commercial attaches, the expatriates and consultants, the development bankers, and the international experts are simply the latest.

Their transience, however, does not diminish their importance. In fact, more than half of the regional investment in telecommunications come from these sources already, and the figure has been trending upwards over the last five years. In several countries, they are the only motivating influences in the sector. Finally, almost all of the expertise needed to expand and improve the internal and international networks continues to come from non-Africans.

There are essentially two broad types of external organizations that influence the sector in Sub-Saharan Africa. First are the multilateral institutions. They have been active in developing telecommunications on the continent since the early days of independence. Their interest has not been spurred primarily by self-interest or profits. And perhaps most importantly, the African countries are members of these organizations and influence their policies just as their policies influence Africa.

The second type of organization is the bilateral institution. In Africa these are basically comprised of Western government donor and commercial agencies and the multinational equipment producers. In each country, the interest of government and business are often intertwined, as the fierce competition in developing countries has borne out. Their interest in telecommunications has not always been one of development, although several donor agencies have begun to come around to this thrust.

The part that is played in Sub-Saharan Africa by the many multilateral and bilateral institutions is outlined below.

A. Multilateral Institutions

"...There is significant evidence that the role of multilateral institutions... in assisting developing countries with telecommunications investment programs is in many cases not replaceable by other agencies or groups."

- The World Bank
Financing of Telecommunications
Expansion 20/

The multilateral institutions have played an important role in increasing telecommunications sector investment and in boosting a general awareness of the technology. They were among the first to recognize telecommunications as a legitimate economic tool for development. And they have been among the few sources of unbiased technical and financial information and independent assistance in equipment selection.

In Africa, the most important of these institutions during the past decade have been the:

- World Bank Group
- International Telecommunications Union
- International Telecommunications Satellite Organization
- Economic Commission for Africa
- Pan-African Telecommunications Network (PANAFTTEL)
- African Development Bank Group
- Union Africaine des Postes et Telecommunications
- Banque de Developpement des Etats de l'Afrique Centrale
- Banque Ouest-Africaine de Developpement
- Economic Community of West African States
- Southern African Development Coordination Commission

These organizations vary greatly in the degree to which they devote resources to telecommunications, both in terms of percentage and in dollar amounts. They also differ with respect to organization, policy, and strategy. To aid in better understanding the involvement of each institution and their distinctions, a description of their activities follows.

World Bank Group

The World Bank Group includes the International Bank for Reconstruction and Development (IBRD), the International Development Association (IDA) and the International Finance Corporation (IFC).

The IBRD (often referred to as simply the "World Bank") was established in 1945, primarily to assist in the postwar

reconstruction of Europe. Beginning in the early 1960's, the primary mission of the Bank became that of raising standards of living and accelerating economic development in the dozens of newly independent nations. The IBRD is owned by its 144 member governments (including 43 Sub-Saharan nations) who subscribe to capital shares in the Bank. The ten largest subscribers, in terms of voting power, are:

1. United States	19.58%
2. Germany (FRG)	6.61%
3. Japan	6.58%
4. United Kingdom	5.01%
5. France	4.55%
6. China	4.53%
7. India	4.37%
8. Italy	3.79%
9. Netherlands	2.94%
10. Canada	7.71%

The industrialized world controls a total of roughly two-thirds of the capital shares. However, the Bank finances most of its continuing lending operations through placements in world capital markets, retained earnings, and repayments on past loans.

According to its charter, the IBRD must make loans only for productive purposes and must stimulate growth in the countries where it lends. Lending decisions must be based on economic considerations and pay due regard to the likelihood of repayment. Finally, loans must be made to or guaranteed by a government.

In fiscal year 1983, lending commitments by the IBRD totaled \$11.1 billion, directed toward the more advanced developing countries. Loans totaled \$10.3 billion in fiscal year 1982. The average grace period of the loans outstanding was 4.3 years, the rate of interest was 11.7%, and the repayment period approximately 14 years.

Figure 13 shows the cumulative lending of the IBRD through the 1983 fiscal year. Of the \$89.6 billion loaned since 1945, Sub-Saharan Africa has borrowed \$8.5 billion or 9.5 percent. Telecommunications represents 1.8 percent of total Bank lending, and 2.5 percent of loans to Sub-Saharan Africa.

The Group's second principal affiliate is the International Development Association. Established in 1960, for essentially the same purposes as the IBRD, the IDA directs its assistance toward poorer developing countries and its loans are structured on more lenient terms. Membership is open to members of the IBRD, 131 of which have joined to date (including 42 Sub-Saharan nations). The IDA is controlled on the basis of subscriptions much like the IBRD. However, membership is divided into two categories. "Part I" members, which subscribe in freely convertible currencies, include most of the industrialized countries and a few oil-producing Arab states. They subscribe to 95.6 percent of the total shares (the industrialized nations' share is 93.5 percent; the largest is the U.S. with 34 percent). "Part II" members, including all of the African countries, subscribe to the remaining 4.4 percent in their local currencies. Besides these subscriptions, IDA funds

**IBRD CUMULATIVE LENDING OPERATIONS
BY MAJOR PURPOSE AND REGION, JUNE 30, 1983**

Expressed in US\$ millions

Purpose ²	IBRD loans to borrowers, by region ¹						Total
	Eastern Africa	Western Africa	East Asia and Pacific	South Asia	Europe, Middle East, and North Africa	Latin America and the Caribbean	
AGRICULTURE AND RURAL DEVELOPMENT							
Agricultural credit	\$ 30.0	\$ 3.5	\$ 326.5	\$ 200.0	\$ 1,242.9	\$ 921.4	\$ 2,724.3
Agriculture sector loan	5.6	9.0	19.3	26.3	2.3	22.7	85.2
Agroindustry	—	—	145.8	—	789.5	807.8	1,743.1
Area development	155.5	764.9	1,056.9	197.0	859.5	1,612.7	4,646.5
Fisheries	—	—	68.2	14.0	48.0	16.2	146.4
Forestry	70.0	66.0	8.5	—	213.5	22.0	380.0
Irrigation and drainage	78.2	32.0	2,263.9	278.4	1,618.6	1,405.3	5,676.4
Livestock	11.8	32.6	48.0	10.0	226.0	957.0	1,285.4
Perennial crops	57.4	437.5	852.1	—	108.0	89.0	1,544.0
Research and extension	—	—	318.1	25.0	12.7	363.0	718.8
Total	\$ 408.5	\$ 1,345.5	\$ 5,107.3	\$ 750.7	\$ 5,121.0	\$ 6,217.1	\$ 18,950.1
DEVELOPMENT FINANCE COMPANIES	\$ 302.6	\$ 239.3	\$ 2,320.5	\$ 1,076.2	\$ 2,829.3	\$ 2,395.7	\$ 9,163.6
EDUCATION	\$ 157.1	\$ 155.6	\$ 1,217.6	\$ —	\$ 1,025.8	\$ 641.7	\$ 3,197.8
ENERGY							
Oil, gas, and coal	\$ 30.6	\$ 106.5	\$ 837.6	\$ 1,114.5	\$ 758.8	\$ 292.5	\$ 3,140.5
Power	896.5	571.0	3,850.4	1,577.0	2,835.3	6,326.3	16,056.5
Total	\$ 927.1	\$ 677.5	\$ 4,688.0	\$ 2,691.5	\$ 3,594.1	\$ 6,618.8	\$ 19,197.0
INDUSTRY							
Engineering	\$ —	\$ —	\$ 10.0	\$ —	\$ 11.0	\$ —	\$ 21.0
Fertilizer and other chemicals	—	—	193.9	519.5	481.4	583.5	1,778.3
Industry sector loan	5.1	0.6	322.4	212.0	743.7	302.8	1,586.6
Iron and steel	—	20.0	—	189.0	512.8	667.0	1,388.8
Mining, other extractive	137.5	191.0	—	—	167.8	532.5	1,028.8
Paper and pulp	30.0	12.0	5.5	104.2	204.0	20.0	375.7
Textiles	63.0	—	157.4	—	272.6	—	493.0
Total	\$ 235.6	\$ 223.6	\$ 689.2	\$ 1,024.7	\$ 2,393.3	\$ 2,105.8	\$ 6,672.2
NONPROJECT							
POPULATION, HEALTH, AND NUTRITION	\$ 372.9	\$ 260.0	\$ 1,579.3	\$ 60.0	\$ 2,699.9 ³	\$ 498.4	\$ 5,470.5
SMALL-SCALE ENTERPRISES	—	99.7	367.8	—	276.0	833.6	1,577.1
TECHNICAL ASSISTANCE	1.0	74.0	13.0	—	8.8	44.8	141.6
TELECOMMUNICATIONS	166.3	61.8	373.4	267.5	299.8	433.3	1,602.1
TOURISM	17.0	37.5	25.0	—	96.6	187.5	363.6
TRANSPORTATION							
Airlines and airports	\$ 49.0	\$ 10.0	\$ 9.2	\$ 5.6	\$ 7.0	\$ 218.5	\$ 293.3
Highways	372.1	704.4	2,187.1	39.9	1,970.4	3,543.7	8,817.6
Pipelines	—	—	—	37.0	57.5	23.3	117.8
Ports and waterways	84.9	194.8	715.3	109.8	1,138.3	279.0	2,522.1
Railways	450.2	183.8	748.4	755.1	742.5	1,338.5	4,218.5
Transportation sector loan	28.0	25.0	261.2	—	137.0	44.0	495.2
Total	\$ 984.2	\$ 1,118.0	\$ 3,921.2	\$ 947.4	\$ 4,052.7	\$ 5,447.0	\$ 16,470.5
URBANIZATION	\$ 83.0	\$ 132.8	\$ 751.1	\$ 49.1	\$ 291.0	\$ 942.5	\$ 2,249.5
WATER SUPPLY AND SEWERAGE	\$ 139.2	\$ 295.5	\$ 747.6	\$ —	\$ 1,128.0	\$ 1,937.5	\$ 4,247.8
GRAND TOTAL	\$ 3,794.5	\$ 4,720.8	\$ 21,977.5	\$ 6,867.1	\$ 23,845.3	\$ 28,411.0	\$ 89,616.2

¹ Except for the total amount shown in footnote 4, no account is taken of cancellations and refundings subsequent to original commitment. Amounts of cancellations and refundings are shown by country and purpose in the Statement of Loans and of Development Credits. IBRD loans of \$1,167.7 million to IFC are excluded.

² Operations have been classified by the major purpose they finance. Many projects include activity in more than one sector or subsector.

³ Includes \$497 million in European reconstruction loans made before 1952.

⁴ Cancellations, terminations, and refundings amount to \$2,868.9 million for the IBRD and \$552.4 million for IDA, totaling \$3,421.3 million. This amount includes \$46.1 million of loans and \$175.8 million of credits made to Pakistan in earlier years for development projects in its former eastern wing, now Bangladesh. The loans and credits were reactivated, in revised form, as commitments to Bangladesh.

Source: World Bank Annual Report, 1983.

come in the form of capital replenishments at irregular intervals (which become incorporated into share holdings) and more regular transfers from IBRD earnings.

IDA assistance is concentrated in countries with an annual GNP per capita of less than \$796, making more than fifty countries eligible. IDA funds are allocated to eligible countries in the form of credits, with ten-year grace periods, fifty-year maturities, and no interest (but borrowers are charged management fees of 0.5 - 0.75 percent). In fiscal year 1983, \$3.3 billion was committed by the IDA, up from \$2.7 billion in 1982.

Figure 14 shows the cumulative lending of the IDA through the 1983 fiscal year. Of the \$30 billion credited since 1960, Sub-Saharan Africa has received \$7.8 billion, or 26.1 percent. Telecommunications represents 3.5 percent of total credits, and 1.9 percent of commitments to Sub-Saharan Africa.

The third member of the Bank Group, the IFC, was established in 1956 in order to assist in the development of less-developed countries by stimulating the flow of capital into private and mixed enterprises, which it accomplishes with its own funds, through the syndication of its own loans, or by attracting parallel financing from international capital markets. However, since the IFC is concerned primarily with financing in the private sector, government ownership of most telecommunications entities precludes their involvement. Thus, the IFC has been

FIGURE 14

**IDA CUMULATIVE LENDING OPERATIONS
BY MAJOR PURPOSE AND REGION, JUNE 30, 1983**

Expressed in US\$ millions

Purpose ²	IDA credits to borrowers, by region ¹						Total
	Eastern Africa	Western Africa	East Asia and Pacific	South Asia	Europe, Middle East, and North Africa	Latin America and the Caribbean	
AGRICULTURE AND RURAL DEVELOPMENT							
Agricultural credit	\$ 189.5	\$ 42.4	\$ 68.7	\$ 1,497.9	\$ 104.2	\$ 23.5	\$ 1,926.2
Agriculture sector loan	28.0	4.5	75.7	150.0	—	—	258.2
Agroindustry	180.7	—	—	384.9	63.0	10.0	638.6
Area development	567.2	415.6	192.3	638.0	82.7	32.0	1,927.8
Fisheries	25.0	1.3	10.6	55.7	54.1	—	146.1
Forestry	97.4	48.9	—	255.7	—	4.0	406.0
Irrigation and drainage	429.2	130.9	271.2	3,118.5	395.7	18.5	4,364.0
Livestock	200.7	100.0	10.6	90.6	49.5	67.5	518.9
Perennial crops	150.6	131.5	166.8	126.0	15.0	3.2	593.1
Research and extension	25.5	19.5	72.0	362.0	6.0	—	485.0
Total	\$1,893.8	\$ 894.6	\$ 867.3	\$ 6,679.3	\$ 770.2	\$158.7	\$11,263.9
DEVELOPMENT FINANCE COMPANIES	\$ 209.9	\$ 67.0	\$ 56.5	\$ 269.5	\$ 93.0	\$ 27.2	\$ 723.1
EDUCATION	\$ 598.0	\$ 280.1	\$ 371.8	\$ 212.8	\$ 250.9	\$ 57.6	\$ 1,771.2
ENERGY							
Oil, gas, and coal	\$ 93.3	\$ 64.0	\$ 3.0	\$ 131.2	\$ 61.0	\$ 18.0	\$ 370.5
Power	170.8	100.0	126.0	2,676.3	261.4	128.8	3,463.3
Total	\$ 264.1	\$ 164.0	\$ 129.0	\$ 2,807.5	\$ 322.4	\$146.8	\$ 3,833.8
INDUSTRY							
Engineering	\$ 4.3	\$ —	\$ —	\$ —	\$ —	\$ —	\$ 4.3
Fertilizer and other chemicals	4.0	13.4	35.0	895.0	21.4	—	968.8
Industry sector loan	1.2	—	—	28.5	18.7	—	48.4
Iron and steel	—	—	—	—	—	—	—
Mining, other extractive	13.5	—	—	16.0	—	7.5	37.0
Paper and pulp	50.0	—	—	—	—	—	50.0
Textiles	20.0	—	—	—	7.0	0.0	27.0
Total	\$ 93.0	\$ 13.4	\$ 35.0	\$ 939.5	\$ 47.1	\$ 7.5	\$ 1,135.5
NONPROJECT	\$ 412.5	\$ 110.0	\$ —	\$ 2,586.6	\$ 35.0	\$ 22.0	\$ 3,166.1
POPULATION, HEALTH, AND NUTRITION	\$ 41.8	\$ 15.0	\$ 86.3	\$ 164.2	\$ 57.7	\$ —	\$ 365.0
SMALL-SCALE ENTERPRISES	\$ 19.2	\$ 63.5	\$ 56.5	\$ 151.0	\$ 2.3	\$ —	\$ 292.5
TECHNICAL ASSISTANCE	\$ 102.6	\$ 70.7	\$ 25.0	\$ 58.5	\$ 6.9	\$ —	\$ 263.7
TELECOMMUNICATIONS	\$ 101.6	\$ 44.6	\$ 12.8	\$ 804.2	\$ 83.0	\$ —	\$ 1,046.2
TOURISM	\$ 14.0	\$ 4.0	\$ 16.0	\$ 4.2	\$ 48.5	\$ —	\$ 86.7
TRANSPORTATION							
Airlines and airports	\$ 9.0	\$ 5.0	\$ —	\$ —	\$ 2.5	\$ —	\$ 16.5
Highways	828.2	620.4	120.4	315.4	142.1	147.3	2,173.8
Pipelines	—	—	—	—	—	—	—
Ports and waterways	143.2	103.0	19.9	293.3	9.2	16.0	584.6
Railways	112.0	129.6	40.0	1,034.2	38.5	8.0	1,362.3
Transportation sector loan	15.0	—	—	38.5	—	—	53.5
Total	\$1,107.4	\$ 858.0	\$ 180.3	\$ 1,681.4	\$ 192.3	\$171.3	\$ 4,190.7
URBANIZATION	\$ 119.5	\$ 38.2	\$ —	\$ 432.0	\$ 38.3	\$ 75.0	\$ 703.0
WATER SUPPLY AND SEWERAGE	\$ 166.6	\$ 73.4	\$ 26.4	\$ 760.4	\$ 192.1	\$ 18.6	\$ 1,237.5
GRAND TOTAL	\$5,144.0	\$2,696.5	\$1,862.9	\$17,551.1	\$2,139.7	\$684.7	\$30,078.9

¹ Except for the total amount shown in footnote 4, no account is taken of cancellations and refundings subsequent to original commitment. Amounts of cancellations and refundings are shown by country and purpose in the Statement of Loans and of Development Credits. IBRD loans of \$1,167.7 million to IFC are excluded.

² Operations have been classified by the major purpose they finance. Many projects include activity in more than one sector or subsector.

³ Includes \$497 million in European reconstruction loans made before 1952.

⁴ Cancellations, terminations, and refundings amount to \$2,868.9 million for the IBRD and \$552.4 million for IDA, totaling \$3,421.3 million. This amount includes \$46.1 million of loans and \$175.8 million of credits made to Pakistan in earlier years for development projects in its former eastern wing, now Bangladesh. The loans and credits were reactivated, in revised form, as commitments to Bangladesh.

Source: World Bank Annual Report, 1983

able to make only a single loan for telecommunications development since its creation.

In general, the Bank Group has tried to limit its involvement in the telecommunications sector to that of a lender of last resort, becoming directly involved in the sector only when alternative financial and technical assistance is unavailable, or when inadequate investment (or other problems like those discussed in Section I) become an obstacle to economic or social development in a country. Because financing for the sector is often available from other banks, institutions, donor agencies, or equipment suppliers, telecommunications has taken a relatively small share of total loans and credits. Nevertheless, the World Bank and IDA are considered the most consistent and generous supporters of telecommunications development in both Sub-Saharan Africa and the world at large. Through fiscal year 1985, the two have provided \$2,884.7 million for 94 telecommunications loans and credits to 42 countries around the world, nearly 60 percent of which has been disbursed within the last ten years (see Figure 15). Additional resources for the sector comes in the form of telecommunications components in other Bank or IDA loans and credits.

In Sub-Saharan Africa, the Bank Group has provided \$412.8 million for 26 loans to 14 countries (see Figure 16). This represents 14.3 percent of the Group's telecommunications sector lending

FIGURE 15

SUMMARY OF WORLD BANK/IDA LENDING FOR TELECOMMUNICATIONS

Fiscal Years:	<u>1961-1965</u>	<u>1966-1970</u>	<u>1971-1975</u>	<u>1976-1980</u>	<u>1981-1985*</u>	<u>Total*</u>
<u>Region</u>						
Sub-Saharan Africa:						
No. of Loans (Countries)	1	5 (3)	9 (8)	2 (2)	9 (9)	26 (14)
Amount (US\$ Millions)	2.9	33.5	164.3	25.2	186.9	412.8
Asia:						
No. of Loans (Countries)	2 (1)	9 (7)	12 (10)	8 (6)	5 (4)	36 (12)
Amount (US\$ Millions)	75.0	130.1	328.5	400.5	539.6	1,473.7
Middle East:						
No. of Loans (Countries)	-	-	4 (3)	4 (4)	2 (2)	10 (7)
Amount (US\$ Millions)	-	-	175.5	117.5	192.0	485.0
Latin America:						
No. of Loans (Countries)	2 (2)	4 (4)	9 (6)	4 (3)	2 (2)	21 (8)
Amount (US\$ Millions)	19.4	70.7	175.5	137.6	70.0	473.2
Europe:						
No. of Loans (Countries)	-	1	-	-	-	1
Amount (US\$ Millions)	-	40.0	-	-	-	40.0
World:						
No. of Loans (Countries)	5 (4)	19 (15)	34 (27)	18 (15)	18 (17)	94 (42)
Amount (US\$ Millions)	97.3	274.3	843.8	680.8	988.5	2,884.7

* Incomplete FY1985

Data Sources: World Bank Group Annual Reports, documents, and press releases.

WORLD BANK/IDA TELECOMMUNICATIONS LOANS AND CREDITS
TO SUB-SAHARAN AFRICA

FIGURE 16

Fiscal Year	Country	Source of Funds	Amount (US\$ millions)			
			Loan	Project Cost	Yearly African Loan Sub-Total	Yearly World Loan Sub-Total
1962	Ethiopia	Bank	2.9	6.2	2.9	2.9
1963	None					42.0
1964	None					19.4
1965	None					33.0
1966	Ethiopia	Bank	4.8	10.8	4.8	41.8
1967	E. African Comm.	Bank	13.0	26.7	13.0	40.2
1968	None					27.0
1969	Upper Volta	IDA	0.8	1.2		
	Ethiopia	Bank	4.5	25.4	5.3	80.7
1970	E. African Comm.	Bank	10.4	28.3	10.4	84.6
1971	None					195.5
1972	Mali	IDA	3.6	4.3	3.6	76.3
1973	Senegal	Bank	6.3	8.9		
	E. African Comm.	Bank	32.5	53.3	38.8	178.6
1974	Upper Volta	IDA	4.5	5.6		
	Ethiopia	IDA	21.4	37.1		
	Ivory Coast	Bank	25.0	53.6	50.9	194.4
1975	Ethiopia	IDA	16.0	60.6		
	Ghana	Bank	23.0	29.5		
	Zambia	Bank	32.0	78.2	71.0	199.0
1976	Niger	IDA	5.2	6.5	5.2	64.2
1977	None					140.0
1978	None					221.1
1979	Kenya	Bank	20.0	63.5	20.0	124.5
1980	None					131.0
1981	Burundi	IDA	7.7	9.1		
	Rwanda	IDA	7.5	17.5	15.2	329.2
1982	Cameroon	Bank	7.5	11.1		
	Kenya	Bank	44.7	123.7		
	Mali	IDA	13.5	25.3		
	Tanzania	IDA	27.0	47.0		
	Upper Volta	IDA	17.0	40.6	109.7	395.8
1983	Uganda	IDA	22.0	26.0	22.0	57.0
1984	None					166.5
1985	Ethiopia	IDA	40.0	151.8	40.0*	40.0*
TOTAL	26 Loans 14 Countries			956.1	412.8*	2,884.7*

* Incomplete FY '85

Data Source: World Bank/International Development Association loan documents and reports.

over the past twenty years, but in the last five years the figure has increased to approximately 19 percent. The loans and credits have included projects for urban, rural, local, long distance, and international telecommunications.

With these loans and credits, the World Bank has attempted to focus country attention on:

- extending service to less economically developed and rural areas in support of social equity;
- more efficient allocation of telephones in urban areas through tariff mechanisms and technical improvements;
- institution-building and policy improvement;
- improved technical and financial planning;
- elimination of sector fragmentation;
- assuring sufficient autonomy for the telecommunications entity; and
- developing in-house technical, financial, and planning capabilities. 21/

As for the future, the World Bank Group should continue to devote approximately 2-3 percent of its loans and credits to the sector. In addition, the Bank Group has become active in attracting other lenders and institutions to the sector through the provision of guarantees and other incentives. Since fiscal year 1980, 10 out of 22 Group loans or credits for telecommunications have been co-financed (as were 5 out of 9 Sub-Saharan loans or credits).

In the projects involved, the additional financing involved

amounted to \$324.5 million which, in addition to World Bank financing of \$386.7 million, covered more than 54 percent of total project costs. Where there was only World Bank funding, the loans and credits covered approximately 26 percent of total project costs.

The World Bank has also published dozens of important papers and articles on the subject of telecommunications and economic development, and should remain a leader in defining sector benefits, outlining sound operating practices, and evaluating the performance of developing country telecommunications entities.

International Telecommunications Union

The ITU was founded in 1865, and was known until 1932 as the International Telegraph Union. According to the Union's Convention, its purposes are:

- to maintain and extend international cooperation for the improvement and national use of telecommunications of all kinds;
- to promote the development of technical facilities and their operation with a view to improving the efficiency of telecommunications services, increasing their usefulness and making them, so far as possible, generally available to the public; and
- to harmonize the actions of nations in the attainment of common ends.

The organization is divided into four parts: the General Secretariat; the International Telegraph and Telephone Consultative Committee, which recommends specifications and deals with technical problems; the International Radio Consultative Committee, which also is concerned with specifications and technical issues; and the International Frequency Registration Board, which assigns radio frequencies around the world. A semi-autonomous agency connected with the General Secretariat is the Technical Cooperation Division (TCD). Outside of the TCD, the ITU operates mainly to promote international agreement among member nations and equipment manufacturers on telecommunications standards and frequency allocations.

The ITU is supported by its 157 members in the form of "contributory units" equivalent in 1984 to SF 209,000 (\$95,871). The maximum contribution is 30 units, and the minimum is one-eighth of a unit. Six members contribute the maximum: the United States, the U.S.S.R., Japan, France, Germany (FRG), and the United Kingdom. Australia and Canada contribute 18 units. Saudi Arabia, China, India, Italy, the Netherlands, Sweden, and Switzerland each contribute 10 units. Together, these 15 countries make up two-thirds of the ITU's 1984 budget of SF 90,201,000 (\$41,376,605).

The operations and budget of the TCD are separated from those of the other ITU bodies (and are not included in the above figures). The TCD was established in its present form in the early 1960's, and includes six subdivisions: Africa, Asia and the Pacific, Europe and the Middle East, Americas, Training, and Administration. The goals of the TCD are:

- to seek greater appreciation of the role of telecommunications in a balanced program of economic development;
- to promote training in all activities connected with the development of telecommunications;
- to take all possible action to help countries become self-reliant in the sector;
- to encourage cooperation between developing countries in telecommunications;
- to promote the transfer of resources and technology to the developing countries; and
- to provide assistance for the development of telecommunications in rural areas.

The TCD is completely dependent on sources outside the ITU proper for funding (with the exception of \$4,495 from the ITU Special Fund for Technical Cooperation). Of the Division's total budget of \$31.9 million, \$26.2 million (82.15 percent) was financed by the United Nations Development Program (UNDP). ITU "Trust Funds" were the source of \$5.2 million, of which \$3.7 million was provided by countries for their own projects, and an additional \$1.5 million was provided by third parties (detailed in Figure 17).

1982 ITU TRUST FUND DONORS

FIGURE 17

Source	Amount	Project/Recipient
World Bank	\$ 352,589	Burundi and Niger
Government of the Netherlands	\$1,039,833	Suriname
Government of Sweden	\$ 295,058	Teletraffic training (TETRAPRO)
Arab Fund for Economic and Social Development	\$ 381,329	Somalia
Arab Bank for Economic Development of Africa (BADEA)	\$ 625,134	Congo, Gabon, Gambia, Guinea Bissau, Senegal
Economic Community of West African States (ECOWAS)	\$ 371,956	West Africa
African Development Bank (ADB)	\$ 80,325	Ivory Coast, Mozambique, Uganda
European Economic Community (EEC)	\$ 901,463	Botswana, Lesotho, Malawi, Swaziland
Gulf Vision	\$ 306,600	Arab States regional project
Federal Republic of Germany UNESCO	\$ 961,630	The Application of Appropriate Modern Telecommunications Technology for Integrated Rural Development in Africa
Federal Republic of Germany and 10 manufacturing companies (contributions received in previous years)	Included in previous years	Contribution of Telecommunications to Socio-economic Development of the Rural Areas (ITU/OECD Study project)

Sources: ITU Technical Cooperation Division and ITU Annual Report, 1982.

An additional \$459,105 was donated by the governments of Germany (\$189,474), Netherlands (\$180,888), Denmark (\$53,453), and Sweden (\$35,290) to cover the costs of associate expert missions (i.e., consultants seconded from that country).

Figure 18 shows the geographical allocation for each of the funding sources. Africa accounted for \$10.2 million (32 percent) of the total, down significantly from \$15.8 million in 1981. It received the largest share of UNDP funding (34 percent), but a much smaller share of the alternative sources of financing (21 percent).

The TCD is currently managing some 35 projects (of a world total of 140) in about 25 Sub-Saharan countries with the above funding, but has assisted all 45 countries in the region at some time since its creation. The projects have included pre-investment surveys, feasibility studies, project proposal preparation, technical specification, system maintenance, planification, recruitment of experts and consultants, training and course development, equipment bids and purchase, system rehabilitation, and others (see Annex 6 for details of 1984 projects). Figure 19 shows the 1982 financial breakdown of project components by region.

The prospects for increased activity by the TCD are cloudy. Since much of the Division's financing is based on requests from UNDP member countries, and as the relatively low priority of telecommunications as well as recessionary and political

FIGURE 18

1982 TECHNICAL COOPERATION RECEIPTS
BY SOURCE AND REGION

<u>Financial Resources (U.S.\$)</u>	<u>Africa</u>	<u>Americas</u>	<u>Asia and Pacific</u>	<u>Middle East</u>	<u>Europe</u>	<u>Inter-Regional</u>	<u>Total</u>
UNDP.....	8,941,709	4,710,516	7,222,875	4,370,921	700,593	225,507	26,172,121
Trust Funds.....	1,102,551	654,326	83,000	3,323,580	1,421	59,258	5,224,136
Associate Experts....	114,325	46,855	289,154	8,771	-	-	459,105
Other Sources.....	4,495	-	-	-	-	-	4,495
Total.....	10,163,080	5,411,697	7,595,029	7,703,272	702,014	284,765	31,859,857

FIGURE 19

1982 TECHNICAL COOPERATION EXPENDITURES
BY PURPOSE AND REGION

<u>Project Components (U.S.\$)</u>	<u>Africa</u>	<u>Americas</u>	<u>Asia and Pacific</u>	<u>Middle East</u>	<u>Europe</u>	<u>Inter-Regional</u>	<u>Total</u>
Experts & Assoc. Experts	6,533,152	3,033,753	4,213,385	5,233,135	317,706	249,215	19,580,346
Admin. Support Personnel	125,704	15,654	113,660	325,173	4,404	30,895	615,490
Sub-Contracts.....	511,012	-	1,036,051	-	-	-	1,547,063
Fellowships.....	409,093	500,771	600,627	784,065	82,413	-	2,376,969
Group Training.....	230,188	53,616	253,259	250,072	123,610	-	910,745
Equipment.....	1,910,594	1,749,880	1,253,763	458,761	168,599	(12)	5,541,585
Miscellaneous.....	443,337	58,023	124,284	652,066	5,282	4,667	1,287,659
Total.....	10,163,080	5,411,697	7,595,029	7,703,272	702,014	284,765	31,859,857

pressures have reduced these requests, the resources available for technical cooperation have dropped significantly in the last few years. Although there are such options as broadening the contributory base or moving closer to a formal relationship with the Union itself, some in the TCD believe that this would reduce the Division's independence, and thereby the unbiased nature of their expertise. It is likely that some fund-raising changes will be required if receipts continue to drop or remain static, but unlikely that the Secretary General would favor the TCD's demise as a relatively independent body. However, officials at the highest level of the Division have expressed fear at what they feel is hostility towards their operation from some quarters in the United States, and suggested to the author that they tread a very thin line politically, as any attempt to support or diminish U.S. interests within the TCD would lead to undesirable reactions from one faction or another (although much of this anxiety seems to be related to the United States' proposed withdrawal from UNESCO).

INTELSAT

The International Telecommunications Satellite Organization was founded in 1965 by fifteen industrialized countries including the United States. Since that time, every year has brought new members and increased utilization to the system. Today, 109 members use 15 INTELSAT satellites for their communications needs. Small users, such as those in Sub-Saharan Africa, have a voice in running the organization since shares are distributed on the basis of use (see Figure 20).

INTELSAT INVESTMENT SHARES

FIGURE 20

Country	Signatory	Investment Share (March 31, 1983)	Country	Signatory	Investment Share (March 31, 1983)
Afghanistan	Ministry of Communication of the Democratic Republic of Afghanistan	0.050000	Liechtenstein	Government of the Principality of Liechtenstein	0.050000
Algeria	Government of the Democratic and Popular Republic of Algeria	0.430502	Luxembourg	Government of Luxembourg	0.050000
Angola	Empresa Publica de Telecomunicacoes (EPTTEL)	0.095558	Madagascar	Societe des Telecommunications Internationales de la Republique Malgache	0.050000
Argentina	Empresa Nacional de Telecomunicaciones de la Republica Argentina (ENTEL)	1.152640	Malaysia	Telecommunications Department, Malaysia	0.237384
Australia	Overseas Telecommunications Commission	3.452596	Mali	Telecommunications Internationales du Mali	0.085418
Austria	Government of Austria	0.289853	Mauritania	Government of the Islamic Republic of Mauritania	0.050000
Bangladesh	Telegraph and Telephones Board of Bangladesh	0.096560	Mexico	Government of Mexico	0.722635
Barbados	Cable and Wireless (West Indies) Limited	0.050000	Monaco	Government of the Principality of Monaco	0.050000
Belgium	Regie des Telegraphes et des Telephones	0.719726	Morocco	Government of Morocco	0.311772
Bolivia	Empresa Nacional de Telecomunicaciones	0.077211	Netherlands	Government of the Kingdom of the Netherlands	1.042586
Brazil	Empresa Brasileira de Telecomunicacoes S.A.	3.041419	New Zealand	Postmaster General of New Zealand	0.439801
Cameroon	Government of the United Republic of Cameroon	0.242399	Nicaragua	Compania Nicaraguense de Telecomunicaciones por Satellite	0.050000
Canada	Teleglobe Canada	2.956855	Niger	Government of the Republic of Niger	0.050000
Cape Verde	Post and Telecommunications Public Enterprise of the Republic of Cape Verde	0.050000	Nigeria	Nigerian External Telecommunications Limited	1.508860
Central African Republic	Government of the Central African Republic	0.050000	Norway	Norwegian Telecommunications Administration	0.420715
Chad	Societe des Telecommunications Internationales du Tchad	0.050000	Oman	Sultanate of Oman	0.510495
Chile	Empresa Nacional de Telecomunicaciones S.A.	0.578405	Pakistan	Government of the Islamic Republic of Pakistan	0.349822
China (PRC)	Ministry of Posts and Telecommunications	0.376436	Panama	Intercontinental de Comunicaciones por Satellite S.A.	0.050000
Colombia	Empresa Nacional de Telecomunicaciones de Colombia	0.775210	Papua New Guinea	Posts and Telecommunications Corporation	0.050000
Congo	Government of the People's Republic of the Congo	0.050000	Paraguay	Administracion Nacional de Telecomunicaciones	0.117805
Costa Rica	Instituto Costarricense de Electricidad	0.050000	Peru	Empresa Nacional de Telecomunicaciones de Peru	0.554413
Cyprus	Cyprus Telecommunications Authority	0.129802	Philippines	Philippine Communications Satellite Corporation	0.645170
Denmark	Generaldirektoratet for Post-og Telegrafvaesenet	0.423381	Portugal	Companhia Portuguesa Radio-Marconi	0.629157
Dominican Republic	Compania Dominicana de Telefonos C por A.	0.050000	Qatar	Government of the State of Qatar	0.351224
Ecuador	Instituto Ecuatoriano de Telecomunicaciones	0.352400	Saudi Arabia	Government of Saudi Arabia	3.182614
Egypt	Government of the Arab Republic of Egypt	0.499746	Senegal	Government of the Republic of Senegal	0.050000
El Salvador	Administracion Nacional de Telecomunicaciones	0.050000	Singapore	Telecommunications Authority of Singapore	1.249364
Etiopia	Telecommunications Service of the Provisional Military Government of Socialist Ethiopia	0.085396	Somalia	Ministry of Post and Telecommunications of the Somali Democratic Republic	0.050000
Fiji	Fiji International Telecommunications Limited	0.050000	South Africa	Department of Posta and Telecommunications of the Republic of South Africa	1.120880
Finland	General Directorate of Posts and Telecommunications	0.080617	Spain	Compania Telefonica Nacional de Espana	1.998983
France	Government of France	5.453972	Sri Lanka	Government of Sri Lanka	0.050000
Gabon	Societe des Telecommunications Internationales	0.050000	Sudan	Government of the Democratic Republic of the Sudan	0.316006
Germany (FRG)	Federal Ministry for Posts and Telecommunications	3.293782	Sweden	Swedish Telecommunications Administration	0.513847
Ghana	Ministry of Transport and Communications	0.050000	Switzerland	Direction Generale de l'Enterprise des Postes, Telephones, et Telegraphes Suisses	1.322465
Greece	Hellenic Telecommunications Organization	0.924087	Syria	Government of the Syrian Arab Republic	0.127960
Guatemala	Empresa Guatemalteca de Telecomunicaciones	0.050000	Tanzania	Tanzania Poste and Telecommunications Corporation	0.050000
Guinea	Government of the People's Revolutionary Republic of Guinea	0.050000	Thailand	Government of Thailand	0.495368
Haiti	Telecommunications de Haiti	0.186681	Trinidad & Tobago	Trinidad and Tobago External Telecommunications Company Limited	0.050000
Honduras	Empresa Hondurena de Telecomunicaciones	0.050000	Tunisia	Administration for Posts, Telephone, and Telegraph	0.050000
Iceland	Government of Iceland	0.141531	Turkey	Government of Turkey	0.227520
India	Overseas Communications Service, Ministry of Communications, Government of India	0.999491	Uganda	Ministry of Power, Posts and Telecommunications	0.050000
Indonesia	Government of the Republic of Indonesia	0.454943	United Arab Emirates	Ministry of Communications	1.748318
Iran, Islamic Rep.	Telecommunications Company of Iran	0.972889	United Kingdom	British Telecommunications	12.996379
Iraq	Government of the Republic of Iraq	0.405501	United States	Communications Satellite Corporation (COMSAT)	24.357185
Ireland	Department of Posts and Telegraphs	0.133250	Upper Volta*	Office des Postes et Telecommunications	0.050000
Israel	Government of the State of Israel	0.578131	Uruguay	Administracion Nacional de Telecomunicaciones	0.050000
Italy	Societa Telespazio	2.298830	Vatican City State	Government of the Vatican City State	0.050000
Ivory Coast	Government of the Republic of Ivory Coast	0.328276	Venezuela	Venezuelan Telephone Company	1.561540
Jamaica	Jamaica International Telecommunications Ltd.	0.470890	Viet Nam	Direction Generale des Postes et Telecommunications de la Republique Socialiste du Viet Nam	0.050000
Japan	Kokusai Denshin Denwa Company Ltd.	3.137645	Yemen A.R.	Government of the Yemen Arab Republic	0.192447
Jordan	Government of the Hashemite Kingdom of Jordan	0.298933	Yugoslavia	Community of the Yugoslav Posts, Telegraphs and Telephones	0.201217
Kenya	Kenya External Telecommunications Company Ltd.	0.338874	Zaire	Office Nationale des Postes et Telecommunications	0.335813
Korea (ROK)	Korea Telecommunications Authority	0.721219	Zambia	Government of the Republic of Zambia	
Kuwait	The Ministry of Communications, State of Kuwait	0.966894			
Lebanon	Government of Lebanon	0.149870			
Libya	Government of the Libyan Jamahariya	0.149600			

* Bourkina-Fasso

With regard to the Sub-Saharan region's specific involvement in INTELSAT, Figure 21 has been provided. Of the forty-five countries in the region, only twenty-four countries are members of INTELSAT and share 4.18 percent of the total investment (but forty-two of the countries make some use of the system). Of the twenty-six members of the INTELSAT Board of Governors, Africa is represented by five Governors (including two for North Africa). Finally, there are thirty-four users of INTELSAT Atlantic Ocean satellites, eighteen users of Indian Ocean satellites, and seven countries using both types.

All of the INTELSAT facilities are available on a non-discriminatory basis to users (and the same tariffs apply regardless of volume), and in the last few years the Organization has been moving to augment services available to benefit less developed countries. Seven of the fifteen operational satellites are used in whole or in part to provide Domestic Lease Service (using two satellites past their design lifetime and spare circuits on the other satellites) on a pre-emptible basis at reduced cost to the user. Twenty-five countries currently lease capacity for this purpose, including Niger, Nigeria, Sudan, and Zaire. Other Sub-Saharan countries with near-term plans for domestic usage are Cameroon, Mali, Mauritania and Mozambique. INTELSAT has also introduced VISTA "thin-route" rates and a Standard "Z" earth station for domestic use.

INTELSAT also began offering Single-Channel-Per-Carrier Pulse-Code Modulation Access Demand-Assigned Equipment (SPADE) service in 1973. SPADE allows a user to establish a communications circuit on demand with other users also equipped with SPADE terminals. The

FIGURE 21

AFRICAN* PARTICIPATION IN INTELSAT
(September 1983)

COUNTRY	INTELSAT			SATELLITE ACCESS					Domestic Lease
	Member	% Investment Share - 1/3/83	Board of Governors	AORP	AOR1	AOR2	IORP	IOR1	
Angola									
Benin	X	.10		A			B		Evaluating
Botswana				A					
Burundi							B		
Cameroon							B		
Cape Verde	X	.24	X Africa2	A	A				Planned
Cent. African Rep.	X	.05	X Africa2	B					
Chad	X	.05	X Africa2		B				
Congo	X	.05	X Africa2	A	B				
Djibouti			X Africa2	A					
Equatorial Guinea							B		
Ethiopia	X	.09	X Africal		B				
Gabon	X	.05	X Africa2	A					
Gambia					A	B			
Ghana	X	.05			B				
Guinea	X	.05			A				
Guinea-Bissau	X	.05			B				
Ivory Coast	X	.33	X Africa2						
Kenya	X	.34	X Africal	A	A				
Lesotho				A			A		
Liberia						B			
Madagascar	X	.05			B				
Malawi							A		
Mali	X	.09	X Africa2			A	B		
Mauritania	X	.05	X Arab 1	B	B				Planned
Mozambique				A					Planned
Niger	X	.05	X Africa2	A			B		Planned
Nigeria	X	1.51	X Own seat		A		B		4 Earth Sta.
Rwanda				A	A	A	A		21 Earth Sta.
Sao Tome e Principe							B		
Senegal				B					
Sierra Leone	X	.05	X Africa2	A					
Somalia	X	.05			B				
Sudan	X	.32					B		
Swaziland				A	A				14 Earth Sta.
Tanzania	X	.05	X Africal			B			
Togo				A			B		
Uganda	X	.05	X Africal	A					
Upper Volta	X	.05	X Africal		A				
Zaire	X	.34	X Africa2		B				
Zambia	X	.12	X Africa2		A				13 Earth Sta.
Zimbabwe			X Africal				A		
TOTALS (42)	24	4.18	18 Represented 3 Seats 5 Members	15A 3B	9A 9B	3A 3B	8A 10B		4 Users 5 Possible

*Sub-Saharan (excluding S. Africa)
Source: INTELSAT

Atlantic: 46 (34 Users)
Indian: 18
Total: 64 (41 Users)

system is heavily used by the developing countries because of the far less expensive utilization charges.

Finally, INTELSAT has created the "INTELSAT Assistance and Development Program"(IADP). The IADP, introduced in 1978, provides assistance to all users (including non-members) "in the design, planning, construction, and effective operation of earth segment facilities." 22/

The IADP completes about fifteen projects per year, and has financed a total of 77 projects in 71 countries to date (24 of those projects were carried out in Sub-Saharan Africa). A large percentage of the projects were formerly concerned with counter-acting existing problems, but most projects now consist of planning and development studies. The IADP also conducts training seminars around the world, including a 1983 seminar which took place in Zimbabwe and was attended by forty-four trainees from six nearby countries.

The IADP's budget in 1983 was about \$500,000 of which 31 percent was devoted to projects in Sub-Saharan Africa. Since 1978, the Program has supported telecommunications development in the region with expenditures of more than \$685,000. However, the IADP is prohibited from supporting any projects outside the area of satellite earth segment and related technical assistance. This is apparently to prevent the Program from becoming diluted into a less-effective, all-purpose institution.

The future at INTELSAT poses several dilemmas for the developing countries and challenges the status quo in international communications. Because INTELSAT is obliged by treaty to average its rates globally, keeping costs low for all users, it now faces competition on the heavily used North America-Europe route. This route has subsidized less profitable routes in the INTELSAT system for many years, and now several companies including RCA, ORION, Cygnus, and ISI plan to enter the market with significantly lower tariffs for these customers.

Should one or more of the competing satellite systems be approved by the U.S. Federal Communications Commission and begin operation, rates on the INTELSAT system will instantly begin to rise, since a larger percentage of its traffic will be coming from the less profitable routes. The net result would be less expensive calls between America and Europe, but significantly more expensive calls between any other two points (including say, United States-Brazil).

The specific effects in Sub-Saharan Africa would be dramatic. Calls within, to, and from the region are now the most heavily subsidized under the present INTELSAT system, and would therefore be the most affected by a "free-market" international telecommunications regime. The sharp increase in rates would be met by a corresponding tailspin in the level of demand. The new regime would undoubtedly be a setback for Sub-Saharan telecommunications, even though the United States and Europe would probably gain substantial benefits.

Economic Commission for Africa

The ECA was established by the United Nation's Economic and Social Council in April 1958. Among its many activities designed to modernize rural areas and aid industrial development, is its position as the lead agency for the United Nation's Transport and Communications Decade in Africa (UNTACDA).

Of the Decade's \$6.5 million in budgetary resources, 81 percent has been granted by the UNDP, with the remainder given by France, the Netherlands, the Federal Republic of Germany, and the Soviet Union. The goals of UNTACDA, in brief, are:

- ° A continental telephone growth rate of .14% p.a.
- ° Completion of the PANAFTEL network, including accords on tariffs and accounts, elimination of parallel networks, meeting CCITT/CCIR specifications on maintenance, and full connection with other continents.
- ° Development of training centers for all skill levels at various locations around the continent.
- ° Reorganization of administrations for increased efficiency, and standardization of job and wage classifications.
- ° Preparation of telecommunications master plans in all countries.
- ° Complete introduction of operational and maintenance services in all countries.
- ° Rural service target of 1 Public Call Office for 10,000 rural population. ^{23/}

UNTACDA includes some 312 telecommunications projects at an estimated cost of \$1.2 billion beyond normal investment expenditures in the African countries.

As should be clear from Section I, the Decade, now nearly two-thirds complete, has had minimal success. None of the goals mentioned above are anywhere near realization. Only 31 percent of the necessary funding for telecommunications has been committed (but of which only 7.6 percent has been implemented), and even then, the vast majority of financing has been for internal facilities in individual countries rather than for regional or continental projects (which receive little or no funding aside from the UN). An aide to the United Nations' Joint Inspection Unit (JIU), which has supervisory authority over ECA's handling of UNTACDA, suggested in our interview that the performance of the ten-year program was "disappointing and disillusioning" and that while "fantastic expectations" had been raised by supporters of UNTACDA, few African countries have taken the initiative to use the Decade as an investment-generating mechanism. In a discussion with the author on UN programs related to telecommunications, Bangale Kone, the founder of an African telecommunications firm, reckoned that these schemes were "just leading a horse to water" because most Africans do not yet have an independent desire to avail themselves of the communications technologies. ^{24/}

Nevertheless, the ECA has embarked on a second phase of the Decade, launched in 1984, and requiring an additional \$3.9 billion for 472 telecommunications projects.

Pan African Telecommunications - PANAFTTEL

The ECA, along with the organization for Africa Unity (OAU), the ITU, the AFDB, and the Pan-African Telecommunications Union (PATU) make up the "PANAFTTEL Coordinating Committee" (PCC) that oversees the development of telecommunications networks in Africa.

The name PANAFTTEL was given to the African network in 1967 by the ITU's Plan Committee for Africa, which was the precursor of the PCC. Between that year and 1970, preliminary studies of the existing network were carried out by the ITU (on behalf of the ECA), with funds provided by the UNDP. At that time, 64 international links between 15 countries were identified, all of them consisting of poor quality high frequency circuits or open-wire systems. Thirty-one additional international systems were thought to be required. In 1970, the UNDP provided the funds required for pre-investment surveys of these routes.

Since that time, the PCC has made progress in implementing a number of systems within the continent (see the map in Annex 4). Although a large number of African countries remain unconnected, 44 systems have been added to the network since 1970 (see Figure 22),

DEVELOPMENT OF THE PANAFTEL NETWORK

Existing 1970:	Nairobi-Dar es Salaam	Kenya-Tanzania	96 UHF	
	Nairobi-Dar es Salaam	Kenya-Tanzania	36 UHF	
	Nairobi-Kampala	Kenya-Uganda	96 UHF	
	Kampala-Mwanza	Uganda-Tanzania	24 tropo	
	Bukavu-Bujumbura	Zaire-Burundi	12 VHF	
	Ndola-Lubumbashi	Zambia-Zaire	12 VHF	
	Lusaka-Ndola	Zambia	960 SHF	
	Lusaka-Harare	Zambia-Zimbabwe	36 VHF	
	Blantyre-Harare	Malawi-Zimbabwe	7 VHF	
	Lagos-Calabar	Nigeria	960 SHF	
	Calabar-Buea	Nigeria-Cameroon	12 VHF	
	Maputo-Nampala	Mozambique	60 tropo	
	Algiers-Rabat	Algeria-Morocco	72 cable	
	Algiers-Tunis	Algeria-Tunisia	22 cable	
Tunis-Tripoli	Tunisia-Libya	600 SHF		
Established 1970-1975:	Nouakchott-Rosso	Mauritania-Senegal	360 cable	
	Abidjan-Ouagadougou	Ivory Cst.-Bourkina	960 SHF	
	Libreville-Kribi	Gabon-Cameroon	30 tropo	
	Douala-Malabo	Cameroon-Eq. Guinea	12 tropo	
	Dolissie-Libreville	Congo-Gabon	12 tropo	
	Aswan-Wadi Halfa	Egypt-Sudan	24 tropo	
	Addis Ababa-Asmara	Ethiopia-Sudan	960 SHF	
	Lilongwe-Blantyre	Malawi-Mozambique	300 SHF	
	Lilongwe-Mzuzu	Malawi-Tanzania	300 SHF	
	Cotonou-Lome	Benin-Togo	960 SHF	
	Porto Novo-Lagos	Benin-Nigeria	48 UHF	
	Kigali-Kampala	Rwanda-Uganda	12 UHF	
	Kigali-Bujumbura	Rwanda-Burundi	24 UHF	
	Nairobi-Kampala	Kenya-Uganda	960 SHF	
	Nairobi-Dar es Salaam	Kenya-Tanzania	960 SHF	
	Yaounde-Gamboula	Cameroon-C.A.R.	960 SHF	
	Established 1976-1980:	Dakar-Banjul	Senegal-Gambia	300 SHF
		Dakar-Casablanca	Senegal-Morocco	640 marine
		Dakar-Abidjan	Senegal-Ivory Coast	480 marine
Ziguinchor-Bissau		Senegal-Guinea bis.	60 UHF	
Monrovia-Abidjan		Liberia-Ivory Coast	600 SHF	
			120 tropo	
Monrovia-Freetown		Liberia-Sierra Leone	600 SHF	
Ouagadougou-Lome		Bourkina Fasso-Togo	960 SHF	
Lome-Cotonou		Togo-Benin	960 SHF	
Lagos-Cotonou		Nigeria-Benin	960 SHF	
Maiduguro-N'Djamena		Nigeria-Chad	960 SHF*	
Kousari-N'Djamena		Cameroon-Chad	960 SHF*	
Brazzaville-Impfondo		Congo	960 SHF	
			48 tropo	
Bujumbura-Bukavu		Burundi-Zaire	48 UHF	
Kinshasa-Brazzaville		Zaire-Congo	120 SHF	
Lusaka-Chipata		Zambia	960 SHF	
Rabat-Algiers		Morocco-Algeria	1260 cable	
Tunis-Algiers		Tunisia-Algeria	960 SHF	
Tripoli-Algiers		Libya-Algeria	960 SHF	
		300 cable		
Established 1980-1983:	Dakar-Bamako	Senegal-Mali	960 SHF	
	Bamako-Bobo Dioulasso	Mali-Bourkina Fasso	960 SHF	
	Conakry-Freetown	Guinea-Sierra Leone	960 SHF	
	Abidjan-Lagos	Ivory Coast-Nigeria	480 cable	
	Ouagadougou-Niamey	Bourkina Fasso-Niger	960 SHF	
	Cotonou-Niamey	Benin-Niger	960 SHF	
	Brazzaville-Pointe Noire	Congo	960 SHF	
	Kigali-Bukavu	Rwanda-Zaire	SHF/UHF	
	Assab-Djibouti	Ethiopia-Djibouti	48 UHF	
	Nairobi-Dar es Salaam	Kenya-Tanzania	960 SHF	
	Dar es Salaam-Lusaka	Tanzania-Zambia	960 SHF	

*No longer in service.

Source: "The Development of the pan-African Telecommunications Network (PANAFTEL), 1960-1983," Telecommunications Journal, Vol. 51 (April, 1984).

and 20 more are under construction. As of 1983, PANAFTTEL consisted of:

- 26 microwave systems between national centers with a total length of 20,000 kms.;
- 8 troposcatter, low capacity radio-relay systems with a total route length of 4,000 kms.;
- 3 coaxial multichannel submarine cables with a total route length of 5,000 kms.;
- 4 coaxial multichannel land cables with a total route length of 3,200 kms.;
- 50 satellite communication earth stations operating 40 intra-African circuits;
- 6 domestic satellite communication systems operating 64 earth stations. ^{25/}

The PANAFTTEL concept is affected by all of the other regional influences, as each link is financed and constructed independently. In effect, expenditures on inter-country telecommunications by all of the organizations described earlier and discussed below are considered part of the PANAFTTEL investment. The various regional organizations, such as ECOWAS and SADCC (described below) have bolstered the ability to raise the \$300 million needed for the current phase of PANAFTTEL's expansion as has, to a limited extent, UNTACDA.

As the ITU's Secretary General has suggested, PANAFTEL is not a project that was meant to be completed. Instead, the hope is that the parties involved in building and financing the African networks to date will continue to strengthen and modernize the many individual telecommunications systems and permit a wider penetration of the network.

African Development Bank

The final institution that is pan-African in scope, the African Development Bank Group, is made up of the African Development Bank (AFDB), the African Development Fund (AFDF), and the Nigeria Trust Fund (NTF).

The AFDB was established in August 1963 and began operations in the second half of 1966, with the goal of promoting economic and social progress in Africa. The AFDB is owned by its 72 members, of which 22 are non-regional. The ten largest shareholders, in terms of voting power, are:

1. Nigeria	8.21%
2. United States	5.86%
3. Libya	5.09%
4. Japan	4.87%
5. Egypt	4.60%
6. Germany (FRG)	3.67%
7. Algeria	3.58%
8. France	3.36%
9. Canada	3.36%
10. Zaire	3.32%

African countries control 64.55 percent of the voting shares. Besides paid up capital of \$1.3 billion, the Bank raises funds by borrowing in capital markets, from investment income, and loan repayments.

The operational policy of the AFDB is to fund projects that satisfy the norms of technical, financial, and economic viability. The Bank will generally not finance more than 50 percent of any particular project, but will accept equity participation. Procurement of goods and services with Bank funds is normally under international competitive bidding, but preference is given to African member countries. Loans cannot be used to refinance existing debt.

During fiscal year 1982, lending commitments by the AFDB totaled \$399 million, directed towards higher per capita income members. Loans totaled \$323 million in fiscal year 1981. The loans carried an interest rate of 9.5 percent (plus a 1 percent statutory commission and a 1 percent fee on undisbursed balances). Repayment periods ranged between 12 and 20 years, excluding a grace period for project execution.

Figure 23 shows the cumulative lending of the AFDB through the 1982 fiscal year. Of the SDR 1.71 billion loaned since 1967, SDR 113.5 million was devoted to telecommunications projects, representing 6.62 percent of the total (1 SDR = U.S.\$1.103 on 12/82).

FIGURE 23

CUMULATIVE LOANS BY SOURCE AND PURPOSE

Expressed in SDR millions

<u>Period</u>	<u>Source</u>	<u>Agricul.</u>	<u>Transport</u>	<u>Telecom.</u>	<u>Water/Elec.</u>	<u>Industry & Dev. Banks</u>	<u>Social</u>	<u>Total</u>
1967-82	AFDB (%)	321.89 (18.71)	385.77 (22.50)	113.50 (6.62)	429.20 (25.03)	415.37 (24.22)	49.00 (2.86)	1714.73 (100)
1974-82	AFDF (%)	561.51 (36.38)	377.69 (24.47)	2.00 (0.14)	280.67 (18.18)	63.00 (4.08)	258.47 (16.75)	1543.34 (100)
1976-82	NTF (%)	9.75 (13.11)	26.17 (35.19)	10.10 (13.58)	12.82 (17.24)	7.43 (9.99)	8.10 (10.89)	74.37 (100)

FIGURE 24

AFRICAN DEVELOPMENT BANK GROUP LOANS BY SECTOR
1967 - 1982

Expressed in US\$ thousands

<u>Period</u>	<u>Agricul.</u>	<u>Transport</u>	<u>Telecom.</u>	<u>Water</u>	<u>Electr.</u>	<u>Indust.</u>	<u>Line of Credit</u>	<u>Social</u>	<u>Total</u>
1967-73	18621	48996	10621	7260	11855	5218	16787	-	119358 (60)
1974	33575	33457	14717	14304	17975	5790	15683	-	135511 (42)
1975	40908	54482	4825	40375	19000	14657	2413	20000	196660 (51)
1976	24309	41232	7238	43368	17854	9892	16527	18989	179409 (44)
1977	66378	100050	10240	41766	39077	16622	21864	29963	325960 (61)
1978	117215	104790	37129	45760	30759	30094	13028	44708	423483 (75)
1979	177566	114736	-	62149	70046	40318	26657	28375	519848 (68)
1980	156471	143463	23888	44781	34970	52762	77633	36869	570836 (63)
1981	181582	131279	37619	61261	33164	43998	77526	69103	635532 (72)
1982	211660	146006	11031	116058	85075	25813	66593	103583	765819 (77)
TOTAL Loans	1028285 (159)	918500 (151)	157308 (29)	477082 (79)	359775 (54)	245164 (33)	334711 (60)	351590 (48)	3872416 (613)
%	26.6	23.7	4.1	12.3	9.3	6.3	8.6	9.1	100

In 1972, the Bank joined with non-regional countries to establish an affiliate, the African Development Fund. The AFDF's resources are meant to give special assistance to the poorer members by granting concessional loans to developmentally important but low financial return projects in the rural and social sectors. Participants in the Fund include the Bank and 25 non-African countries. The ten largest participants, in terms of voting power, are:

1. AFDB	50.00%
2. United States	7.41%
3. Japan	6.52%
4. Canada	5.54%
5. Germany (FRG)	5.04%
6. France	3.16%
7. Sweden	3.13%
8. United Kingdom	2.38%
9. Norway	2.25%
10. Switzerland	2.25%

The Fund's resources are dependent on periodic replenishments from participants. These funds are incorporated into each country's voting position (but the AFDB always retains a 50 percent share).

AFDF assistance is given on a priority basis to countries with an annual per capita GNP of less than \$280, but some loans go to countries with a per capita GNP between \$280 and \$550.

Loans are provided interest free, with ten year grace periods,

and fifty years to repay. In fiscal year 1982, \$358.2 million was committed by the AFDF, up from \$311.1 million in 1981.

Figure 21 shows the cumulative lending of the AFDF through the 1982 fiscal year. Of the SDR 1.54 billion loaned since 1974, SDR 2 million was devoted to telecommunications projects, representing 0.14 percent of the total. Telecommunications has received a relatively small share of the AFDF's disbursements because most such projects are considered to have too high an economic viability to be eligible for concessional funding.

The third member of the Group is the Nigeria Trust Fund. The NTF was established in 1976 by agreement between the AFDB and the Nigerian Government. The purpose of the NTF is to contribute to the economic development of poorer AFDB members by extending loans with more lenient terms than conventional AFDB loans. NTF loans carry a 4 percent rate of interest with a repayment period of twenty-five years (including a five year grace period). The Fund's resources are wholly contributed by the Government of Nigeria.

In fiscal year 1982, the NTF loaned \$8.6 million. Figure 21 shows the cumulative lending of the Fund through 1982. Since its creation, the NTF has loaned SDR 10.1 million for telecommunications projects, or 13.58 percent of its loan base of SDR 74.4 million.

Together, the three members of the Group are the most important regional (African) supporters of telecommunications development. Through fiscal year 198 , they have provided \$266.1 million for 30 loans to 21 Sub-Saharan countries, of which two-thirds has been committed within the last five years. The projects supported have included local and international switching equipment, microwave systems, modernization and extension of local networks, and troposcatter rehabilitation. Through 1982, these telecommunications projects represented about 4 percent of total loans (see Figures 24 and 25).

The development of telecommunications will continue to play a major role in the operations of the AFDB Group. The Bank Group expects to give more assistance to multilateral projects including UNTACDA, ECOWAS, PANAFTEL, and SADCC. Additionally, the Group's contribution will include fund-raising through co-finance, and funding for sector studies, feasibility analysis, and investment surveys. It may be interesting to note, finally, that the African Development Bank Group regularly loans only half of the funds allocated to telecommunications because, according to a Bank official, "very few good projects are presented by members." 26/

AFRICAN DEVELOPMENT BANK GROUP
TELECOMMUNICATIONS LOANS AND CREDITS

FIGURE 25

Fiscal Year	Country	Source of Funds	Amount (US\$ millions)	
			Loan	Year Sub-Total
1970	Niger	AFDB	1.43	1.43
1971	None			
1972	Mauritania	AFDB	1.89	
	Swaziland	AFDB	2.20	4.09
1973	Zaire	AFDB	3.98	
	Botswana	AFDB	2.20	6.98
1974	Guinea	AFDB	6.77	
	Zambia	AFDB	5.07	11.84
1975	Congo	AFDB	3.02	3.02
1976	Swaziland	AFDB	7.24	7.24
1977	Cape Verde	AFDF	2.24	
	" "	NTF	1.93 (4.17)	
	Ghana	AFDB	6.07	10.24
1978	Gabon I	AFDB	6.55	
	Gabon II	AFDB	6.60	
	Liptaka-Gourma (Mali-Niger-U.Volta)	AFDB	13.02	
	" " "	NTF	8.59 (21.61)	
	Mozambique	NTF	2.48	37.24
1979	None			
1980	Lesotho	AFDB	11.13	
	Botswana	AFDB	12.50	23.63
1981	Guinea	AFDB	4.50	
	Central African Rep.	AFDB	11.64	
	Botswana	AFDB	13.20	
	Swaziland	AFDB	8.32	37.62
1982	Ivory Coast	AFDB	11.03	11.03
1983	Angola	AFDB	33.35	
	Zimbabwe	AFDB	7.72	
	Malawi	AFDB	10.20	51.27
1984	Mozambique	AFDB	28.57	
	"	NTF	5.50 (34.07)	34.07
1985	Ethiopia	AFDB	26.40	26.40*
Total	30 Loans 21 Countries			266.10

*Incomplete FY 1985

Data Sources: AFDB project reports, documents, and press releases.

Union Africaine des Postes et Telecommunications

The UAPT attempts to bring together many countries for the purpose of improving telecommunications services, in this case, primarily in Francophone Africa. It is a regional inter-governmental organization composed of Postal and Telecommunications Administrations or Offices. UAPT was established in October 1975 by 12 nations: Benin, Bourkina-Fasso, Central African Republic, Chad, Congo, Gabon, Ivory Coast, Mauritania, Niger, Rwanda, Senegal and Togo. Mali and Djibouti joined subsequently and Gabon has apparently withdrawn. According to the UAPT's convention, the organization has the following aims:

- cooperation between its member states with a view toward the improvement and national organization of the postal and telecommunications services;
- development and improvement of postal and telecommunications services with the goal of ensuring a high standard of operation;
- basic and advanced training of the professional postal and telecommunications staff of the member states;
- close collaboration with specialized agencies of the United Nations such as the UPU and the ITU in the fields of research and technical cooperation;
- coordination of the member administrations' activities directed towards these common objectives.

The UAPT received from members and spent approximately \$600,000 in 1983, mostly for operating expenses and conferences. Otherwise its attention has been focused on its proposal for an African Network for Telecommunications by Satellite, or AFSAT. The UAPT has just published a feasibility study, which estimates the cost of the AFSAT system to be over \$200 million for the space segment alone.* 27/

*A note on Satellites: There are currently 5 satellite proposals for Africa in various stages of development. Only one, Arabsat, is close to operation; it should be servicing the five North African countries plus Sudan, Somalia, and Djibouti within 1984. PATU has a proposal known as AFROSAT, to link all of the African capitals by satellite. The ECA has plans for satellite use for the Pan-African Documentation and Information Service. Another scheme has its base with the ITU/UNTACDA Integrated Rural Development projects, and would serve rural areas by satellite. Finally, there is the UAPT proposal. Some moves have been made to unite these diverse proposals. In 1983, the OAU set up the Regional African Satellite Communicating System (RASCOS) as an umbrella organization, but thus far little integration has been accomplished.

In reality, however, the problem is not the integration of these different proposals, but their appropriateness. Like the flashy African airports, conference centers, and cars, the satellite may represent a need to assure the Africans in power of their progress in the world. Also like these other examples, a satellite may not be the best way to assure progress for the whole society. African unity is another rationale sometimes heard in support of a regional satellite. And yet, joint ownership of a satellite may create only the illusion of unity. Even if an agreement could be negotiated between the fifty African nations, probably based on financial and technical motives, it would not bridge the deep political chasms of the continent.

Even the financial and technical rationales give doubtful support to the notion of an African satellite. Effective levels of utilization may or may not be possible. The high returns demanded by the enormous costs of a "thin-route" (high power, rural service) satellite are unlikely to be achieved, and would probably require continuing subsidization. The cost and distribution of operations and administration have generally not been accurately determined. Finally, the very small satellite earth stations required for equitable dispersion of services do not yet have adequate transmission quality (echos, background noise, etc.), sufficiently high power production or low power usage, or a lengthy service life under poor climate conditions. The satellite earth station signals may interfere with existing microwave transmission. Finally, currently available earth stations have a far lower circuit capacity than other methods of communication transmission (see also EEC below). 28/ Clearly, other alternatives need to be thoroughly explored before finally committing the necessary time and resources to a regional satellite.

The organization has raised and spent a total of \$21 million so far on the project and plans to devote its energies, as far as telecommunications is concerned, to lining up commitments for the actual investment phase. An official of the UAPT pointed out to the author that the governments of France, Germany, Canada, Italy, and Brazil as well as most of the major non-American equipment manufacturers participated in the organization as observers, and also said that despite its stated commitment to regional integration, the U.S. had never shown any interest in the organization.

BDEAC

The Central African States' Development Bank was also created in 1975, and began lending operations in 1978. The BDEAC has five members: Cameroon, Central African Republic, Chad, Congo and Gabon (a sixth, Equatorial Guinea, is in the process of joining). The Bank, however, has ten capital shareholders, which are:

Cameroon	15.98%
Central African Republic	15.98%
Chad	15.98%
Congo	15.98%
Banque des Etats de l'Afrique Centrale	12.24%
Gabon	9.86%
France	5.83%

Kuwait	2.91%
Germany (FRG)	2.91%
AFDB	2.33%

They have contributed a total of CFA 34.3 billion (US\$85.8 million) to the Bank's capital base.

The objectives of the BDEAC are:

- to promote economic and social development in the member states, particularly by financing multinational projects and projects with the goal of economic integration;
- to cooperate with the states and the national financial institutions in order to mobilize financial resources and financing of projects of great importance to the economies of the member states;
- to aid the member countries in financing feasibility studies for regional projects.^{29/}

A result of the BDEAC's overriding interest in regional integration is the commitment of 50 percent of its capital for transport and communications infrastructure, of which at least 24 percent is specifically devoted to telecommunications projects. The Bank loaned CFA 6.2 billion (U.S. \$17.7 million) in fiscal year 1983, of which CFA 2.9 billion (U.S. \$8.2 million) was for infrastructure and CFA 1.8 billion (U.S. \$5.1 million) was for telecommunications. The telecommunications loans comprised a three year grace period and a repayment period of 10 to 12 years in length, and carried a rate of interest between 8.5 and 13 percent.

The BDEAC's cumulative lending of CFA 14.7 billion (U.S. \$49 million) included the following telecommunications projects:

Fiscal Year	Country	Loan Amount (Millions)	Rate%
1979	Gabon	CFA 500.0 (\$2.22)	8.00
1980	C.A.R.	CFA 240.0 (\$1.06)	8.50
1981	C.A.R.	CFA 322.5 (\$1.08)	10.50
1981	C.A.R.	CFA 54.6 (\$0.18)	13.00
1982	C.A.R.	CFA 500.0 (\$1.66)	8.50
1983	C.A.R.	CFA 720.0 (\$2.05)	8.75
1983	Congo	CFA 255.0 (\$0.72)	8.75
1983	Gabon	CFA 815.0 (\$2.32)	13.00
Total		CFA 3417.1 (\$11.29)	

The projects included modernizing and extending national telecommunications networks, installation of satellite earth stations, and construction of a regional microwave system (all part of PANAFTEL). These telecommunications projects comprised 23.2 percent of the BDEAC's cumulative lending since 1978.

In the next few years, the Bank has plans to connect Cameroon and Gabon by microwave, and to finance maintenance training centers in Bangui (C.A.R.) and Libreville (Gabon) as well as a coordinated maintenance program for all member countries. Other projects currently being evaluated include rehabilitation of Chad's war-torn telecommunications system, and funding for an ITU generated program for rural service extension in the C.A.R.

The United States Government has never expressed any interest in the Bank or Bank projects, with the exception of its indirect involvement in a fiasco that was caused when GTE abandoned a Bank-financed project in the Central African Republic.

The equipment had been exported under an Export-Import Bank loan, and based on statements by GTE, the Ex-Im Bank refused to allow suspension of payments on the loan by the C.A.R. The matter was eventually settled in the C.A.R.'s favor by the EDEAC. 30/

BOAD

The West African Development Bank was founded in 1976 by its six member states: Benin, Bourkina-Fasso, Ivory Coast, Niger, Senegal and Togo, with the backing of France. BOAD's capital is approximately \$142 million, which includes later infusions of \$8.9 million from the EEC's European Investment Bank (EIB) and \$2.2 million from the Federal Republic of Germany.

BOAD has additional financial dealings with these and other Western European countries, including:

Gifts (for Expert Salaries) from:

- Belgium	BF	20,000,000	(\$362,500)
- Switzerland	SF	750,000	(\$312,500)
- Netherlands	Gld.	500,000	(\$152,500)

Subsidized Loans from:

- European Econ. Community (EIB)	ECU	5,140,000	(\$6,688,400)
- Switzerland	SF	9,250,000	(\$3,854,100)
- W. Germany (DEG)	DM	10,000,000	(\$3,430,500)
(KFW)	DM	9,100,000	(\$3,121,800)

In addition to its capital contribution, France has also loaned the Bank FF 160 million (U.S. \$18 million) through the CCCE and three government-owned banks, restricted to the purchase of French goods and services.

The Bank makes loans on commercial terms for all economically viable development purposes in its member countries, but is strongly oriented toward infrastructural loans (which accounted for approximately 83 percent of the Bank's lending programs). BOAD loaned a total of CFA 6.5 billion (U.S.\$21.6 million) in fiscal year 1982, as against CFA 7.4 billion (U.S.\$26.9 million) in 1981.

Of its cumulative lending of CFA 29.7 billion (U.S.\$99.1 million), the Bank supported the following telecommunications projects:

Fiscal Year	Country	Loan Amount (Millions)	Rate%
1978	Niger	CFA 417 (\$1.85)	8.0
1978	Togo	CFA 360 (\$1.60)	8.0
1979	Senegal	CFA 366 (\$1.62)	8.0
1979	Togo	CFA 374 (\$1.66)	8.0
1980	Togo	CFA 900 (\$4.00)	11.5
1982	Ivory Coast	CFA 1100 (\$3.66)	11.0
1982	Niger	CFA 800 (\$2.66)	11.0
(1983)	Senegal	CFA 718 (\$2.39)	11.0

The loans included projects for new central switching exchanges in principal and secondary cities and modernization and extension of local networks. Total telecommunications lending of CFA 4.3 billion (U.S.\$19.4 million) was equivalent to 14.5 percent of Bank lending in the years 1976-1982.

BOAD plans to devote more of its lending to rural telecommunications in future years, and has conducted feasibility studies for two such projects in Senegal and Niger requiring CFA 3 billion. The Bank will also be cooperating with ECOWAS in funding materials for the PANAFTEL network in West Africa as well as on a diagnostic study of telecommunications bottlenecks in the region. The Bank has never had any involvement or meetings with officials of the United States Government.

ECOWAS

The Economic Community of West African States was founded in 1975 by 16 countries: Benin, Bourkina-Fasso, Cape Verde, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo. The broad goal of the organization was to promote the economic integration of the entire West African region, and several political and financial accords have been reached to that end. In November 1976, the members joined in inaugurating the ECOWAS Fund for Cooperation,

Compensation, and Development (FCCD), and supplied it with \$50 million in capital, in order to:

- Finance projects in member states;
- Provide compensation to member states which have suffered losses as a result of community enterprises or arising out of the application of liberalization of trade within the community;
- Guarantee foreign investments made in member states in respect to enterprises established in pursuance of industrial policy harmonization;
- Promote development projects in the less developed member states of the community. 31/

As part of the FCCD, the Authority of Heads of State and Government approved the Community Telecommunications Programme (CTP) at its May 1979 meeting in Dakar. In May 1980, it created a special fund for the CTP (to be administered by the FCCD) as a means of facilitating the execution of the program.

The special fund, totalling \$8.8 million, is to be used to guarantee loans by member states to develop their telecommunications networks and to grant subvention to member states for improved maintenance of telecommunications network equipment, training and refresher courses for technicians, and procurement of spare parts and measuring instruments.

The CTP has as its main component a project designated as "Integration of Telecommunications Networks within ECOWAS Member States," or INTELCOM. The first phase of INTELCOM involves Benin, Nigeria, Bourkina-Fasso, Niger, Ghana, Ivory Coast and Mali, while the second phase involves Senegal, Mauritania, Gambia, Guinea-Bissau, Guinea, and Mali.

In regard to Phase A, six of the seven countries have signed loan agreements with the Fund:

Country	Amount	Amount (\$)	Rate%	Period (Grace)
Mali	FF 25,393,000	3,475,000	7.5	18 (3)
Ghana	FF 5,454,000	745,000	7.5	17 (5)
Niger	DM 1,029,072	425,000	6.5	15 (3)
Benin	FF 3,859,850	530,000	7.5	15 (3)
Bourkina-Fasso	FF 30,370,200	4,150,000	6.0	18 (7)
Ivory Coast	FF 10,623,385	1,450,000	7.5	15 (3)
Total		10,775,000		

A loan agreement with Nigeria is expected to be signed in the near future. The loans are meant to finance PANAFTEL links between the seven countries and with the rest of the world. Some of the funds will be used to expand and improve exchanges in secondary cities, such as Oradora in Bourkina-Fasso and Bougouni in Mali.

Contracts for \$11 million worth of equipment and construction have been signed with Siemens AG (German), and four French firms: Telecommunications Radioelectriques et Telephoniques (TRT), Jeumont-Schneider, C.G.C.T., and La Signalisation. Phase A construction should be completed by 1987.

Phase B is slightly more ambitious, totalling \$24 million in six countries. British Telconsult (a subsidiary of the government-owned telephone company, British Telecom) has completed feasibility studies for the project, which were financed by grants of ECU 250,000 (\$215,000) from the EEC. The EEC has committed ECU 10 million (U.S.\$8.5 million) to the Senegal-Gambia-Mali section of the network through a loan by the European Investment Bank (carrying a 2% rate of interest and a 20 year repayment period). The United States was involved at the earliest stage of INTELCOM Phase B. However, the Director of the ECOWAS Fund, Robert Tubman, claimed in our interview that the EEC funded the full amount of the INTELCOM proposal during a delay of several months that USAID took "to study the request." The U.S. has financed ECOWAS projects in other sectors.

SADCC

The Southern African Development Coordination Commission was established in 1980 in order to reduce the member countries' dependence on South Africa, particularly with regard to transport and communications. The nine member nations (Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia, and Zimbabwe) subsequently created the Southern African Transport and Communications Committee (SATCC), based in Maputo, to deal specifically with these two problems.

SATCC has significant success in the short time since it began operation, raising over \$113 million for 15 projects in member states including:

Year	Country	Project	Amount (US\$ Millions)	Source of Financing (U.S.\$ Millions)
1981	Botswana/ Zimbabwe	Microwave System	5.00	3.00 Norway 2.00 Sweden
1981	Zambia	Switching Center Expansion	3.30	3.10 Sweden
1981	Zimbabwe	Microwave System	10.00	10.00 Norway/ Sweden
1982	Malawi/ Zambia	Microwave System	1.70	1.70 Japan
1982	Mozambique	Satellite Equip- ment	12.80	6.50 Kuwait 6.30 France
1982	Mozambique	Microwave System Switching Center Telex Exchange Int'l Switching Center	152.00 3.70 2.50 3.50	50.00 Italy 20.00 Norway/ Sweden
1982	Swaziland	Satellite Center Station	3.50	3.50 Canada
1982	Zimbabwe	Int'l Switching Center	4.00	4.00 Sweden
1983	Lesotho	Satellite Circuits	0.05	0.05 Germany
1983	Mozambique/ Zimbabwe	Open-Wire System	1.00	0.60 KFAED
1983	Tanzania/ Malawi	Microwave System	6.10	2.60 France
1983	Zambia	Microwave Terminal	0.20	0.20 Internal

The SATCC is in the process of organizing funding for 15 additional projects in Angola, Mozambique, Malawi, Tanzania, Swaziland, Zambia, and Zimbabwe. Including the unfinanced portion of earlier projects, the total needed is \$181 million. ^{32/} The U.S. efforts in the Southern African region have not to date included any funding for SATCC projects.

Others

- UNDP- The United Nations Development Program spends approximately 3 percent of its budget annually on telecommunications, including support for UNTACDA(81%) and the ITU's TCD(82%). The U.S. contribution is about 18% of the UNDP budget, followed by Sweden and Holland with 10% each, Germany and Denmark with 8%, and Norway and Japan with 6%. Telecommunications expenditures in 1982 were about \$9.6 million.
- UNESCO- The United Nations Educational, Scientific, and Cultural Organization donated approximately \$500,000 for the ITU's Integrated Rural Development Study. The U.S. contributed 25% of the UNESCO budget, followed by the U.S.S.R(12%), Japan(9%), West Germany(8%), and France(6%).
- OPEC- The OPEC Fund made its first loan for telecommunications in 1982 for \$2.5 million to Cape Verde, in a co-financing arrangement with Brazil.
- BADEA- The Arab Bank for Economic Development in Africa supports development projects in non-Arab Africa. BADEA has made \$27.7 million in loans for telecommunications, including projects for PANAFTEL, Comoros, Mozambique, Zimbabwe, Congo, Gabon, and Senegal.
- AFESD- The Arab Fund for Economic and Social Development supports projects in Arab areas of Africa. AFESD has made \$23 million in telecommunications loans to Sudan, Djibouti, and Mauritania since 1975.
- BDGL- The Banque des Etats du Grand Lacs was founded in 1982 to support economic development in the member states of Zaire, Burundi, and Rwanda with the support of the African Development Bank. No loans have been made for telecommunications at this writing, but are part of the BDGL program.
- The East African Development Bank made several million dollars worth of telecommunications project loans through 1977, but was paralyzed in that year by the withdrawal of Kenya from membership (Tanzania and Uganda are the other members). With the renewal of good relations between the three countries in the last year, the EADB may renew operations in the sector.

B. Bilateral Institutions

"You can't really say that there is a free market operating in telecommunications [in Sub-Saharan Africa]. For one thing, African officials base their purchasing decisions outside the normal categories of cost, quality, or service. For another, the largest and most advanced producer of telecommunications products [the United States] is not even a factor on this continent."

- Wane Ismaila
Director of Research, UAPT 33/

The important bilateral institutions in Sub-Saharan Africa are comprised of ten giant telecommunications companies and the eight countries (along with the EEC*) in which they are based. In every case, these companies and countries work together for their mutual benefit. Subsidized loans, grants, and technical assistance sells equipment and raises company profits to be sure, but as a byproduct it increases employment and GNP, supports the high-technology segment of the economy, and eases trade deficits.

France and the United Kingdom have taken advantage of their historical ties in many parts of the world to get an edge in the telecommunications sector, and have been far more successful at selling equipment than most. Most of the other countries involved in the telecommunications export business have very small home markets (particularly Holland, Sweden, and Canada), and need to sell large amounts of equipment abroad in order to be able to

*The EEC is included as a bilateral instead of a multilateral organization because of restrictions on the use of loans committed for telecommunications (i.e., tied to purchases in member countries, and heavily tilted towards the larger members: France, Germany, and the United Kingdom).

produce efficiently and benefit from economies of scale (i.e., lower prices and higher profits).

The scramble in Africa and other "new" markets, by the Europeans in particular, can be traced to telecommunications export performance over the past five years. Figure 26 shows the statistics for the ten largest exporters in the sector. While all countries experienced growth during the five years, this growth is discounted by inflation averaging 10-11 percent. This becomes apparent in Figure 27, where Japan, Canada, and "other" countries (the three experiencing real growth) all boosted their market shares significantly. Sharp drops were suffered by W. Germany, the U.K., France, Italy and Benelux, while less severe setbacks were dealt to Sweden and the United States.

In order to reverse their decline, most of these countries have reverted to a "hard-sell" approach, especially in Africa, Asia, and Latin America, because these three areas are considered to have very high growth potential. The African market alone could easily absorb 5 or perhaps 7 million telephones and related switching equipment, cabling, and construction materials worth more than \$20 billion before the turn of the century. Already, the major telecommunications companies in France and the United Kingdom* derive more than ten percent of their profit from the African market. The rest of the pack is close behind. And it probably will not be long before non-European firms begin infiltrating not only the African market, but the European market

*Plessey, CIT-Alcatel.

FIGURE 26

TELECOMMUNICATIONS EXPORTS AND EXPORT GROWTH, 1977-81

<u>Country</u>	<u>Telecommunications Exports (\$1000s)</u>			<u>Average Annual Growth Rate (Compound)</u>
	<u>1977</u>	<u>1979</u>	<u>1981</u>	
JAPAN	2,294,447	3,079,303	4,922,566	21.1%
UNITED STATES	2,020,248	2,464,556	3,134,779	11.6%
W.GERMANY	1,407,442	1,983,164	2,015,757	9.5%
UNITED KINGDOM	875,837	1,179,953	n.a.	10.5%*
FRANCE	693,780	1,014,458	1,008,389	9.8%
NETHERLANDS	854,363	1,000,024	945,935	2.5%
SWEDEN	607,004	916,435	919,466	11.0%
CANADA	310,742	500,616	846,775	28.5%
BELGIUM/LUXEM.	461,442	531,987	606,396	7.1%
ITALY	503,395	612,704	555,188	2.2%
Others	1,052,003	1,346,798	2,376,033	22.5%

*Through 1980

FIGURE 27

WORLD TELECOMMUNICATIONS EXPORT SHARE, 1977-81

<u>Country</u>	<u>Export Share 1977 (%)</u>	<u>Export Share 1981 (%)*</u>	<u>Net Change</u>	<u>Percentage Change</u>
JAPAN	20.7	26.5	+5.8	+28.0%
UNITED STATES	18.2	16.9	-1.3	- 7.1%
W.GERMANY	12.7	10.9	-1.8	-14.2%
UNITED KINGDOM	7.9	6.7*	-1.2	-15.2%
FRANCE	6.3	5.4	-0.9	-14.3%
NETHERLANDS	7.7	5.1	-2.6	-33.8%
SWEDEN	5.5	5.0	-0.5	- 9.1%
CANADA	2.8	4.6	+1.8	+64.3%
BELGIUM/LUXEM.	4.2	3.3	-0.9	-21.4%
ITALY	4.5	3.0	-1.5	-33.3%
Others*	9.5	12.6	+3.1	+32.6%

*U.K., 1980 exports; shares based on combined 1981 world exports and unmodified 1980 U.K. exports.

*East Asia and non-EEC Europe each represent approximately 45% of the remaining exports.

Sources: United Nations, 1981 Yearbook of International Trade Statistics (New York, 1983); and OECD and country data.

as well. All the more reason the major suppliers want to build up client relationships in the Sub-Saharan market now. A description of the relevant activities of the major telecommunications firms and their government backers follows.

Japan

Japan has moved into Africa with speed and energy. So much so, that it has become as much the nemesis of the other Western countries here as in other parts of the world. Japan's attack has been two-pronged, comprising both the commercial might of the two giant electronics firms, NEC and Fujitsu, and the helping hand of the Tokyo Government.

The Japanese dominate the African market for small earth stations and digital equipment, and run no less than second or third in the markets of other types of telecommunications equipment. NEC, the largest Japanese electronics firm experienced the following results in 1983:

Total Sales:	\$6,012,746,000*
Telecommunications Sales:	\$2,224,716,000
African Telecommunications Sales:	\$ 56,741,000 (Est.)**
Net Income:	\$ 137,629,000

Fujitsu followed close behind:

Total Sales:	\$3,986,762,000
Telecommunications Sales:	\$1,196,028,000 (Est.)
African Telecommunications Sales:	\$ 40,550,000 (1984)
Net Income:	\$ 201,104,000

*All figures converted from Japanese Yen.

**"African Telecommunications Sales:" are simply estimates arrived at by combining the percentage of sales accounted for by telecommunications equipment and services and the percentage of sales accounted for by experts to Africa. The resulting figures are by no means definitive, in part because 20-50 percent of African sales may go to North African countries or the Republic of South Africa.

These two companies and a few smaller ones join with the Japanese Government in Sub-Saharan Africa to improve their competitive position. In cooperation with the government-owned Nippon Telephone and Telegraph Corp. (NTT), several dozen Japanese experts were sent to the region to provide technical assistance, and a similar number of local personnel were sent for training in Japan as part of a government exchange program.

Since 1954, the Japanese International Cooperation Agency (JICA), and the NTT have sent or trained the following number of people in 26 countries in Sub-Saharan Africa: 34/

	1980	1981	1982	1954-82
Trainees	43	31	51	468
Experts	10	13	13	82
Survey Team	8	10	6	148
Volunteers	18	16	14	146

The government and the telecommunications companies have, in recent years, began to provide laboratory and testing equipment along with technical information. In many cases, spare parts have been provided to telecommunications administrations in Africa in exchange for local currency (making the parts, in effect, a gift).

Furthermore, through Japan's Overseas Economic Cooperation Fund (OECF), numerous projects in the PANAFTEL network have been financed. Projects in 1982 included \$27.3 million in loans and equipment

grants in Malawi, Zambia, and Kenya. Past assistance has gone to Ivory Coast, Nigeria, Sudan, Ethiopia, and Tanzania.

Japan's estimated technical assistance (JICA) contribution to Sub-Saharan telecommunications is extensive: ^{35/}

Year	Total Technical Cooperation	Telecommunications	Sub-Saharan Telecommunications
1979	\$145,380,000	\$16,137,200	\$1,290,900
1980	\$170,304,400	\$18,052,265	\$1,353,900
1981	\$215,931,900	\$25,911,800	\$2,228,400
1982	\$224,370,800	\$24,680,700	\$1,851,000

Telecommunications generally accounts for 10-12 percent of technical cooperation expenses, and Sub-Saharan Africa is allotted roughly 8 percent of that figure.

It has not been government support alone that has made Japan a fierce competitor in Sub-Saharan Africa. According to several African administrators, Japan's commercial success in the region stems partly from the country's reputation for quality equipment but, to a greater extent, because Japanese enterprises are always "looking toward the next sale." Thus, they also have a reputation for making concessions on spares (as above), having an extensive and coordinated follow-up system, and sticking with even money-losing contracts (whereas many operators simply abandon such contracts). Most of these local officials assert that Japan will continue to dominate most areas of the market where the former colonial powers have not intervened, and claim that the Japanese

are planning to devote more of their marketing to Africa in order to maintain their traditionally high growth.

Germany (FRG)

Germany, like Japan, has no recent colonial connections in Africa that turn to the country by reflex. Instead, these two countries are "self-made" in the telecommunications sector.

The Germans have only two powerful entities in Africa since the purchase of AG Telefunken's telecommunications operations by France's Thomson-CSF), Siemens AG and Kreditanstalt für Wiederaufbau (KfW). Siemens is one of the largest electronics firms in the world and the largest in Western Europe. While the firm does not control any particular area of the African market, its technologies perform well in all areas and are particularly excellent in the fields of digital switching, cables, and optical fibers. Its operating results in 1983 were:

Total Sales:	\$13,610,689,600*
Telecommunications Sales:	\$ 3,810,993,100
African Telecommunications Sales:	\$ 76,219,862 (Est.)
Net Income:	\$ 276,551,700

The KfW has also become very active in Sub-Saharan Africa, contributing about \$49 million to telecommunications since 1980 alone. The organization's loans break down as follows (in millions):

*All figures converted from Deutsche Marks.

Year	Total Loans/Credits	Loans/Credits for Telecommunications[%]	Loans/Credits for Sub-Saharan Telecommunications
1980	DM 2,846 (\$1,138)	DM 57.0 (\$22.8) [2.0]	DM 39.0 (\$15.6)
1981	DM 2,866 (\$1,102)	DM 93.0 (\$35.7) [3.2]	DM 59.4 (\$22.8)
1982	DM 2,718 (\$1,006)	DM 78.4 (\$29.0) [2.9]	DM 28.4 (\$10.5)

Sub-Saharan Africa accounted for between 37 and 68 percent of telecommunications lending in those years, including the following projects: 36/

Year	Country	Project	Amount (Millions)	Credit Type
1980	Zambia	Tel. Equipment	DM 15.0 (\$6.0)	Loan
1980	Zambia	Signaling Syst.	DM 24.0 (\$9.6)	Loan
1981	Kenya	Tel. Switching	DM 25.0 (\$9.6)	Loan
1981	Lesotho	Tech. Equipment	DM 21.0 (\$8.1)	Grant
1981	Lesotho	Tech. Assistance	DM 2.9 (\$1.1)	Grant
1981	Tanzania	Tel. Switching	DM 10.5 (\$4.0)	Loan
1982	Mali	Tel. Equipment	DM 2.4 (\$0.9)	Grant
1982	Niger	Tel. Equipment	DM 26.0 (\$9.6)	Grant

In addition to the KFW, in combination with the Deutsche Entwicklungsgesellschaft (DEG) credited DM 19.1 million (U.S.\$7.1 million to BOAD in soft loans. The DEG separately contributed CFA 500 million (U.S.\$22 million) to the equity of BOAD in 1978, and has also supported a cable-producing plant in Nigeria. Virtually all of the money loaned or granted by the two German organizations is "tied" to the purchase of German telecommunications or other equipment and the use of German technical assistance.

United Kingdom

The United Kingdom has had a "head start" in Africa, as a legacy from the colonial period. Crown Agents are still quite active, and in fact, Cable & Wireless PLC, once one of the most influential British companies in Africa, still owns parts of telecommunications entities in Nigeria, Cameroon, and Sierra Leone, and has recently signed a thirteen year management contract with the Botswana Telecommunications Corporation. ^{37/} Several British equipment manufacturers are competing in the Sub-Saharan market, including Standard Telephones & Cables PLC, Pye Telecommunications, BICC, and Marconi. The largest by far, though, is Plessey, which had the following results in 1983:

Total Sales:	\$1,612,125,000*
Telecommunications Sales:	\$ 761,191,500
African Telecommunications Sales:	\$ 71,625,800
Net Income:	\$ 219,543,000

Plessey has a very strong African presence, including ownership of interests in Kenya and Zimbabwe, and regional sales of 10.4 percent of total 1984 turnover. Notably, it also has the highest average return on equity of the major telecommunications companies.

The U.K. has not made a parallel effort within its development agency, the Commonwealth Development Corporation (CDC). In the period 1978-81, CDC did not fund any telecommunications projects in the Sub-Saharan region, unless as limited components of projects in other

* All figures converted from Pounds Sterling.

sectors. However, the government owned British Telconsult completed the ECOWAS feasibility study (above) and its parent company, British Telecom, participated in some training and exchange programs.

France

Thanks to its colonial holdings of the past, France has held on to more of the African telecommunications market than it probably would have otherwise. as it stands, Japan is her only serious competitor for dominance on the continent.

As is often the case, the government and the telecommunications corporations cooperate with each other to improve their respective interests. however, in the case of France, cooperation is much closer than usual because the government owns the two largest telecommunications firms. CIT-Alcatel is owned by the Compagnie Generale d'Electricite, the French energy and electrical equipment concern. Thomson-CSF remains nominally independent, but reports to the office of the French Minister of Industry from which it will receive over \$700 million in subsidies in 1984. ^{38/}
the operating results of the companies in 1981 were:

CIT-Alcatel:

Total Sales:	\$1,543,209,900*
Telecommunications Sales:	\$ 756,172,800
African Telecommunications Sales:	\$ 83,179,000 (Est.)
Net Income:	\$ 11,749,000

*All figures converted from French Francs.

Thomson-CSF:

Total Sales:	\$3,097,407,400*
Telecommunications Sales:	\$ 487,500,000
African Telecommunications Sales:	\$ 43,875,000 (Est.)
Net Income:	\$ (7,900,000)

The two companies jointly own Telspace, which produces and installs satellite earth stations. Telspace has installed 14 Standard A stations in Sub-Saharan Africa in recent years, including at least one in every former colony: Benin, Bourkina-Fasso, C.A.R., Cameroon, Congo, Gabon, Ivory Coast, Madagascar, Mali, Mauritania, Niger, Senegal, and Togo. They have begun to move into non-Francophone areas as well, with sales in Sudan, Nigeria, and Mozambique.

The French government unabashedly supports and promotes these companies in Sub-Saharan Africa through the Caisse Centrale de Cooperation Economique (CCCE). The CCCE is one of the most active development agencies in the Sub-Saharan telecommunications sector. The CCCE's loans since 1980 (in millions):

Year	Total Loans/Credits	Loans/Credits for Telecommunications[%]
1980	\$323.5	\$26.2 [8.1]
1981	\$373.3	\$37.7 [10.1]
1982	\$552.0	\$27.6 [5.0]

*All figures converted from French Francs.

Sub-Saharan Africa accounted for over 80 percent of telecommunications lending in those years (outside DOM/TOMs) including the following projects in cooperation with the World Bank:

Year	Country	Project	Amount (Millions)	Credit Type
1981	Rwanda	Rural/Urban Equipment	\$ 1.95	Loan
1982	Mali	Switching Equip. Rural Networks	\$ 7.70	Loan
1982	Bourkina- Faso	Rural Networks	\$13.00	Loan
1983	Mauritania	Satellite Earth Stations	\$ 3.90	Loan

In addition, another French development organization, Fonds d'Aide et Cooperation, donated \$1.95 million to the Rwanda project. Further efforts in Africa were made by the state-owned Service de Controle Technique des Telecommunications (field testing), France Cables et Radio (operations), SOFRECOM (export promotion), Satel-Conseil (satellite equipment studies), Bureau d'Etudes des Postes et Telecommunications (management), and Telediffusion de France (training and engineering assistance).

The French have also been major influences in the multilateral banks and organizations, including:

- The largest number of employees, consultants and experts in the TCD;
- The second largest contribution (after UNDP) to UNTACDA;
- The largest non-African participant in the African Development Bank;

- A close relationship with and the largest non-African contribution to UAPT;
- Capital ownership in BOAD plus a soft tied-loan of \$18 million;
- The largest non-African participation in BDEAC;
- Four French firms as sole construction contractors for ECOWAS INTELCOM Phase A;
- About \$9 million in contributions to SADCC telecommunications projects.

The French Socialist Government of Francois Mitterand, has staked its prestige on high technology, and with full control of the French telecommunications industry, the major French banks, and the French development agencies, it can and will do everything in its power to remain dominant in the African telecommunications sector.

Netherlands

The Dutch were the first to claim a part of Sub-Saharan Africa, but their merchant fleet has been replaced there by the Philips Corporation, the largest household appliance and electronics company outside North America. Philips has a strong presence in Africa, and even though it represents less than 3 percent of their annual sale, Philips' size makes that 3 percent a challenge to their competitors. In 1983, Philips performed as follows:

Total Sales:	\$15,092,400,000*
Telecommunications Sales:	\$ 1,181,700,000 (Est.)
African Telecommunications Sales:	\$ 35,450,000
Net Income:	\$ 141,500,000

*All figures converted from Dutch Guilders.

In an effort to boost its sales in Africa and other developing areas, Philips in 1983 signed an agreement with AT&T to form a joint venture known, simply enough, as "AT&T and Philips Telecommunications Corporation," based in Holland. The venture will begin by marketing digital public telephone exchanges outside the United States, and later expand to produce and sell other types of telecommunications equipment (see AT&T below).

The Dutch government, through the Financierings Maatschappij voor Ontwikkelingslander (FMO) and the Netherlands Ministry of Development Cooperation (NMDC), has also shown some interest in the telecommunications sector, but most often outside of Africa (e.g., several million dollars each has been allocated in recent years to Surinam and Indonesia, both former Dutch colonies). In 1982, the NMDC co-financed a telecommunications project in Bourkina-Fasso with the French CCCE and the IDA, providing \$3.2 million of the \$17 million loan. The NMDC has also contributed several hundred thousand dollars to the ITU and regional banks to subsidize the salaries of Dutch telecommunications experts.

European Economic Community

The Germans, French, and Dutch are all members of the EEC (along with Belgium, Denmark, Greece, Ireland, Italy, Luxembourg, and the U.K.), which has been independently active in the telecommunications sector through two affiliate bodies, the European Development Fund (EDF) and the European Investment Bank.

The European Development Fund (EDF) has been the less active of the two (financially), spending roughly \$4.5 million in the last two years. Project countries included Ethiopia, Sudan, Botswana, Lesotho, Malawi, and Swaziland (technical studies performed by ITU, economic/commercial studies by EEC members). Financing was also provided for the AFSAT feasibility study (see above) for UAPT.

The European Investment Bank (EIB) has allocated about 3.3 percent of its funds to telecommunications since the 1981 Lomé Convention with developing countries (the ACP or associate states).

Total expenditures were ECU 41.8 million (U.S.\$55 million) for projects in Togo, Cameroon, Ivory Coast (ECU 10 million), ECOWAS (ECU 10 million, see above), Zimbabwe (ECU 15 million), and a soft loan to BOAD (see above).

Together with the European Space Agency (ESA) and the Federal German Government, the EDF and EIB also supports Eurospace, a communications and transportation consulting firm. Eurospace, according to reliable but unconfirmed reports, is apparently the source of an offer to "give away" satellite capacity to the OAU or some pan-African organization, in return for a pledge to purchase terrestrial components from EEC manufacturers (which would probably most benefit France). While appearing exceedingly generous at first glance, the rationale is sound; the space segment costs of a satellite system are bound to be but a fraction of the total costs, with the ESA and its backers

recovering the costs of the "gift" through earnings on terrestrial equipment sales.

Sweden

Sweden, while far smaller in both population and overall telecommunications exports, sells far more equipment in Africa than do the Dutch, the Canadians, and the Americans combined. Once again, this is a result of a large telecommunications manufacturer cooperating with an activist government.

The large telecommunications company, in fact the fourth largest in the world (after AT&T, ITT, and Siemens), is Ericsson. Ericsson's world market share for telephone exchanges is over 13 percent, and has the fourth largest share of the African market. Ericsson also has the second highest average return on equity of any of the major manufacturers. Its 1983 results were:

Total Sales:	\$3,155,500,000*
Telecommunications Sales:	\$1,063,500,000
African Telecommunications Sales:	\$ 63,810,000
Net Income:	\$ 219,750,000

Ericsson is backed strongly by the Swedish International Development Authority (SIDA) as well as the Norwegian Agency for International Development (Norway's Elektrisk Bureau has been a partner with Ericsson on several African projects). Both of these agencies have spent about 3-5 percent of their development budgets in the

* All figures converted from Swedish Kronors.

telecommunications sector in recent years (about 70 percent of which has gone to Sub-Saharan Africa). Between 1981 and 1983, Sweden and Norway have provided \$48.1 million to the SATCC for telecommunications equipment (where Ericsson manufactured the appropriate components, they were selected as the project vendor). SIDA has also provided telecommunications assistance to ITU and AFDB projects, and recently contributed \$12 million to the Ethiopian Telecommunications Authority in a co-financing arrangement with the IDA, the AFDB, and Italy.

Canada

Canada has been the fastest growing telecommunications exporter in the industrialized world, nearly tripling its sales in the last five years. As a result, it has moved up from the tenth largest exporter to a virtual tie with the Netherlands and Sweden for sixth place. The telecommunications industry also has a good relationship with the Canadian Government. However, few Canadian firms have entered the Sub-Saharan market yet, and those that have have done so on a very limited scale. The largest telecommunications company, Northern Telecom, sells perhaps \$3 or 4 million annually in Africa, or about one-tenth of one percent of its total sales. Another Canadian company, SPAR Aerospace, has had more activity in Eastern and Southern Africa, most recently a \$3.5 million contract to build earth station facilities in Swaziland. This particular contract had 90 percent of the foreign exchange component funded by the Canadian Government in combination with supplier and credits. 39/

CIDA, the Canadian International Development Agency, also has but an incipient presence in the African telecommunications sector. Aside from a small number of equipment credits, CIDA has mostly been involved in technical assistance and training. In the last three years nearly 300 Canadian communications experts have been sent to the region to provide technical advice to dozens of countries. CIDA has also contributed more than \$4 million to ECOWAS to be used for training technicians in several of the member states.

United States

Last, and indeed least, in the Sub-Saharan Africa telecommunications sector is the United States. While the United States is, by far, the most generous donor to the developing countries and is the home of the largest telecommunications manufacturer on earth, its presence is nearly negligible.

The three giant U.S. telecommunications firms, AT&T, ITT, and GTE, had combined sales of over \$90 billion in 1982, but sales to Africa account for only about \$11 million, or about one-hundredth of one percent. ITT's African operations contribute most of the sales; AT&T has sold less than \$1 million in the last four years, and GTE slightly more (although it has recently signed a major contract with Zimbabwe). As earlier mentioned, AT&T has entered into a joint venture with Philips to produce and market telecommunications equipment last year. Although the venture may compete in Africa, it will be several years at minimum before the new company moves

outside developed markets, which account for the bulk of equipment sales. Generally, U.S. companies have been unusually hesitant about the African market. Assistant Secretary of State Chester A. Crocker criticized U.S. business interests at a recent event sponsored by the Los Angeles Task Force on Africa, saying that American companies have not "taken the initiative in developing opportunities" but have "waited for Africans or third parties to come to them."

Government contributions to the sector are equally meager.

USAID allocated about \$4.6 million in Development Assistance and \$42 million in Economic Support Funds to the sector, representing about 0.9 percent of the Agency's economic assistance (this already low percentage is not inclusive of P.L. 480 (food aid), Peace Corps, or other types of assistance). Only a tenth of this \$42 million goes to Sub-Saharan Africa. ^{40/} The Ex-Im Bank devotes almost 3.8 percent of its annual loans to telecommunications equipment, but because so little equipment is exported to Sub-Saharan Africa, the Ex-Im's regional allocation to the sector is miniscule.

The Overseas Private Investment Corporation (OPIC), has provided political risk insurance and financial services in the sector, but not as yet in Sub-Saharan Africa.

One bright spot in the U.S. assistance program is its support for the United States Telecommunications Training Institute (USTTI). USAID contributed \$2.25 million to USTTI in fiscal year 1983, while a matching grant (in kind) came from American corporations such as IBM, MCI, ITT, GTE, COMSAT, Harris, and AT&T. In the last

two years USTTI has trained about 300 participants in electronic equipment operation; network planning, design, and operation; satellite communications management; and the like. However, approximately 70 percent of the trainees (who should be employed with a national telecommunications entity) were self-funded or sent by their own countries. In fiscal year 1983, USAID helped only 11 of 176 participants (6%) aside from its organizational contribution.

Future U.S. involvement in the sector is looking a bit more hopeful. Interested elements of the USAID Bureaus of Science and Technology (S/T) and Policy and Program Coordination (PPC) along with the State Department's Office of the Coordinator for International Communications and Information Policy (T/CIP) have begun to organize a more coordinated approach to communications policy, especially in regard to the developing countries. PD-10, the communications policy document mentioned earlier is one example. Science and Technology plans to organize several conferences on communications in Africa. And PPC's Bureau for Program Development and Policy Review has just recently supported a National Science Foundation conference focusing primarily on African problems in the telecommunications field.

Another hopeful sign has been Congress' creation of the Inter-Agency Group on the Private Sector in Africa, which includes the Export-Import Bank, USAID, and the Department of State, Commerce, Treasury, and Agriculture. The Group should be helpful in coordinating future aid-trade linkages and private investment

initiatives in the sector. Congress has also approved the Administration's \$500 million Economic Policy Initiative, which includes \$75 million available to promote economic reforms in government-controlled African sectors such as telecommunications. Finally, Congress has given AID and the Ex-Im Bank the authority to grant concessional credits for export promotion, to respond to predatory financing by some countries mentioned in this report.

Others

- Italy - The Italian Development Cooperation Department (DCD) has become involved recently in Sub-Saharan telecommunications project financing, and in a very big way. In 1982, the DCD contributed \$50 million to Telecommunicacoes de Mozambique's modernization program. The DCD recently loaned \$25 million to the Ethiopian Telecommunications authority in co-financing arrangement with the IDA. Several large Italian companies have benefitted from the government program, especially Italcable, ITT Telecomunicazioni, and Telespazio.
- Brazil - The Brazilian Government co-financed two telecommunications loans for Cape Verde (a former Portuguese colony) in 1982 with the OPEC Fund and the KFAED. Amount: approximately \$3 million.
- Saudi Arabia - The Saudi Fund for Development has made loans totaling \$14 million to the Sudan and Zimbabwe for telecommunications modernization projects.
- Kuwait - The Kuwait Fund for Arab Economic Development (KFAED) has loans for switching equipment, modernization, and microwave systems to the Comoros, Mozambique, and Cape Verde. Cumulative lending of KFAED for telecommunications is \$10.8 million.
- Belgium - The Belgium Administration for Development Cooperation has assisted telecommunications entities in Rwanda and Zaire (former colonies) in past years.

C. Overview

External institutions contributed more than \$336 million to Sub-Saharan telecommunications in 1982, and an estimated \$2 billion since 1960. That the sector would be quite different without these organizations is made quite apparent by the realization that their contributions are actually higher than the normal investment of the African countries themselves during the same period. Approximately 46 percent has come from multilateral organizations, with about 54 percent generated by bilateral development agencies and corporations (see Figure 28).

The multilateral contributions are heavily weighted by loans from the major development banks; overall 1982 spending broke down as follows:

	1982 Spending	% Multi.	% Total
International Banks	\$109,600,000	71.1	32.6
African Banks & Funds*	\$ 19,010,000	12.3	5.6
Arab Banks & Funds	\$ 14,910,000	9.7	4.4
International Organizations	\$ 10,256,000	6.6	3.0
Regional Organizations	\$ 540,000	0.3	0.2
Total	\$154,316,000	100.0	45.8

*Including Sub-Regional Banks

The international and Arab banks have been expanding financing for rural and inter-country projects, although a majority of loans remain devoted to switching equipment and general network modernization. The African banks (AFDB Group, BOAD, BDEAC) have concentrated more on urban networks and equipment (although greater rural

TELECOMMUNICATIONS CONTRIBUTIONS FROM EXTERNAL SOURCES

Source	Cumulative Sub-Saharan Loans/Assistance	1982 Sub-Saharan Loans/Assistance
AFDB	245,360,000	11,030,000
World Bank	228,100,000	52,100,000
IDA	186,200,000	57,500,000
U.N. Agencies*	99,429,000	10,100,000
BADEA	27,700,000	10,000,000
AFESD	23,000,000	2,410,000
BOAD	19,400,000	6,320,000
NTF	18,500,000	-0-
BDEAC	11,290,000	1,660,000
ECCOWAS	10,775,000	-0-
OPEC	2,500,000	2,500,000
AFDF	2,240,000	-0-
INTELSAT	685,000	156,000
UAPT	n.a.	540,000
Total Multilateral	875,179,000	154,316,000
Italy**		50,000,000
Japan		29,151,000
France		28,900,000
Sweden		24,300,000
EEC		12,500,000
Germany (FRG)		10,500,000
Kuwait		7,500,000
Saudi Arabia		6,960,000
Canada**		6,000,000
Netherlands**		5,300,000
United States		4,200,000
Brazil		3,000,000
Total Bilateral***		182,311,000
Grand Total		336,627,000

*UNDP, ITU, and UNESCO contributions to ECA/UNTACDA and TCD/Africa.

**Based on unofficial tabulations of third party sources (incomplete).

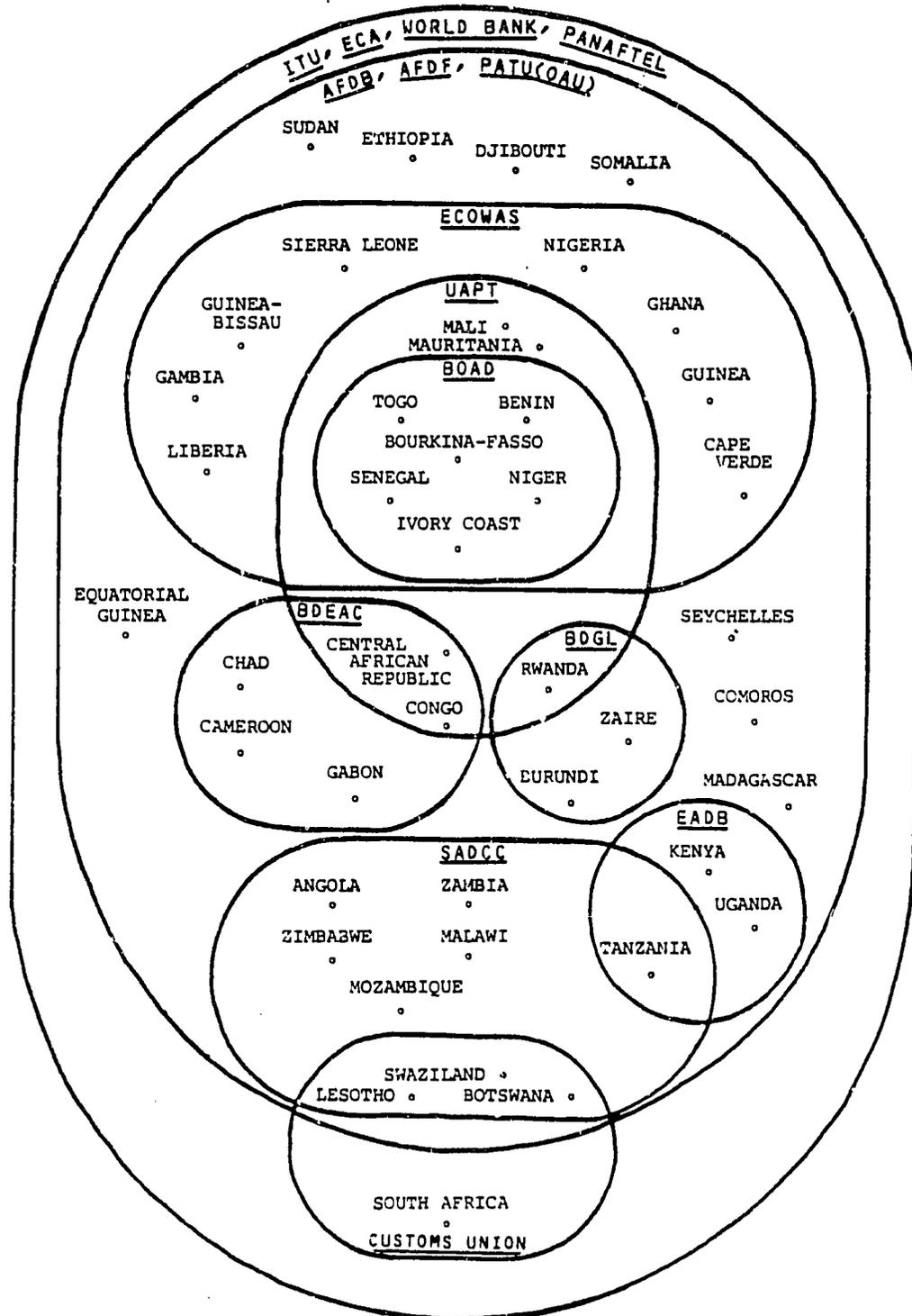
***All bilateral totals are best estimates; not available: United Kingdom and Belgium.

involvement is projected), and the international organizations have done most of their work in the technical assistance and training areas. There has been a good deal of work by these organizations, in one form or another, to breach the political barriers that exist on the continent and permit improved service provision, technical coordination, and multi-country financing arrangements. Figure 29 shows, in diagrammatic form, the Sub-Saharan multilateral institutions (except the two Arab organizations) and is a good indication of the degree of cooperation among African countries in the telecommunications sector.

Developed country involvement in the Sub-Saharan telecommunications sector, rising since the mid-1970s, has begun to level off, although the \$182 million contributed in 1982 is probably a record. For France and the United Kingdom, the historical ties with most of Africa have contributed to outstanding sales of telecommunications equipment. Others have used development assistance to propel themselves into a greater share of the African market. Italy, the largest donor in the sector, is the tenth largest world exporter of telecommunications equipment, but ranks seventh in Africa. Japan, the second largest donor, has managed to actually move ahead of the United Kingdom in the African market. Sweden, ranked seventh in the world, has used its telecommunications project assistance (the fourth highest) to become the

FIGURE 29

INTERNATIONAL, REGIONAL, AND SUB-REGIONAL ORGANIZATIONS
FOR CO-OPERATION AND INTEGRATION IN THE
SUB-SAHARAN TELECOMMUNICATIONS SECTOR



fifth largest supplier in Africa. The complete comparison:

Country	World Telecom. Exports (Rank)	African Sector Financing (Rank)**	African Telecom. Exports (Rank)*
France	5	3	1
Japan	1	2	2
United Kingdom	4	n.a.	3
Germany (FRG)	3	5	4
Sweden	7	4	5
Netherlands	6	9	6
Italy	10	1	7
Canada	8	8	8
United States	2	10	9

*Not including Belgium

** Not including EEC

If one considers that telecommunications sales in the region by these countries are close to \$700 million annually, the return on their contributions is very high indeed. This is but one result of what has been called a "beggar-thy-neighbour" strategy carried out by a number of European countries (which control above 80 percent of regional sales). In essence, France, Sweden and some others target concessional assistance on telecommunications equipment, leading to bulk purchasing of equipment from their respective national telecommunications manufacturers. Once this is accomplished, the Sub-Saharan telecommunications entity has become a "junkie" -- since new equipment must be compatible with that previously purchased, only a substantial extra investment would allow, say, American equipment to be added on to French equipment (because of differing electronic languages, power consumption, etc.). If a manufacturer does not get at least some equipment into a country's system at the initial stages of a

modernization, there is a probability that it will be locked out of future sales opportunities until the next generation of equipment is purchased.

Ultimately, the rule of the telecommunications competition in Sub-Saharan Africa and other developing areas is that long-term trade considerations take precedence over economic development in the recipient country. Almost all bilateral telecommunications assistance is tied to the purchase of equipment from donor country manufacturers and the use of donor country nationals for technical assistance. Equipment that would not meet the requirements of developed countries are sometimes "dumped" in the region, for no better reason than that one can get away with it. According to several officials of the development banks, there is little hesitation about bringing national influence to bear on purchasing decisions within the banks by a number of European countries. The limits of behavior have been defined most aggressively in this sector.

Today's political and economic realities indicate that competition for export markets will remain fierce, and that loss-leader (sometimes known as "predatory") financing will continue. Further use will be made of state-supported consulting firms which claim impartiality, but almost invariably recommend the equipment of their own countries. If necessary, telecommunications manufacturers will not only be assisted at the point of sale, but subsidized at the point of production. And the multilateral institutions will

continue to feel the pressure to buy country "X," especially with the increased use of co-financing and parallel financing, and even more so with an increasing amount of their capital held by some of the most aggressive "predators."

At the moment, all of this jockeying may not be too bad for Sub-Saharan Africa. After all, hundreds of millions of dollars in loans and grants for the sector are pouring into the region each year. Africans are receiving free or subsidized technical assistance and training. Thus networks are expanding and improving in quality, albeit slowly. In the long-run, however, the often incomprehensible, high-level maneuvers of competing governments and manufacturers may redound to the disadvantage of the Sub-Saharan countries. In perhaps five years or so, they will begin to find themselves in possession of millions of dollars of increasingly complex equipment (never in place long enough for them to master); cornered into semi-permanent client relationships with single manufacturers or countries; and locked into a dependency on ITU or other external expertise in order to cope with a set of circumstances parallel to those currently experienced, but an order of magnitude more complex.

III. INITIATIVES IN THE SUB-SAHARAN TELECOMMUNICATIONS SECTOR

"National economic development, regional political stability and a healthy global economy require effective communications and information capabilities. Developing countries can gain significant economic and social advantages for their internal development, as well as a more effective voice in the responsible conduct of world affairs, through improved communications."

- Undersecretary of State
James F. Buckley
Current Policy 41/

The nature of telecommunications is such that those who have access to it have certain advantages over those who lack access to it. In terms of development, the logical course would be to assure the equitable dispersion of telecommunications so that large elements of society are not deprived of the intrinsic benefits of the technology. From a wider perspective, telecommunications support is a logical extension of an American foreign policy that attempts to prevent the introduction of new international restrictions or regulatory mechanisms affecting communications and the free flow of information. Weak telecommunications networks in the developing countries create a certain defensiveness on their part that results, for example, in demands for shared ownership of orbital slots for satellites or a New International Communications Order. As an adjunct to a strong foreign policy motivation, communications has a vast export potential, and is an area where the United States is unchallenged as the leader in technological innovation.

Moreover, there is little doubt that even with their technological leadership, U.S. telecommunications manufacturers will face

unusually stiff competition, both in the export and the home markets. And since telecommunications is a most important area of the high-technology segment of American industry, the time will most likely come when the government is asked for its implicit or explicit promotional support.

As the gears of the various foreign policy-making institutions in United States turn slowly towards a common acceptance of the importance of telecommunications and the need for a well-developed global strategic response, basic questions are raised. What are the problems of telecommunications in the developing countries? What are the roles of the development banks, the industrialized and OPEC development agencies, and other external actors? Shall the United States go about supporting the manufacturers, and simultaneously development, in the same way as its leading competitors? Parts I and II have, at least in reference to Sub-Saharan Africa, substantially answered the first two questions. The question of prospective U.S. actions, focusing particularly on the role of USAID, is the present concern

Essentially, there are two broad categories of future initiatives. First are those best made by the individual countries themselves. These internal initiatives consist of four sub-divisions:

- (1) Structural - Initiatives concerning organizational difficulties and systemic, regulatory, and strategic barriers to quality service.
- (2) Financial - Initiatives concerning problems in fiscal management and planning, budgetary allocations,

financial and staff controls, and weak investment policy.

- (3) Technical - Initiatives concerning the appropriateness of telecommunications equipment in use, the lack of standardization, and inadequate maintenance.
- (4) Cooperative - Initiatives concerning agreements between entities and neighboring countries, and coordination with private operators and internal interest and user groups.

U.S. activities in these areas could probably be limited to technical and economic advice along with grants for the purpose of initiative implementation. Such assistance would fall into the first of three substantive divisions of external initiatives:

- (1) Collaborative - Initiatives concerning cooperation by the U.S. with national telecommunications entities and with other industrialized countries.
- (2) Promotional - Initiatives concerning U.S. actions taken to improve its regional market position.
- (3) Reformative - Initiatives concerning the reorganization of strategy and perspectives in support of the sector.

These seven categories cover a good portion of the spectrum of possible initiatives. However, only the initiatives felt to be most relevant to the region as a whole and reasonably realistic were included under each of the seven. The suggestions are described in the broadest possible manner, leaving the specifics of implementation to the appropriate country authority or organization. Moreover, while the internal initiatives are directed toward the Sub-Saharan region in this instance, they could apply to most developing countries. And while the external initiatives were generated with the United States in mind, other industrialized countries could make (and may well have made) use of them.

A. Internal Initiatives

Structural

(1) Separate the postal and telecommunications entities; telecommunications has changed and grown apart from what once may have been an efficient relationship. The need for sophisticated personnel and technology, the demands for capital, and the high level of maintenance and planning required for smooth operation argue for the functional division of all remaining PTTs. A minister might retain the two portfolios, as long as finances, staff, and planning were kept distinct in each organization.

(2) Join fragmented domestic and international telecommunications organizations; the existence of two (or more) separate entities providing telecommunications services obstructs effective decision-making in the areas of rates of internal finance, access to capital markets, and efficient provision of such service as domestic satellite communications (which uses both domestic and international capacity). Furthermore, unification would reduce expenditures for spare parts and maintenance, avoid unnecessary overlap of staff and plant, and allow better coordination of technical assistance and training.

(3) Establish a degree of independence from the central government; excessive regulation has stifled the efficient operation of most telecommunications entities. The entity should be free to determine its own needs with respect to long-term hiring, salary levels, and investment policy. Flexibility of this sort is necessary in order to respond to changing technological and economic conditions as they occur. At the same time, the entity should have an explicit agreement with the central government regarding mutual expectations, renewed periodically, along with ultimate accountability for its actions. In combination with relative autonomy, this should lead to less complicated chains of commands, realistic goal-setting, and increased individual initiative and morale.

(4) Guarantee the jobs of senior managers; too many administrators and high-level personnel in the telecommunications entities are unqualified and/or politically motivated. Since the chief concern of senior telecommunications managers should be the improvement of their respective operations, and not the hold on their jobs, they should be given three or four years service contracts with appropriate clauses for negligence, criminal actions, etc. While this would not prevent their firing, it would at least make it something to think twice or three times about.

(5) Give the entity a development "mandate"; telecommunications administrators are generally too overwhelmed by many other problems to be able to concentrate on development activities. The appropriate authority should organize an "Office of Telecommunications Development," which would study and suggest changes/additions to national telecommunications plans, and act as official liaison between the telecommunications entity and outside consultants, development banks, and donor governments. The Office should also be given responsibility for monitoring rural service, and coordinating internal and external programs for telecommunications extension to rural areas.

(6) Adopt a realistic attitude regarding rural telecommunications; if an entity starts out trying to provide service to the whole rural population few, if any, of them will receive adequate connection. Begin with the realization that rural areas will not have full connection for perhaps fifty years (remembering that it took over fifty years for rural services to become relatively widespread in the industrialized countries). For the rest of the century, a goal such as the provision of service to towns and villages with a population of 5,000 or more has a good chance of being accomplished, and the requisite level of energy should be concentrated upon it. Comprehensive connection remains "pie-in-the-sky" for numerous economic and technical reasons (mentioned in Sections I and II) during the next few decades, and a measure of success is far better than no success at all.

(7) Limit the scope of tasks to be carried out by the entity; African telecommunications cannot hope to effectively become a vertical monopoly and still provide quality service. Almost all construction work, up to the point of hooking up the extension, should probably be farmed out, preferably to local firms. This would include trenching for cables and drop lines, erecting poles, stringing wire, and building any switching centers or equipment housing. The telecommunications entity would benefit from speedier and higher quality workmanship, lower costs, and a reduction in staff.

(8) Introduce a "competitive environment" into the sector; the telecommunications monopolies in most countries have become very unresponsive to consumer needs and the changing technological environment. The privatization of the telecommunications entity would be the most obvious move but, in the African countries at least, full privatization is an almost impossible notion because of perceived national security and social considerations. It should also be noted here that the public good quality of telecommunications ("resource costs not attributable to beneficiaries") argues against full privatization. ^{42/} An effort should be made, however, to actually study in detail the effects of full privatization in individual countries. Alternatively, several scenarios exist that would allow some competitive benefits to emerge:

- (a) Develop a system of incentives in the operational divisions including cash bonuses or promotions for meeting specific goals set during a fiscal year (or other definite period).
- (b) Partially privatize the entity by distributing a fraction of the shares to employees; this would have combined effect of increased staff morale (thanks to a sense of participation in the decision-making process and a new community of interests between shareholders and employees) and the resultant increase in efficiency. The shares could probably be delivered in lieu of salary increases, thereby helping to cap operating costs.

- (c) Make a determination of unprofitable business or geographic areas and discontinue service, instead licensing private operations; perhaps the employees working in that area already could be engaged. A successor company might be able to get around restrictions on salaries, employment, currency, etc. A system could be worked out that would make good losses to the private operator up to, say, 80 percent of losses in the entity's final fiscal year of operations in that area. After about three years, the contract would stipulate payment of certain percentage of profits, or if still unprofitable, the government could continue to bail out the private operation or discontinue service entirely. The telecommunications entity could also demand an initial stake in the new company in order to continue to have a say in operational policy.
- (d) Permit the creation of small independent telephone companies or rural cooperatives to provide telecommunications access to areas not currently served or within a planned service area. In the United States, for example, 1432 independent companies or cooperatives outside of the former Bell System serve 59 percent of the national territory, and operate nearly 22 million main lines, or one out of every five telephones. These companies range in size from the GTE Corporation, with \$10 billion in sales, to "mom and pop" outfits serving as little as a few dozen phones in rural communities. ^{43/} Smaller African towns could easily support a small independent company, although at a slim margin of profitability. Villages would probably not have much chance of initially profitable telephone service, but a small cooperative spreading losses among its subscribers

or a Public Call Office paid for by local tax revenues plus telephone receipts might be a possibility. In any event, current practice often prohibits such ventures. These laws should be changed in order to determine the willingness of local entrepreneurs to take on such a challenge, perhaps even in limited cooperation with a foreign supplier or donor organization.

- (e) Finally, a review should be undertaken of all rules and regulations restricting a "competitive environment" including, inter alia, the proscription of private firms from the sector, limitations on foreign borrowing and other means of access to foreign exchange in the soft-currency countries, individual disincentives such as semi-permanent wage freezes, decrees setting minimum sector employment, and preferential treatment toward habitually used contractors and suppliers.

Financial

(1) Attempt to relieve the burdensome levels of congestion and unsatisfied demand; this is possible through the two standard economic mechanisms: increasing supply, or increasing prices. More specifically, there are two realistic actions that could be taken:

- (a) Institute substantial price hikes for calls within urban areas. Cost of service should first be determined, and a rate of return well above that cost should be fixed. Contrary to increasing prices across the board, which often occurs in these countries, raising urban call tariffs does not discriminate between old and new subscribers, but effectively penalizes the geographical area where most congestion is generated. Furthermore,

such a policy is an entirely supportable means to relatively lower rural tariffs, because geographically these areas affect the functions of the network to a very small degree.

- (b) Set a minimum level of public telephone installations on a quarterly basis. Public telephones or Public Call Offices are a way to increase "subscribers served" by a number greater than that of telephones installed, because one such location may satisfy the demand of dozens of consumers. In most African countries, even though public telephones are often accompanied by lines a score deep, investment in additional locations is but a small fraction of total expenditures. Especially in urban areas, public telephone connection should be set at least at 10 percent of total investment.

(2) Establish a full-time planning office; planning functions must be taken seriously if the entity is to operate effectively. Countries that have foreign or ITU experts involved in financial planning should take advantage of their presence by having several staff members trained to complete at least basic calculations and projections. Other countries could use local auditors or borrow an economist or planner from another branch of government. Within a short period, all entities should initiate production of quarterly reports including, inter alia, subscriber and line growth, an accounting of assets and liabilities, financial interaction with outside parties (especially the central government), and geographical traffic estimates. As a stock of these reports is built up, the planning office should have the ability to discern trends, project budgetary requirements, and generally act to assist accurate decision-making within the entity.

(3) Create an efficient system for record-keeping; without adequate information, planning becomes an exercise in futility.

A small number of employees should have responsibility for collecting and collating data within each functional division. Master lists or tallies of subscribers, tariffs, receipts, expenditures, employees, equipment systems faults, and applications for service should be created and periodically updated. These should be further broken down into geographical and service components (international, domestic, telephones, telex, etc.). A determination should also be made regarding the possible need for a small data processing system for information storage.

(4) Institute effective financial and staff controls; laxity has allowed sloppy accounting and swollen operating budgets in many entities. Rules should be set up regarding approval of all expenditures above a few hundred dollars. Time-punch card systems should be considered, and staff supervisory procedures reviewed. Accounts should be kept separate from those of the central government and organized as if the entity was a commercial operation. Transfers between the central government and the entity must be recorded, and applied against future year budgets or tax payments as the case may be. Systems should be inaugurated for suspension of service to non-paying subscribers, including government ministries (under previously agreed upon circumstances).

(5) An effort should be made to restrict staff levels, particularly in countries with high operating ratios. In order to determine the real needs of the entity, all present employees should be requested to provide their division with a brief job description. These descriptions should be studied, revised, and reissued while at the same time using the information collected to judge divisional employment efficiency. If it appears that too many employees are doing the same job, and not enough doing another (etc.), appropriate action can be taken. The collated data can also be used to justify low or no-growth in staff to government central planners.

(6) Allocations for hard currency and total budgetary resources should be regularized. An agreement with the finance ministry should be made regarding the government's desired level of subscriber growth and system reliability. Then a joint determination of the resources needed to meet those requirements should be made. Subsequently, it would be far more difficult to deny the telecommunications entity sufficient hard currency for capital expenditures and local currency for operating expenditures than it is at present.

Technical

(1) Strive for gradual improvement of networks; attempts to "leapfrog" intermediate steps may lead to frustration and increased dependency. For example, digital systems are the leading edge of telecommunications technology, with many advantages over electromechanical switches including reliability, compactness, energy consumption, etc. While there is little doubt that digital technology will become widespread in future years and eventually provide superior worldwide service, there are many reasons why the jump to digital now would be detrimental to overall service in Sub-Saharan Africa. These reasons include little long-term public use testing, a high level of technological sophistication, a very high initial cost, and a need for expatriates to handle maintenance. Other problems would include expensive interfaces for analog-digital signal conversion, and electronic faults that might force the return of equipment to the manufacturer because of inadequate local facilities. Some of these same problems apply to optical fibers and satellite systems. The need in Africa is for functioning basic networks and telecommunications development, not "leap-frogging" and over-development. As one relevant bit of industry humor puts it, "dial tone before touch tone."

(2) Regular maintenance procedures should be developed or reinforced. One of the most serious problems in Sub-Saharan Africa telecommunications is the lack of regular maintenance and follow-up. The entity should test equipment and transmission quality on a periodic basis, and perform preventive maintenance along with curative maintenance, rather than just the latter. The entity should also determine if the level of technical staff is appropriate. In several countries, the lack of qualified technicians is masked by a high overall level of staff. To avoid the maintenance problems caused by such blurred distinctions, technical staff should be hired and directed under a separate system from operating staff.

(3) Increase technical staff salaries; inadequate remuneration has caused a developing country "brain drain." Even if good maintenance procedures exist and a system of training is in operation, low salaries for technicians can mean the demise of the distribution system. Salaries of technicians should be set at a level that guarantees a reasonably high standard of living in each country's economy. This is a necessity because superior salaries are to be had in the Middle East and Europe for sufficiently trained and experienced employees (although most of them would probably rather stay at home). It makes little sense for an investment in training to become an emigration support program.

(4) Standardize equipment to the extent possible. In an advanced system the telecommunications entity can afford diversity, but in a developing system many different types of equipment from different countries and manufacturers is highly inefficient. Superior service will result if the technical staff is given the chance to understand one or two types of equipment sufficiently.

(5) Investigate alternatives for rural service. On an individual country basis, the various types of equipment that can be used to provide telecommunications service to rural areas should be studied. These options would include open-wire lines,

aerial or buried cables, open-wire with stackable-carrier systems, cables with distributed concentrators based on PCM, single channel radio telephone (VHF or UHF), multi-access radio telephone, radio call systems, microwave, or small satellite based systems. All have some merits and disadvantages, briefly described: 44/

- Open-wire lines: lowest costs, uses local resources minimum foreign currency, high reliability, easy erection and maintenance, allows service to intermediate points, easily expanded, can be used with new technologies (e.g., digital), 40 kms. repeaterless transmission. Disadvantage: frequent damage.
- Aerial cable: higher capacity than open-wire, simple maintenance. Disadvantages: frequent maintenance, liable to damage.
- Buried cable: higher capacity than open-wire and little damage. Disadvantages: difficult construction, maintenance.
- Open-wire with stackable subscriber-carrier systems: multi-user capacity on one open-wire pair, unrestricted availability and privacy for up to 10 subscribers, distance of 200 kms. with repeater (also see open-wire).
- Cables with distributed concentrators based on PCM (Pulse Code Modulation): two cable pairs allow 240 subscribers in 30 locations, damage only affects single location, possibility of priority connections (e.g., PCO), queuing, and pulse metering. Maximum length of 60-90 kms.
- Single channel radio telephone: low power (2 watts continuous), easy installation, virtually maintenance free up to 100 subscribers. Disadvantage: limited frequency availability.
- Multi-access PCM radio telephone: 400 kms. maximum length (8X50 kms. hops), multiple locations (160 stations in groups of 1 to 8), pulse-metering, digital interface.
- Radio call systems: 1000 kms. maximum length, three simultaneous calls, 15 locations, low costs, no infrastructure required. Disadvantages: normal propagation problems (i.e., reduced transmission quality at certain times of day).

- Satellite based systems: unaffected by distance, infinite number of stations, good quality transmission, multi-service. Disadvantages: very high cost, high power consumption, low circuit capacity, sophisticated maintenance, no intermediate connections.

It is important that all of these alternatives be investigated, because of differences between individual countries. The satellite systems are receiving a great deal of attention at the moment, but it may be some time before their use becomes the most efficient alternative for the majority of rural areas. For large countries with extensive geographical obstacles (and only a dozen African countries fit this description) domestic satellite use may be wise. In these cases, the INTELSAT domestic lease program (described in Section II) seems to be the best solution available.

Cooperative

(1) Jointly pursue local manufacturing with neighboring countries; this is a necessity in the many regions of Africa where annual growth of service in individual countries is below the 20,000 lines necessary for viable production levels. ECOWAS or SADCC could probably raise the initial \$5 million or so needed for a small cable or telephone set producing plant (a list of related equipment that could be locally produced is provided in Annex 7). SADCC countries annually import enough telephone equipment to hook up 47,000 new subscribers, while ECOWAS countries add just over 28,000 phones annually. Out of the 24 members in the two organizations, only Zimbabwe has enough annual subscriber growth to justify local manufacturing on its own. While local/regional construction of basic materials would probably not be any cheaper initially, its main attraction is that payment could be made in soft currency.

(2) Investigate all forms of regional sector cooperation; this could include joint network development efforts, a unified project finance solicitation office, and most importantly,

regional training centers. Most of the Sub-Saharan countries have populations just too small for effective action in these areas, and will benefit significantly by coordinating efforts with their neighbors.

(3) Secure agreement with bordering countries on tariffs and exchange rates; lack of official agreements prevent the operation of more than a few existing international telecommunications links. It is rather regrettable that such unused systems exist at all, let alone when there are demands from the region for further expansion.

(4) Coordinate the sector's internal interest and user groups; these groups lack cohesion, and rarely can act as an influence on central government decision-making as they do in the industrialized countries. Companies doing a large percentage of their business outside the country might be a logical choice to form national, regional, or sub-regional associations of subscribers and/or populations of unserved areas desiring service. In combination with a telecommunications entity "Development Office" and multilateral organizations, these groups could bring welcome pressure for higher quality service and system expansion. In addition, the entity might consider inviting user representatives to assist with long-range service and expansion planning.

(5) Cooperate with internal groups to expand the network. Using the very interests that have created heavy demands on the African telecommunications systems, wider penetration and improved service can be achieved. At least two possibilities exist:

- (a) Encourage groups in peripheral areas to "invest" in the telecommunications network. In essence, all this proposal requires is setting a scale construction price per mile. For example, if the cost is estimated to be \$10,000 per mile, a community 25 miles from a serviced area would be required to pay the telecommunications entity

\$250,000 for trunk laying and drop lines. If the community has a population of say, 20,000, and one out of ten takes service, the cost to each new subscriber would be \$125. Later subscribers would pay the same \$125 to be distributed among the charter subscribers. If the telecommunications entity were to later expand its service area to include the community, they would be required to pay the subscribers the \$250,000 plus an agreed upon interest charge.

- (b) Allow large companies and institutions to invest in telecommunications systems for their own use, and to interconnect with the public system. This proposal would permit these users to acquire any kind of equipment they desire (so long as it is compatible with the national system). It would also relieve the telecommunications entity, in part, of the largest current source of demand (and at the same time it would give the entity a basis of comparison for equipment and construction costs). Furthermore, any company with important rural outposts (mines, drilling rigs, etc.) could be induced to sell excess microwave capacity to intermediate stations set up by the entity on the same route. Finally, such an option would legitimize the many existing "parallel" networks and allow the national telecommunications entity to benefit from them.

(6) Support the creation of African consulting organizations in the sector; such organizations are a key to telecommunications self-sufficiency. One example (perhaps the only one) is a newly organized firm in Abidjan, Ivory Coast called SAFRITEC (Societe Africaine d'Etudes en Communications et Technologie). SAFRITEC was formed by a former Director General of the Ivory Coast's PTT, and performs essentially the same

consulting services as France's SOFRECOM or Germany's GTZ. The difference, of course, is that almost all of SAFRITEC's consultants are African. Not only are their services less expensive (reduced travel expenses), but they are much less ethnocentrically biased toward a particular manufacturer than European firms. SAFRITEC received more than 75 percent of their capital from West African governments and banks, and this speaks well of the prospects for financing the creation of other regionally based consulting organizations (particularly for Eastern or Southern Africa).

B. External Initiatives

Collaborative

(1) The U.S. should support internal changes in Sub-Saharan telecommunications entities. The importance of efficient reorganization, improved financial management, adequate maintenance, and internal cooperation is paramount to successful telecommunications development. There should be many opportunities for the United States to provide technical and financial experts to assist in the creation of new organic structures, and small grants for the purpose of initiative implementation.

(2) The U.S. should contract independent consultants to conduct studies and provide expertise; the European method of contracting equipment manufacturers or other prejudiced agents is unseemly and exploitive. American consultants should be free to choose the equipment they feel is best in a particular situation. While they would have no ties to the telecommunications component producers, they would nonetheless be very likely to recommend American equipment on the basis of familiarity quality, and cost competitiveness.

(3) USAID should conduct telecommunications sector studies in each Sub-Saharan country. This would simultaneously help these countries in reorganizing, give the Agency a good overview on which to base possible development projects, and

give U.S. manufacturers some insight into the potential equipment market.

(4) Expand and improve USTTI; although the Institute has been a successful example of telecommunications development to date, there are a few ways to make it even more successful:

- (a) Organize two two-week terms abroad each year (for example, one in Africa and one in Asia). These could be organized in cooperation with USAID's regional centers (REDSOs) and would likely multiply the number benefitting from the Institute by ten or more. At the moment, each trainee costs his/her government \$5,000 or more. The expense would be but a small fraction of that amount for an African training session, and thus, far more trainees could attend. The costs for bringing approximately 20 trainers to Africa for two weeks would be less than \$100,000 (divided among the fifteen corporate sponsors - about \$7,000 each).
- (b) Add more "basics" to the course program. The courses offered now are excellent, but may be over the heads of some trainees. Courses on the differences between and the advantages of various basic technologies such as open-wire, microwave, high-frequency radio, and others would be useful to many Sub-Saharan managers. Programs in related areas such as public utility management (for improved general business decision-making), applied economics (as it relates to telecommunications pricing, investment strategies, etc.), and development would also yield great benefits to participants.

(c) Applications should be initially screened by the country's USAID Mission. Several officials in Africa and at the ITU have mentioned that frequent "self-selection" that has occurred among officials eager for a paid vacation in the United States. While such participants are probably only a very small percentage of the total, future dissimulation can be thwarted by checking qualifications and references locally.

(5) The U.S. should participate in the ITU's Technical Cooperation Division. The TCD is one of the few U.N. agencies that is little influenced by the United States. Many necessary internal changes in the sector are supported by what amounts to a pool of experts in the organization. Americans are poorly represented in this pool, even though the UNDP pays for more than 80 percent of its operations (and the U.S. pays almost 20 percent of the UNDP's budget). The French, Germans, Swedish, and British all have strong contingents in the TCD, generating a reputation for interest in the sector's development (and perhaps succumbing to a natural tendency to indirectly support their native country).

(6) USAID should determine how telecommunications interacts with other sectors in the region. Benefits of access to service should be quantified, and detailed research on increased use of telecommunications in agriculture, project management, etc. should be conducted. This is probably the first area where telecommunications can play a part in improving the effectiveness of the development program.

(7) The U.S. should exchange information on telecommunications problems, needs, and activities in the developing countries with other donor governments and multilateral organizations. The primary motivation of telecommunications development is development, even though there is a strong secondary interest in equipment sales.

It would be helpful to all of the organizations concerned to have access to information on projects they have undertaken.

(8) Cooperate with Sub-Saharan governments in regionalizing the sector. Telecommunications is a relatively apolitical area, with significant cooperative ventures already in existence. The U.S. is a strong believer in regional agglomeration, and should be participants in all of the multi-lateral organizations (whether as observers or members) and should support the creation of additional groups where appropriate.

(9) The U.S. could assist in the creation of local manufacturing capability by guaranteeing purchase of output. The U.S. could set up an "AID Bank" to allow exchange of the locally manufactured goods between non-contiguous soft-currency countries and to set a minimum price for products below which AID would buy supplies for its own projects.

(10) The U.S. should explore co-financing and parallel financing arrangements in the sector. In large telecommunications projects funded by the World Bank and others, the U.S. could take responsibility for non-infrastructure project components such as technical assistance and/or rural service project components. While USAID has begun to make extensive use of this financing mechanism, it has not been tried in the telecommunications sector.

(11) The U.S. should investigate the creation of a telecommunications "Donor's Club." Some of the most important projects in developing the sector will be those of \$10,000 - \$25,000 which are often too small to be considered. The "Club" could provide the necessary funds for such projects (rehabilitation, short network extensions, maintenance projects, etc.), and national services could be used based on the scale of contributions. This concept could also be expanded at some point to joint ventures on large projects.

(12) USAID should support infrastructural investments where possible, such as service expansion to include rural areas. Perhaps AID could provide assistance for the formation of national organizations along the lines of the Depression-era Rural Electrification Agency (REA). The REA made it possible for U.S. rural areas to receive both electric and telephone long-term service over a period of about twenty-five years, through low-interest financing. This Agency is the best example anywhere of successfully providing almost comprehensive utility service to rural areas in a short time period, and the U.S. should make use of its experience to improve rural penetration in Africa.

Promotional

(1) The U.S. should protect buyers and sellers of American telecommunications equipment. OPIC already protects the seller with risk insurance and other services, but coverage should be expanded to include protection of service providers (consultants, software technicians, etc.). Furthermore, the USAID Mission or Embassy should be authorized to step in on behalf of the buying country when a disagreement or breakdown arises. Japan and Germany regularly act in this manner, and they both have built up a reputation in parts of Africa as countries with which one "won't get burned" with abandoned equipment, refused spares, etc.

(2) The U.S. should encourage its telecommunications manufacturers to enter the African market. There is a market for American equipment in Africa; an official of the UAPT told this author that "the U.S. would have no competition if it came here in force." The American manufacturers continue to stay away because they fear making an investment in a small or unsophisticated market. They need to be convinced that \$20 billion worth of telecommunications equipment and services will be sold in Africa before the turn of the century, and that that equipment will be no more or less sophisticated than is sold elsewhere in the world. One idea might be to organize "manufacturer missions"

to some of the countries with major telecommunications modernization and expansion programs (Botswana, Zimbabwe, Ivory Coast, Ethiopia, and Kenya are examples). Such promotional events are organized for farming equipment with a measure of success. The same could and should be done with telecommunications. Once a base is established on the continent, expansion to a region-wide scale could be expected.

(3) Link aid and trade in the sector. Target aid for telecommunications so that buyers of American equipment receive subsequent installation support, network planning assistance, and technical training. Explore the use of "mixed credits" (essentially equipment financing using private export credits alongside concessional development funds). While this is not a financing mechanism that should be used in all circumstances, it may be necessary in a number of instances when competing countries offer sales terms that cannot be matched by the manufacturer alone or where it is in U.S. interests to break into the market of a particular country. The new "mixed credits" authority granted by Congress to the Ex-Im Bank and AID (Section II) is controversial, but if it is used in the sector, there should be a strong developmental rationale behind it. A parallel possibility for promotional financing in the sector is the Commodity Import Program under the Economic Support Fund. Both Sudan and Egypt have been offered multi-million dollar loans for telecommunications under this program. Since the CIP is essentially a program loan, it can be used for infrastructure development, contrary to regular development assistance.

Reformative

(1) Set up a full-time USAID coordination office for telecommunications controlled by an inter-Bureau working group. Since it has been decided that telecommunications would not become an official AID "sector," some other means of monitoring activities and developing projects must be organized. The working group would have representatives from each Bureau, perhaps chaired on a rotating basis. It would meet periodically to review projects and determine policy implementation, while the coordination office would transmit decisions to appropriate missions and Bureaus and collect national, multilateral, and project data for abridgement and distribution. The loose arrangement that presently exists (with components in offices of the Bureau for Science and Technology, the Bureau for Policy and Program Coordination, and others) is bound to be overwhelmed if financing for telecommunications is increased and becomes regularized.

(2) Investigate broadly-based development projects; past projects like Senegal River Basin/OMVS have been concerned with point-to-point communications (heavily satellite-biased), which, while it is important, should not become a specialization. Since rural service can take many forms, a good project possibility might be to help national entities to determine their "appropriate" technology. Other broadly-based projects would include many of the items listed under Internal Initiatives. It is most important, in any event, not to become locked into a specific technology or methodology before the ink on AID's Policy Determination is even dry.

(3) Outline specific circumstances under which infrastructure can be financed. The PD on communications could be interpreted to rule out most infrastructural investments.

The vague guideline included on the subject might also be interpreted the opposite way (allowing such investment), and will sooner or later generate confusion. It is important to project development that the limitations in this area be clarified.

(4) Develop "test projects" outside the CDSS process.

Many African USAID Missions are unreceptive to telecommunications development because it falls outside the three or four areas that must be chosen in the USAID Country Development Strategy Statement (CDSS). While the CDSS process is a good way to prevent Mission resources from becoming spread too thinly, it also acts to obstruct inchoate development possibilities like telecommunications. One possible initiative to overcome this obstacle is to set up small test projects in smaller, more receptive countries (Togo is one example). These projects would most likely begin with technical assistance support, but could later expand to include project communications, test equipment for maintenance, small network interconnections, and others. The important point, however, is to begin to break down the initial barriers to telecommunications that exist because it is "new" and because it does not fall within any operating development sector.

C. Conclusion

If all of the 52 initiatives set out above were to be implemented it would be, of course, nothing short of revolutionary. But even if only a handful were to be adopted, a marked change would be felt in the telecommunications development process. In any event, the initiatives described are by no means definitive but, rather, are meant to point out the broad possibilities for change in the sector.

Change is the all-important factor in telecommunications. The

technology and the sociology of today's telecommunications are as different from those of ten years ago as all of the other "information age" products. This, however, has not been reflected in the day-to-day management and operation of telecommunications entities in Sub-Saharan Africa. And it is this inertia which must be attacked if telecommunications is to live up to its promise.

Put simply, the leitmotiv of Sub-Saharan telecommunications and of this report has four divisions:

1. Telecommunications are an integral part of the national infrastructure.
2. The priority assigned to telecommunications in a majority of Sub-Saharan countries is too low.
3. More national resources should be devoted to telecommunications.
4. Access to telecommunications should be available to all.

These are the fundamental points which must be recognized by the Sub-Saharan countries, and it should be the aim of the United States and the other interested parties to help these countries achieve such recognition. Like so many other concepts for development, the development of telecommunications is highly dependent on political will. The rest will follow.

NOTES

NOTES

1. Mary Cameron Kilgour, "The Telephone in the Organization of Space for Development" (unpublished Ph.D. dissertation, Political Economy and Government, Harvard University), p.4.
2. Quoted in Ibid., p.3.
3. Harold Innes, Empire and Communication: The Bias of Communication (London: Oxford University Press, 1950), p.17.
4. The names of the three categories, "Restrictive," "Market-Response," and "Activist" are adapted from Robert J. Saunders, J. Warford, and B. Wellenius, Telecommunications and Economic Development (Baltimore: The Johns Hopkins University Press/World Bank, 1983), p. 17-18.
5. J. H. Clippinger, "Can Communication Development Benefit the Third World?" Telecommunications Policy (September 1977) p. 300.
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ANNEXES

1. A Summary of Economic and Social Benefits
2. Fifty Year Telephone Trend (Sub-Saharan Africa)
3. Description of Telephone Services (Zimbabwe)
4. African Telecommunications Network (PANAFTEL)
5. ITU/PANAFTEL Route Plans and Surveys
6. ITU World-wide Technical Cooperation
7. Components for Local Manufacture or Assembly

ANNEX 1

A Summary of Economic and Social Benefits

Selected Potential Users (by sector)	Examples of Usage	Resulting User Benefits	
<u>Agriculture</u>			
Small Holders Large Estates Cooperatives Extension Agencies Suppliers Marketing Institutions Veterinary Services Crop Sprayers	<ul style="list-style-type: none"> - market information dispersal - order supplies, parts and inputs - request extension services - agency contact with field workers - check on transport availability - contact between farmers, organisations and financial sector - epidemic control 	<ul style="list-style-type: none"> - increase in average price received for output - less idle machine time due to available parts/repair service - improved efficiency - coordination of own-marketing with overall market demand and/or production schedule of processors - access to financial/banking services - optimisation of transport capacity 	<ul style="list-style-type: none"> - higher agricultural output - greater efficiency of farm units, - increased commercialisation of sector - larger mobilisation of funds - financial mobility - improved utilisation of transport capacity - reduced inventory requirements (suppliers) and stockpiling (marketing agencies/processors) - resource savings
<u>Forestry</u>			
Fire Prevention Agencies Forestry Operations Sawmills Development Bodies	<ul style="list-style-type: none"> - issue of fire warnings - request fire fighting assistance - contact with site if fires occur - market information access - order supplies, parts, etc. - contact between forestry (cutting) operations and sawmills or other processors and forestry administrators 	<ul style="list-style-type: none"> - better coordination of fire fighting efforts - earlier fire warning - ability to take earlier preventive action - coordination of cutting schedule with processing production schedule and marketing activities - improved efficiency - less idle machine time due to lack of parts/repair service 	<ul style="list-style-type: none"> - higher forest output (employment) - increased efficiency of fire prevention agencies and reduced fire losses - lower supplier inventory requirements and financial savings - smoothing of processing production schedule - reduced waste due to better planning - more efficient use of skilled personnel
<u>Fishing</u>			
Coastal Operators Inland Enterprises Marine Development Bodies	<ul style="list-style-type: none"> - contact between boats and ship-shore facilities (if marine service available) - liaison between fishing villages and suppliers - link between fishing villages and markets/marketing agencies - contact with transport agencies and processing industries - contact between fishermen/fishing organisations (e.g. cooperatives) and financial sector 	<ul style="list-style-type: none"> - improved efficiency from improved contact with suppliers - coordination of effort under variable market conditions - direct access to financial/banking services - coordination of effort with processing plants - improved average prices (for fishermen) - improved coordination/deployment of transport (both water and land based) 	<ul style="list-style-type: none"> - higher fishing output - increased productivity of fishing sector and capital - improved utilisation of capacity - coordinated production schedule with processing plants - greater efficiency in marketing activities/agencies - improved mobilisation/mobility of funds

Selected Potential Users (by sector)	Examples of Usage	Resulting User Benefits	
<u>Mining</u> Small Producers Large Companies Geological Surveys Mapping Consulting firms	<ul style="list-style-type: none"> - direct mine-sites and head offices/senior management contacts - contacts with suppliers, emergency services, transport agencies and financial sector - conveyance and receipt of market information - direction of field teams - remote sensing in difficult terrain 	<ul style="list-style-type: none"> - improved coordination/deployment of survey teams/prospecting units, access by field teams to outside experts, quicker analysis of field work results - improved coordination with transport suppliers - fewer production slow-downs due to lack of parts - improved coordination of mine production and market conditions - more efficient administration of mine sites 	<ul style="list-style-type: none"> - higher mining output (employment) - greater efficiency of mine operations - increased utilisation of transport capacity - improved mobilisation/mobility of funds - lower loss (of life and property) in mine emergencies - improved utilisation of scarce, skilled professionals (e.g. surveyors) and senior administrative personnel - increasing efficiency of domestic mineral processing integrated to mine outputs - lower transport costs and depreciation on vehicles

<u>Manufacturing</u> Handicraft Producers Modern Industries Traditional Enterprises	<ul style="list-style-type: none"> - immediate contact with markets - linkage with suppliers - liaison between branch officers - coordination with financial sector - harmonisation with transport agencies 	<ul style="list-style-type: none"> - better coordination of supply deliveries - improved administration of branch offices. - reduced travel requirements - synchronised coordination/deployment of transport capacity - conveyance of market information 	<ul style="list-style-type: none"> - improved rural employment and income - better utilisation of transport capacity - wider geographic markets for rural producers - relocation of industry to rural areas - enhanced coordination (and hence productivity) of small producers (e.g. handicrafts) - relief of urban congestion, unemployment,

<u>Infrastructure</u> (excluding transport) Energy and Power Water Services Roads Construction Civil Aviation (public/private) Meteorological Services Other Public Works Post Offices	<ul style="list-style-type: none"> - contact between customers and service suppliers - rapid damage or service interruption reports - direct liaison with maintenance personnel - inter-relationships between field installations - coordination between field sites and inventory depots - control of construction crews and material supplies - remote identification or service interruptions/nature of service interruptions - dissemination of weather reports 	<ul style="list-style-type: none"> - improved administration/supervision of construction crews and field installations - reduced time of service interruptions - improved access to parts - better coordination of materials delivery - greater centralisation of inventories - earlier warning of weather disturbances - improved weather forecasting and distribution of weather broadcasts 	<ul style="list-style-type: none"> - improved delivery and maintenance of rural energy and power services, water services, etc. - customer savings due to quicker maintenance/repair - impact on agriculture due to improved dissemination of weather bulletins and greater accuracy of weather forecasts - reduced losses from weather damage due to improved forecasting/quicker issuance of warnings, allowing preventive action - incentives to firms/government agencies to relocate to rural areas because of improved infrastructure availability and performance

Selection Potential Users (by sector)	Examples of Usage	Resulting User Benefits	
<u>Banking/Financial Services</u>	<ul style="list-style-type: none"> - contact between fixed/mobile branches and central office for administrative purposes and funds management purposes 	<ul style="list-style-type: none"> - centralisation of customer accounts 	<ul style="list-style-type: none"> - incentive to expansion of rural industry/relocation of industry to rural areas provided by access to financial institutions/markets
Rural Branches	<ul style="list-style-type: none"> - more rapid authorisation for rural loans 	<ul style="list-style-type: none"> - improved efficiency in fund transfers to and from rural residents 	<ul style="list-style-type: none"> - expansion of rural banking services
Fixed and Mobile Agencies	<ul style="list-style-type: none"> - data transmission 	<ul style="list-style-type: none"> - greater security of financial assets 	<ul style="list-style-type: none"> - increased rates of rural saving
Savings/Credit Institutions	<ul style="list-style-type: none"> - personal customer links with financial institutions 	<ul style="list-style-type: none"> - enlarged access to financial institutions/range of financial asset holdings 	<ul style="list-style-type: none"> - better loan access for rural residents
	<ul style="list-style-type: none"> - handling of urban-rural financial transactions 	<ul style="list-style-type: none"> - better administration of rural branches 	<ul style="list-style-type: none"> - improved capital mobility at national level
		<ul style="list-style-type: none"> - wider deployment of mobile branches 	<ul style="list-style-type: none"> - prospects of more rural fixed branch banking
<u>Transport</u>	<ul style="list-style-type: none"> - direct liason between vehicles and central dispatchers 	<ul style="list-style-type: none"> - improved utilisation of fleet capacity 	<ul style="list-style-type: none"> - greater utilisation of national transport capacity
Road Haulage/Operators	<ul style="list-style-type: none"> - contact between customers and service suppliers 	<ul style="list-style-type: none"> - more efficient handling of reservations and cancellation 	<ul style="list-style-type: none"> - improved access to transport services
Railway Authorities	<ul style="list-style-type: none"> - reservations handling/processing 	<ul style="list-style-type: none"> - quicker reporting of time delays/breakdowns 	<ul style="list-style-type: none"> - increased efficiency/performance of transport operations in rural areas
Air Services	<ul style="list-style-type: none"> - coordination of pick-up/delivery schedules 	<ul style="list-style-type: none"> - better access to emergency services in cases of vehicle breakdown 	<ul style="list-style-type: none"> - incentive to expansion/relocation of industry afforded by improved transport sector performance
Navigation Bodies		<ul style="list-style-type: none"> - daily control on fleet deployment 	<ul style="list-style-type: none"> - higher direct rural employment
		<ul style="list-style-type: none"> - potential administrative/supervisory control of decentralised facilities 	<ul style="list-style-type: none"> - more efficient rural bus services
			<ul style="list-style-type: none"> - wider spread of road haulage network
			<ul style="list-style-type: none"> - fewer losses of perishables in transport
			<ul style="list-style-type: none"> - lower congestion at transshipment points
<u>Commerce</u>	<ul style="list-style-type: none"> - liason with suppliers 	<ul style="list-style-type: none"> - reduced stock-holding requirements 	<ul style="list-style-type: none"> - lower stock finance costs
Retail	<ul style="list-style-type: none"> - personal links with customers 	<ul style="list-style-type: none"> - faster ordering and checking on status of orders 	<ul style="list-style-type: none"> - possible price reductions due to comparative pricing possibilities
Wholesale	<ul style="list-style-type: none"> - direct contacts with special services (financial, legal, etc.) 	<ul style="list-style-type: none"> - improved access to customers 	<ul style="list-style-type: none"> - increased range of consumer products products available in rural areas
	<ul style="list-style-type: none"> - management between rural branches and central office 	<ul style="list-style-type: none"> - processing of special orders 	<ul style="list-style-type: none"> - rural service/sales outlets
		<ul style="list-style-type: none"> - easier comparative pricing by customers 	<ul style="list-style-type: none"> - reduced losses in perishables
		<ul style="list-style-type: none"> - efficiency gains through access to special services 	

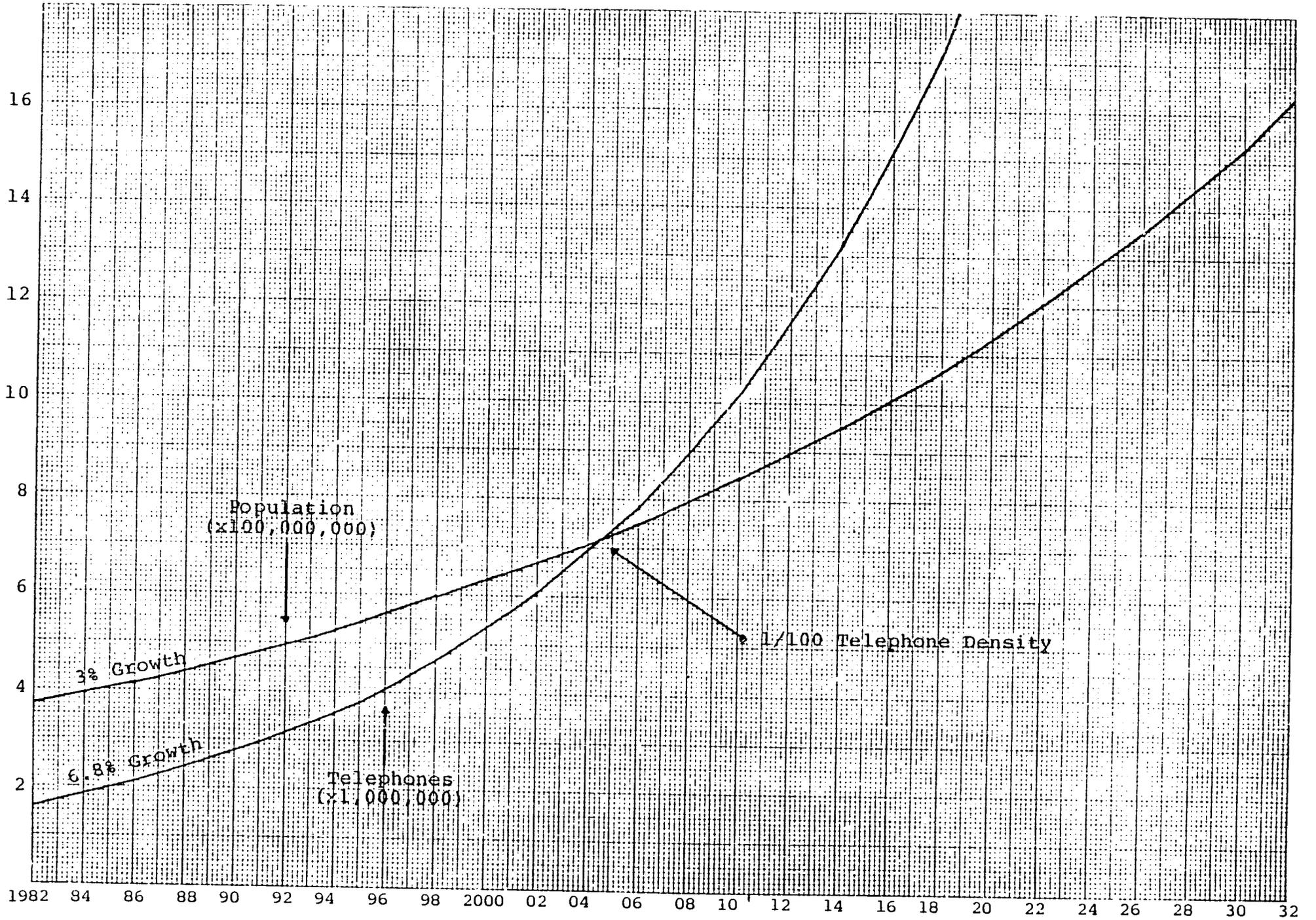
Selected Potential Users (by Sector)	Examples of Usage	Resulting User Benefits	
<u>Tourism</u>			
Parks and Lodges	- reservations handling	- improved planning	- expansion of rural tourist industry and regional income (employment effects)
Hotels and Resorts	- supply ordering	- better optimisation of occupancy	- derivative (growth in related rural industries (e.g. handicrafts and services))
Development Corporations	- access to emergency services	- increased tourist flow due to advance reservations system	- faster development of new tourist sites
Service Suppliers	- client contact with home base - client contact with business and work-place - administration/supervision contacts with main office and/or special services (legal, etc.)	- improved client satisfaction due to possibility of home and/or work contact	- better tourist sector performance
		- higher efficiency in tourist sector establishments	- increased foreign exchange earnings due to growth in international tourism
			- reduced foreign exchange losses due to more "domestic tourism"
			- potential decentralisation of tourist flows
<u>Education</u>			
Primary	- liaison between rural schools and district/regional/national administrators	- pooling of scarce professional teachers through remote delivery of education services	- improved delivery of education services in rural areas
Secondary	- direct (remote) broadcast of education services	- more effective use of teacher aides in rural schools	- improved (adult) literacy rates, in rural areas
Tertiary	- contact between parents and school officials/students	- economies in travel costs/allocation of supervisory personnel	- improved skill levels in the rural labour force
Technical	- ordering of books and other teaching materials/supplies	- improved contact with local education personnel	- greater attractiveness of rural areas to employees of firms relocating to rural areas on account of improved facilities
Adult Literacy		- quicker transmission of policy directives	- more uniform education standards
		- enhanced coordination of text-book requirements/orders and other teaching supplies	- improved utilisation of scarce highly-skilled professionals
		- improved parent-school contacts	
<u>Private Sector/ Households</u>			
Individual Premises	- personal/family contact	- quicker decisions in personal emergencies	- higher output from labour stabilisation
Public Call Offices	- management of rural assets (for migrants)	- social contact	- social stability in countryside
	- access to urban society	- less labour circulation	- savings in transport otherwise used
	- international contact		- higher disposable incomes from resource savings

Select'd Potential Users (by sector)	Examples of Usag	Resulting User Benefits
<u>Health and Other Social Services</u>		
Hospitals	- contact between rural clinics and regional/urban hospitals	- pooling of scarce medical professionals
Rural Clinics	- contact between rural medical aides/clinics and medical professionals and health sector administrators	- more effective use of para-medical personnel in remote areas through links to medical personnel in regional centres
Emergency Medical Centres	- contact with emergency medical services	- more efficient deployment/administration of mobile clinics
Flying Doctor Services	- contact with medical specialists in urban areas	- more optimal allocation of drug supplies
Refugee Bodies	- contact between mobile clinics and regional headquarters	- more efficient, quicker access to emergency services
	- contact between refugee settlements and government/international agency personnel	- economies in travel costs/allocation of administrative/supervisory personnel
		- improved access to specialists
		- improved coordination of refugee assistance and delivery of such assistance
<hr/>		
<u>Administration</u>		
District HQ	- contact between local residents and government offices	- improved coordination/supervision/administration of decentralised offices
Customs Posts	- contact between local/district offices and national ministries/ personnel	- improved coordination/supervision/administration of field sites of rural development projects
Security	- issuance of warnings, where possible, of pending natural disasters	- improved coordination/supervision/administration of decentralised units of security services/customs/emergency services
Development Projects	- contact between rural development projects in the field and central administrative personnel/suppliers/clients	- earlier warning of pending disasters/coordination of relief efforts when natural disasters occur
Emergency Services	- requests for emergency services	
	- requests for security services	
		- more efficient use of scarce administrative/supervisory personnel
		- improved delivery of government services in rural areas
		- improved contact between rural residents and government personnel/services
		- reduced loss of life, injury, and property through preventive measures allowed by earlier warning of pending natural disasters and/or quicker, better coordinated relief efforts
		- increased opportunities for decentralisation of administrative services/personnel

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ANNEX 2

Fifty Year Telephone Trend



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ANNEX 3

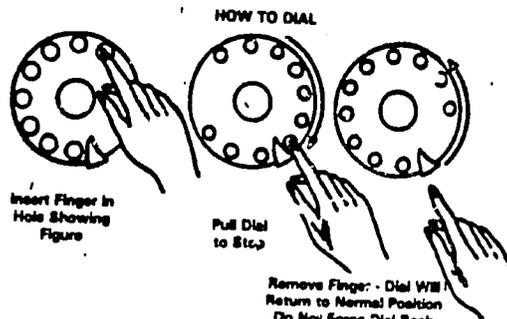
Description of Telephone Services (Zimbabwe)

HOW TO USE YOUR TELEPHONE

To avoid wrong numbers consult the latest issue of the Telephone Directory. If the number is not listed, or you cannot get the subscriber you want on the published number, dial your local "Directory Enquiries" number or ask your local exchange operator. Enquiry calls are free.

AUTOMATIC TELEPHONES

- Recognise these tones:-
- Dialling tone** is a continuous low-pitched burr, which should be heard in the absence SHORTLY AFTER removing the handset. It indicates that the exchange equipment is ready for dialling to begin, and the burr ceases on the first rotation of the dial.
 - Ringing tone** is a recurring double burr or (in a few places) low-pitched single burr. It indicates that the wanted number is being rung and it ceases when the telephone is answered.
 - Engaged tone** is a recurring single high-pitched burr. It indicates that the wanted number is engaged, or that the exchange equipment is engaged.
 - Unobtainable tone** is either a continuous high-pitched burr, or a high-pitched burr interrupted at intervals of approximately three seconds. It indicates that the wanted number is unobtainable for some reason other than "number engaged".
 - Waiting tone** on lines equipped with Subscriber Trunk Dialling facilities is a two-note "warbling" tone. When a line becomes available the waiting tone gives way to the dialling tone.



REPEAT FOR EACH FIGURE

- Lift handset and listen for dialling tone.
- Insert finger in dial-hole showing the first figure of the wanted number. Pull dial round to stop and withdraw finger; the dial will revert to normal position. Do not force dial back with finger or other object. Repeat the operation for each succeeding figure of the wanted number.
- If ringing tone is heard, await reply from called number.
- If engaged tone is heard, replace handset and recommence dialling after a suitable pause.
- If number unobtainable tone is heard, replace the handset, verify the number and re-dial. If number is still unobtainable, dial the number for "Enquiries" to obtain further information.
- DO NOT REPLACE HANDSET** until conversation is finished, or the connection will automatically be released.
- Speak clearly and deliberately into the mouthpiece.
- FOR FURTHER DETAILED INSTRUCTIONS, CONSULT THE BEGINNING OF THE RELEVANT EXCHANGE SECTION OF THE MAIN PART OF THE DIRECTORY AND THE INSTRUCTIONS UNDER THE FOLLOWING HEADINGS.**

AUTOMATIC PARTY LINES

To call a Subscriber on the same party line lift the handset and wait for the dialling tone. Dial the last two digits and replace the handset. The called Subscriber's code ring will be heard on your own telephone until the Subscriber answers. Lift your handset and speak. Should there be no reply stop the ringing by lifting your own handset for a few seconds and then replace it. To call any other number in your exchange area lift the handset to obtain dialling tone, dial "0" and when the second dialling tone is heard dial the required number.

1. ELECTRONIC PARTY LINE

- Subscribers on the same party line have the same number, except for the last digit.
- To call a subscriber who is not on the same party line, or to make an STD call, lift the handset and wait for dialling tone. On receipt of dialling tone, dial the required number and the call will proceed in the normal manner. If busy tone is heard on lifting the handset, replace it and wait for the "line clear" signal, (a 5-second buzz) before attempting to make another call.
- To call a subscriber on the same party line, first press the button briefly, then lift the handset and wait for dialling tone. When dialling tone is received, dial the last digit of the required subscriber's number. Ringing tone will be heard until the call is answered. If the line is busy on lifting the handset, repeat the above when the line becomes free.

METERED AUTOMATIC PARTY LINES NON SELECT 15 PARTY

2.

- Subscribers on the same party line have the same telephone number apart from the last two digits.
- To call a subscriber on the same party line, lift the handset and briefly press the button on the base of the telephone. If the line is busy, nothing will be heard. The handset should be replaced. When the line becomes free a "RING-OFF" (one short ring) signal will be heard indicating that the party line is ready for the next call to be made. If the party line is free, a distinctive tone will be heard indicating that dialling may commence. First dial "0" to obtain party line dialling tone, then dial the last two digits of the wanted subscriber's number. At the end of dialling depress the button on the base of the telephone and keep it depressed. Ringing tone will be heard while the called subscriber's telephone is ringing. When the called subscriber answers, release the button on the base of the telephone and speak.
- To call another subscriber in the same exchange area (calls other than trunk or "Subscriber Trunk Dialling" or to a subscriber on the same party line) ensure that the party line is free (as detailed above) and then dial "0" to obtain party line dialling tone and then dial the wanted number.
- To call important numbers dial 0-0 and the number, e.g., in an emergency dial 0-0-99; to call the exchange dial 0-0-0.
- To make a "Subscriber Trunk Dialling" call, dial 0-0, then proceed as detailed on page 4.
- To receive an incoming call lift the handset and briefly press the button on the base of the telephone to answer the call.

3. NON SELECT 10 PARTY

- Subscribers on the same party line have the same telephone number except for the last digit.
- To call a subscriber on the same line lift the handset and briefly press the button on the base of the telephone. If the line is busy nothing will be heard. The handset should be replaced. When the line becomes free a "ring-off" (one short ring) signal will be heard indicating that the party line is ready for the next call to be made. If the party line is free a distinctive tone will be heard indicating that dialling may commence.
- First dial "6" to obtain party line dialling tone then dial the last digit of the wanted subscriber's number. After dialling depress the button on the base of the telephone and keep it depressed. Ringing tone will be heard while the called subscriber's telephone is ringing. When the subscriber answers release the button on the base of the telephone and speak.
- To call another subscriber in the same exchange area (calls other than trunk or to a subscriber on the same party line), ensure that the party line is free (as detailed above), dial "0" to obtain the main exchange dial tone and then dial the wanted subscriber's number.
- To make a trunk call proceed as above and then dial "0" to book the call; e.g. dial "0" to obtain main exchange dial tone and then dial "0" again to obtain the exchange operator.
- To receive an incoming call, lift the handset and press the button on the base of the telephone to answer the call. Release the button when the call is established.

4. SELECT 10 PARTY LINES

- This type of telephone has a switch which can either be thrown to "ALL RINGS" or "OWN RINGS". When the switch is in the "OWN RINGS" position only the code ring applicable to that telephone will be received. When the switch is in the "ALL RINGS" position the code rings of all incoming calls will be received. The switch should normally be in the "OWN RINGS" position except when the subscriber wishes to receive a "RING OFF" signal.
- Subscribers on the same party line have the same telephone number except for the last digit.
- To call a subscriber on the same line lift the handset and briefly press the button on the base of the telephone. If the line is busy nothing will be heard. The handset should be replaced. The switch on the telephone should be thrown to the "ALL RINGS" position and when the line becomes free a "RING OFF" (one short ring) will be heard to indicate that the line is now free for use. If the party line is free a distinctive tone will be heard indicating that dialling may commence.
- First dial "6" to obtain party line dialling tone then dial the last digit of the wanted subscriber's number. After dialling depress the button on the base of the telephone and keep it depressed. Ringing tone will be heard while the called subscriber's telephone is ringing. When the subscriber answers release the button on the base of the telephone and speak.
- To call another subscriber in the same exchange area (calls other than trunk or "Subscriber Trunk Dialling" or a subscriber on the same party line) ensure that the party line is free (as detailed above), dial "0" to obtain the main exchange dial tone and then dial the wanted subscriber's number.
- To make a trunk call proceed as above and then dial "0" to book the call, e.g. dial "0" to obtain main exchange dial tone and then dial "0" again to obtain the exchange operator.
- To make a "Subscriber Trunk Dialling" call, dial "0" to obtain exchange dial tone then proceed as detailed on page 4 - Subscriber Trunk Dialling (STD).
- To receive an incoming call lift the handset and press the button on the base of the telephone to answer the call. Release the button when the call is established.

Chagos	62	Morocco	2
Chama	32	Montserrat	2
Quarante	32	Mozambique	6
Island	4	Nairobi	7
Island	8	Nairobi	32
Kalaba	1	Nairobi	4
Kalaba	7	Nairobi	1
Kalaba	52	Nairobi	4
Kalaba	2	Nairobi	28
Kalaba	7	Nairobi	32
Kalaba	8	Nairobi	32
Kalaba	4	Nairobi	32
Kalaba	62	Nairobi	7
Kalaba	2	Nairobi	8
Kalaba	32	Nairobi	62
Kalaba	7	Nairobi	8
Kalaba	1	Nairobi	8

ORDINARY CALLS

These are all calls which do not fall under any other class. The three-minute charges for ordinary internal trunk calls are based on the straight-line distance between the two exchanges, according to the following scale:-

Distance in kilometres between exchanges		CHARGE
Exceeding	Not exceeding	
0	20	6c
20	32	18c
32	80	36c
80	130	54c
130	240	72c
240	480	\$1.08
480	-	\$1.44

For calls connected by exchange operators, the three-minute charge is payable for the first three minutes or part thereof, and a "per minute" rate, which is one-third of the three-minute charge, applies to each additional minute or part thereof; "per minute" charges do not, however, apply in the case of calls from public call offices and all such calls are charged in units of three minutes.

Charges are payable in respect of all calls which may be, including calls made at caller's risk.

The calling subscriber is liable for the charge for a call of three minutes duration if the call is not completed because:-

- (i) there is no reply from the calling telephone when the call is ready,
- or (ii) the call is refused by anyone at the calling telephone when it is offered,
- or (iii) the calling telephone is engaged on a local call and the trunk call is refused when it is offered.

FIXED TIME CALLS

A call may be booked for connection at or about a specified time, but such calls can only be accepted on sufficient notice being given to the exchange, and subject to the "Fixed Time" being available to the required destination. "Fixed Time" calls should be booked well in advance of the time at which they are required, but not more than two working days ahead.

For a single "Fixed Time" call the extra charge is as follows:-
Internal calls and calls to Botswana, Lesotho, Malawi, Mozambique, South Africa, South-West Africa, Swaziland or Zambia: 66.6% of the normal charge for a call of three minutes' duration.

For a daily "Fixed Time" call arranged under a standing order for a period of at least one week (including or excluding Sundays and Public Holidays) an extra charge per call is applied as follows:-

Internal calls and calls to Botswana, Lesotho, Malawi, Mozambique, South Africa, South-West Africa, Swaziland or Zambia: 33.3% of the normal charge for a call of three minutes' duration.

The booking of a Fixed Time Call may be cancelled without charge being made provided at least TEN minutes' notice of cancellation is given.

CALL TRANSFER SERVICE

Calls may be booked from one number for connection on another number and debited to the second or a third number provided all telephones (except the called number) are within the same exchange area.

Calls may also be booked at one exchange for connection and debit to a number at another exchange e.g. a call is being booked in (Kilwayo) to a Johannesburg number for connection on and charging to a number in Harare. Such calls must be booked in advance as fixed time calls. The charge is the normal tariff, plus the fixed time charge plus a supplementary fee of 33.3% of the appropriate three-minute call rate. This privilege does not apply to international calls.

PERSONAL CALLS

The object of this service is to advise the called subscriber's telephone station that the caller wishes to speak to a person designated by name, or in any other way (e.g., Manager, Chief Engineer, Secretary, etc.). Any call may be booked as a personal call.

The supplementary fee is 66.6% of the normal charge for a call of three minutes' duration and is chargeable once particulars have been passed to the called telephone station irrespective of whether the wanted person is available and whether or not the call is completed. Timing for the trunk call does not commence, however, until the wanted person lists the telephone.

MESSENGER SERVICE CALLS

The object of this service is to summon by messenger a named person, who is not obtainable direct by telephone, to attend at the nearest telephone for the purpose of taking a call. The Messenger Service may be applied to any call booked to an exchange at a place where telegram delivery is undertaken. Delivery of Messenger Service advices will only be undertaken within the area in which telegrams are delivered free. The offices at which the Messenger Service is not available are indicated by symbol "****" in the alphabetical section of the Directory.

The supplementary fee is 33.3% of the normal charge for a three minutes' duration which is chargeable once particulars have been passed to the called exchange, irrespective of whether the wanted person comes to the telephone.

COLLECT CALLS

At the request of the caller and with the consent of the called subscriber, the charges for an internal trunk call or for a trunk call to or from certain other countries may be debited against the called subscriber.

The call is known as a "collect call" and the supplementary charge for this service is 33.3% or 66.6% of the normal charge for a call of three minutes' duration dependent upon the destination. Collect calls are not permitted to Public Call Office telephones.

DURATION OF TRUNK CALLS

Limitation: The right is reserved to terminate any trunk call after the expiration of six minutes from the time of commencement or to limit the number of consecutive bookings of trunk calls by any subscriber, if this is considered necessary. Callers will be notified of the termination of each three minutes occupied in conversation when it is possible to do so. At the large exchanges the notification takes the form of a "pip pip pip" signal. The Corporation cannot recognise any claims for the waiving of the full fees due in the event of failure in this respect.

Allowance for interruptions: If, owing to a fault affecting the service or other cause, a call is not satisfactory throughout the whole or a portion of its duration, a suitable reduction may be made in the chargeable duration of the call. The caller cannot demand the application of this provision unless, during or immediately after the call, he reports the difficulties to the controlling exchange.

INTERNATIONAL TELEPHONE SERVICE AND CHARGES

International telephone calls may be made from subscribers' telephones. International calls cannot be connected from Public Call Office telephones.

International telephone service is available to the countries, etc., listed below, at the charges shown. These charges are subject to a surcharge of 10%. The minimum charge is that for three minutes. For each minute, or part thereof, in excess of three minutes, the charge is one-third of the three-minute rate. Report charges, which are 10% of the charge for a call of three minutes' duration, are payable in certain circumstances, on "person-to-person" calls which cannot be completed.

Destination	3-Minute Call Charge	Destination	3-Minute Call Charge
Afghanistan	\$10.50	Brazil	\$6.60
Ajman	\$6.60	Brunei	\$6.55
Alaska	\$6.60	Bulgaria	\$6.60
Albania	\$6.60	Burundi	\$7.50
Algeria	\$6.60	Canada	\$7.50
Andorra	\$6.60	Canary Islands	\$6.60
Angola	\$6.55	Cape Verde	\$6.60
Antigua	\$7.50	Carricou	\$6.60
Antilles(Neth)	\$10.50	Cayman Islands	\$6.55
Arab Emirates	\$6.60	Central African Republic	\$10.50
Argentina Republic	\$10.50	Chad	\$10.50
Ascension	\$6.60	Chile	\$10.50
Australia	\$6.60	China People's Republic of	\$10.50
Austria	\$6.60	Colombia	\$6.55
Azores	\$6.60	Comoros	\$6.55
Bahamas	\$6.60	Congo People's Republic of	\$6.60
Bahrain	\$6.60	Cook Islands	\$10.50
Balearic	\$6.60	Costa Rica	\$6.55
Bangladesh	\$6.60	Cuba	\$6.60
Barbados	\$6.60	Cyprus	\$6.60
Belgium	\$6.60	Czechoslovakia	\$6.60
Bequia	\$10.50	Denmark	\$6.60
Bermuda	\$6.60		
Bolivia	\$10.50		

Destination	3-Minute Call Charge
Djibouti	
Republic of.....	\$10.50
Dominican Republic.....	\$9.60
Ecuador.....	\$10.50
Egypt (Arab Republic of).....	\$8.55
Equatorial Guinea.....	\$8.55
Ethiopia.....	\$8.00
Falkland Islands.....	\$10.80
Feroe Islands.....	\$8.60
Fiji (Suva).....	\$7.80
Finland.....	\$8.60
France.....	\$8.60
Gabon Republic.....	\$10.80
Gambia.....	\$7.50
Germany East.....	\$8.60
Germany West.....	\$8.60
Ghana.....	\$7.50
Gibraltar.....	\$8.60
Greece.....	\$8.60
Greenland.....	\$8.60
Grenada.....	\$7.50
Guam.....	\$8.55
Guatemala.....	\$10.50
Guinea Bissau.....	\$8.60
Guyana.....	\$7.50
Hawaii.....	\$8.55
Hong Kong.....	\$8.60
Hungary.....	\$8.60
Iceland.....	\$8.60
India.....	\$8.60
Indonesia.....	\$8.55
Iran.....	\$7.50
Iraq.....	\$7.50
Ireland (Eire).....	\$8.00
Israel.....	\$8.60
Italy.....	\$8.60
Ivory Coast.....	\$8.55
Jamaica.....	\$8.60
Japan.....	\$8.60
Jordan.....	\$7.50
Karaya.....	\$8.60
Korea Republic of.....	\$10.50
Kuwait.....	\$8.55
Lebanon.....	\$8.55
Liberia.....	\$8.55
Libya	
Arab Jamahiriya.....	\$8.60
Leichtenstein.....	\$8.60
Luxembourg.....	\$8.60
Macao.....	\$10.55
Madagascar	
Republic of.....	\$8.00
Madera.....	\$8.60
Malaysia.....	\$8.60
Maldives Islands.....	\$10.50
Mali.....	\$10.50
Malta.....	\$8.60
Mauritania.....	\$10.50
Mauritius.....	\$7.50
Mexico.....	\$10.50
Monaco.....	\$8.60
Montserrat W Indies.....	\$7.50
Morocco.....	\$8.60
Nepal.....	\$7.50
Netherlands.....	\$8.60
New Caledonia.....	\$8.55
New Zealand.....	\$8.60
Niger.....	\$10.50
Nigeria.....	\$8.60
Norway.....	\$8.60

Destination	3-Minute Call Charge
Oman.....	\$8.60
Pakistan.....	\$7.80
Panama.....	\$10.50
Papua New Guinea.....	\$8.55
Paraguay.....	\$8.55
Peru.....	\$9.60
Philippines.....	\$8.55
Poland.....	\$8.60
Portugal.....	\$8.60
Puerto Rico.....	\$8.60
Qatar (Doha).....	\$8.50
Rouman.....	\$8.00
Roumanie Socialist Republic of.....	\$8.60
Rwanda.....	\$8.55
Samoa (Western).....	\$8.55
Samoa (American).....	\$8.55
Sao Tome and Principe.....	\$8.00
Saudi Arabia.....	\$8.60
Senegal.....	\$10.50
Seychelles.....	\$10.50
Sierra Leone.....	\$7.50
Singapore.....	\$8.60
Solomon Islands.....	\$8.55
Spain.....	\$8.60
Sri Lanka Democratic Socialist Republic of.....	\$7.50
St Helena.....	\$8.60
St Lucia	
(West Indies).....	\$8.60
St Vincent	
(West Indies).....	\$8.60
Sudan Republic of.....	\$8.60
Sweden.....	\$8.60
Switzerland.....	\$8.60
Syrian Arab Republic.....	\$10.50
Taiwan.....	\$10.50
Tanzania.....	\$8.60
Thailand.....	\$10.50
Tonga.....	\$8.55
Tortola Vh. n	
Islands (British).....	\$7.50
Trinidad and Tobago Democratic Republic of.....	\$7.50
Tritan da Cunha.....	\$8.00
Tunasa.....	\$8.60
Turkey.....	\$8.60
Turks & Caicos Island.....	\$8.60
Uganda.....	\$8.60
Union of Soviet Socialist Republics.....	\$8.60
United Kingdom (Great Britain and Northern Ireland).....	\$8.00
United States of America.....	\$8.60
Uruguay.....	\$10.50
Vatican City.....	\$8.60
Venezuela.....	\$10.50
Vietnam.....	\$10.50
Virgin Islands (US).....	\$9.00
Yemen Arab Republic	
(Peoples Democratic Republic).....	\$8.60
Yugoslavia.....	\$8.60
Zanz.....	\$8.60

- Ships at sea fitted with suitable radio-telephone apparatus:
- (i) via Great Britain..... \$9.00
 - (ii) via the Republic of South Africa
 - A. Short range (i.e. ship within approximately 180 km of a coastal radio station)..... \$1.32
 - B. Long range (i.e. ship beyond 180 km of a coastal radio station)..... \$1.98

GENERAL INFORMATION

ENQUIRIES AND COMPLAINTS

Enquiries and complaints regarding the operation of the telephone service should generally be made to the local exchange operator or supervisor (if there is one) in the first instance. Other enquiries and complaints (e.g. enquiries about the provision of telephone service and complaints which cannot be dealt with by the local exchange operating staff) should, with the following exceptions, be addressed to the local Postmaster:-

Services and Sales Manager, Malacaland, P.O. Box 80, MUTARE.
 Services and Sales Manager, Mashonaland, P.O. Box 4800, HARARE.
 Services and Sales Manager, Matabeleland, P.O. Box 48, BULAWAYO.
 Services and Sales Manager, Midlands, P.O. Box 274, GWERU.
 Services and Sales Manager, Victoria, P.O. Box 310, MASVINGO.

RELINQUISHMENT OF SERVICE AND TRANSFER

Subscribers are requested to give at least 30 days notice when relinquishing telephone service or requesting the transfer of an existing telephone to a new address.

FAULTS

Faults should be reported to the local exchange, in accordance with any special instructions which may appear at the beginning of the relevant exchange section of the main part of the Directory.

TELEPHONE ACCOUNTS

Accounts should be paid in full within the statutory period, even though some or all of the charges are in dispute. Failure to comply with the Bye-Laws in this respect renders a subscriber liable to penalties as are laid down in Postal and Telecommunications Service (Telephones) Bye-Laws, 1973. Any adjustment found necessary following a dispute will be made in the telephone account next following the conclusion of investigations. Codes are used, under certain circumstances, to indicate the destination of calls and/or the type of service for which a charge is being raised. A list of these codes appears at the end of this Protocol. Telephone accounts are subject to sales tax.

(Note: Further details available on application to the Services and Sales Manager or Postmaster.)

TRANSFER OF CALLS

At the discretion of the Posts and Telecommunications Corporation, and at such exchanges as may be prescribed by the Corporation, any subscriber with a direct line to such an automatic exchange may, when absent (e.g. on holiday), have incoming calls transferred to another number on the same automatic exchange. The charge for this service is an installation charge of \$12.00 for the provision and connection of equipment for the regular transfer of calls plus a rental of \$1.50 per month, or part thereof, for each period of absence.

TIME CALLS

Subscribers requiring the correct time may obtain this from the local exchange. The charges are as for a local call to another subscriber on the same exchange.

ALARM CALLS

A subscriber, other than a party line subscriber, requiring to be rung at a certain time (e.g. early in the morning to catch a train) may book an "alarm" call. The operator will ring the subscriber at the specified time. The charge for this service is as prescribed in the charges bye-laws.

PHONOGRAMS

Phonograms are messages telephoned by a subscriber to a telegraph office for onward transmission as telegrams. Telegraph offices at which phonograms are accepted are known as phonogram centres and the appropriate centre for any particular subscriber is usually, though not always, the nearest Corporation telegraph office.

Subscribers on automatic exchanges should dial the number shown against "Phonograms" in the list of important numbers at the head of their exchange alphabetical list or in the alphabetical list under "Posts and Telecommunications Corporation". Subscribers on manual exchanges and manual party lines should ask the exchange operator for "Phonograms".

Phonograms cannot be accepted from Public Call Offices or at Post and Telegraphic Agencies and certain Corporation offices. Subscribers to Agency exchanges or such Corporation offices are, instead, connected to the nearest Phonogram centre. In such cases, no charge is levied for the trunk call.

When the local Phonogram centre is closed, a subscriber may ask the local exchange for a call to Harare Phonograms "97" for the purpose of sending an "After Hours" Phonogram. No trunk call charge will be levied for this service. Harare Phonograms opens at 8 a.m.

"After Hours" Phonograms are accepted at Herein Phonograms up to midnight Mondays to Fridays, 10 p.m. Saturdays and between the hours 8 a.m. to 11 a.m. and 6 p.m. to 8 p.m. Sundays.

When a phonogram is dictated the subscriber should confirm with the phonogram operator the rate at which the phonogram is to be transmitted, e.g. Urgent, Ordinary or Letter Telegram. The operator can advise the rate applicable to the class of telegram concerned. This will obviate any disputes regarding charges.

A reception fee of 2c per word subject to a minimum charge of 24c plus 5c ledger fee is levied for each phonogram in addition to the telegraph charge and the total amount is debited to the subscriber's telephone account.

Phonograms are subject to the rules and regulations governing the acceptance and transmission of telegrams but the Corporation reserves the right to refuse to accept phonograms composed wholly or partly in secret language.

DELIVERY OF TELEGRAMS BY TELEPHONE

Only telegrams addressed to a telephone number are telephoned to an addressee in the normal course but, on receipt of written instructions from a subscriber who lives or has his business in an area beyond the area in which telegrams are delivered free of charge, the Posts and Telecommunications Corporation may arrange for all telegrams to be telephoned free of charge. The right is reserved, however, to refuse this facility when its object, the expeditious delivery of telegrams, would be defeated.

A confirmatory copy of the telephoned telegram will be delivered by post if required.

IMPROPER USE OF TELEPHONES

A subscriber may not allow his telephone installation to be used other than for his own business or private purposes or by any guest residing or boarding with him.

TYPICAL TELEPHONE CHARGES

1. Rental for a direct exchange line—
 - (a) where the subscriber's premises are situated within a basic rental area and the line is connected to—
 - (i) a manual exchange..... \$2.00
 - (ii) an automatic exchange..... \$2.50
 - (b) where the subscriber's premises are situated outside a basic rental area but within the exchange area..... The rental prescribed in paragraph (a) and, in addition, for each 500 metres or part thereof from the premises to the nearest point on the boundary of the basic rental area... \$1.00
2. Rentals for plug and socket extensions—
 - (a) On a direct exchange line or extension off a direct exchange line within the same premises and the telephone is connected to a plug
 - (i) exchange line or extension line (including telephone)..... The rental prescribed in item 1
 - (ii) plug..... 15c
 - (iii) each socket outlet, including the first one..... 15c
3. *Rental for automatic party lines— not exceeding a chargeable length averaging 8 km per subscriber; per subscriber..... \$6.00
4. *Rental for manual party lines— not exceeding a chargeable length averaging 8 km per subscriber; per subscriber..... \$4.60
5. *Rental for metered automatic party lines— not exceeding a chargeable length averaging 8 km per subscriber; per subscriber..... \$3.30

for each 500 metres or part thereof by which the average chargeable length per subscriber exceeds 8 km; per subscriber..... 25c

Per month

Charges for the installation of telephone apparatus—

- (a) (i) direct exchange line to premises situated within a basic rental area..... \$25.00

Subscribers are reminded that under the terms of the Post Office Act it is an offence to tamper or interfere with any Telecommunication line or apparatus belonging to or used by the Corporation.

ATTACHMENTS TO TELEPHONES

Electronic or mechanical devices, offered for sale or hire, for attachment to telephones connected to the public system must be approved in advance by the Posts and Telecommunications Corporation. Telephone speech recording and answering machines and some types of fire and burglar alarms come within this category, and subscribers should, in their own interests, seek the advice of the Corporation before purchasing or renting such devices.

Subscribers are reminded that, except for type-approved telephones connected to P.A.S.X. extensions under certain conditions, it is illegal for privately owned telephone instruments to be connected to Post Office exchange lines by any means whatsoever.

JOINT-USER AGREEMENT

Any person who:

- (a) is not a telephone subscriber and occupies an office or resides in the same building as a telephone subscriber, and
- (b) wishes to share the use of the telephone subscriber's telephone installation:

may, with the approval of the Posts and Telecommunications Corporation, enter into a joint-user agreement for service under that exchange number at charges as prescribed. It is emphasized that a joint user is not a telephone subscriber. The subscriber with whom a joint-user shares telephone service is responsible for the payment of all rentals, fees and charges and for the actions of joint-users insofar as they affect the telephone service provided by the Corporation.

- (ii) direct exchange line to premises situated outside a basic rental area..... Such amount as may be fixed by the Corporation in each case, being not less than the charge prescribed in subparagraph (i).
- (iii) telephone connected to a shared service line..... \$25.00
- (b) telephone connected to an automatic party line, metered automatic party line or manual party line—
 - (i) if the subscriber's premises are situated within a basic rental area..... \$25.00
 - (ii) if the subscriber's premises are situated outside a basic rental area and are not more than 8 km from the nearest point on the boundary of the basic rental area for the exchange to which the line is connected... \$50.00
 - (iii) if the subscriber's premises are—
 - A. situated outside a basic rental area and are more than 8 km from the nearest point on the boundary of the basic rental area for the exchange to which the line is connected..... \$100.00
 - a. where the average line length of a new party line exceeds 8 km per subscriber, or the length of an individual new spur is more than 8 km..... Such amount as may be fixed by the Corporation in each case, being not less than the charge prescribed in A.
- (c) plug and socket extensions— for each additional internal extension socket extension... \$12.00

Note: Further details available on application to the Services and Sales Manager or Postmaster.)

Above charges subject to sales tax.

TELEPHONE ACCOUNTING CODES

The undermentioned Accounting Codes are some of those used on subscriber's telephone accounts to indicate the type of service for which a charge is being raised. (The codes are often preceded by additional code letters which are used for internal accounting only.)

A D C	Advice Duration/Charge	COLL	Collect	F	Fixed Time	RGSTN	Registration
A D J	Adjustment	D	Daily Fixed Time Call	M	Messenger Service Call	T/USER	Temporary User
A P P	Apparatus	DIR	Directory	P	Personal Service	XFER	Transfer
B A L	Balance	ENT	Entry	PP	Double Personal Service Call	PHOND	Phonogram

ANNEX 4

African Telecommunications Network

ANNEX 5

ITU/PANAFTEL Route Plans/Surveys

PANAFTTEL ROUTES ALREADY SURVEYED BUT NOT IMPLEMENTED

WITH ESTIMATED COST OF IMPLEMENTATION

	Route length Kms	When surveyed	US\$ X1000 Est. Cost	Remarks
Lilongwe (MLW) - Chipata (ZAM)	133	6/76	980	.
Francistown (BOT) - Livingstone (ZAM)	563	9/73	4,000	Note 2
Tete (MOZ) - Katete (ZAM)	287	1978	1,050	Note 3
Tete (MOZ) - Blantyre (MLW)	167	1978	808	Note 3
Nampula (MOZ) - Mtwara (URT)	571	1978	2,474	Note 3, 17
Mzuzu (MLW) - Mbeya (URT)	318	1976	1,914	Note 1
Chingola (ZAM) - Lubumbashi (ZAI)	109	12/76	693	Note 4
Songo (Burundi) - Kigoma (URT)	170	1978	1,200	Note 3
Ngara (URT) - Kigali (RWA)	99	1978	244	Note 3
Garissa (KEN) - Chisimao (SOM)	421	9/76	3,100	Note 5
Jijiga (ETH) - Hargeisa (SOM)	158	9/73	1,600	Note 5
Asmara (ETH) - Tessenai-Kassala (SUD)	345	9/77	2,634	Note 6
Atbara-Wadi Halfa (SUD route)	560	9/77	3,275	Note 7
N°Djamena-Moundou-Sarh (CHD route)	701	10/73	4,326	Note 8
Moundou (CHD) - Gore-Pacua (CAF)	181	10/73	530	Note 9
Pacua-Bossemhele (CAF route)	291	10/73	1,679	Note 9
Berberati-Nola (CAF route)	103	10/73	306	Note 9
Bangui (CAF) - towards Impfondo (PRC)	309	10/73	928	Note 10
Ebolowa (CMR) - Bata (EQG)	200	1977	1,400	Note 11
Kigali-Cyangugu (RWA route)	208	10/73	769	Note 12
Cyangugu (RWA) - Bukavu (ZAI)	10.4	10/73	97.5	Note 12
Korhogo (IVC) - Sikasso (MLI)	175	12/73	700	Note 1
Bamako-Mopti (MLI route)	555	12/73	2,496	Note 13
Bamako (MLI) - Siguiri (GUI)	195	12/73	522	Note 14
Siguiri-Kankan (GUI route)	123)			Note 15
Kankan-Koule (GUI route)	307)			Note 15
Farnah-Koule-Nzerakore (GUI route)	364)	12/73	18,000	Note 15
Conakry-Boke-Sangaredi (GUI route)	210)			Note 15
Kindia-Koundara-Mali (GUI route)	407)			Note 15
Mali (GUI) - Tambacounda (SEN)	262.5	12/73	948	Note 14
Akjoujt-Atar (MAU route-CX cable)	220	11/73	1,500	Note 16
Aquelil-Timzak-Mt. Choum (MAU route)	77	11/73	900	Note 16
Choum-Zoverate (MAU route)	190	11/73	1,500	Note 16
Choum-Nouadhibou (MAU route)	<u>550</u>	11/73	<u>3,600</u>	Note 16
Carried Forward	9539		64,074	

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	Route length Kms	When surveyed	US\$ X1000 Est. Cost	Remarks
Brazzaville-Pointe Noire(PRC)	400	11/79	7,800	
Bakoumba(GAB)-Makabena(PRC)	230	11/79	1,600	
Praia(CVI)-Dakar(SEN)	600	12/79 }	2,500	Note 18
Praia(CVI)-Bissau(GBS)	840	12/79 }		Note 18
Bissau(GBS)-Boke(GUI)	180		2,069	
Bissau(GBS)-Ziguinchor(SEN)	120		1,191	
	<hr/>		<hr/>	
GRAND TOTAL	<u>11,909</u>		<u>74,334</u>	

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Notes	Remarks
1	Implementation under discussion by both governments.
2	Route has low viability but required for political reasons.
3	Consultants report on survey under consideration.
4	Specifications prepared by PANAFTEL team.
5	Project being postponed by Somalia presumably pending construction of Mogadishu - Hargeisa trunk route.
6	Project being postponed by Ethiopia due to problems of implementation. Alternative alignment under considera-
7	Project has been dropped from present National Development Programme. tion.
8	Government reviewing its options for provision of national trunk route.
9	Priority for these routes to be confirmed in view of operational difficulties in Central African Republic and the review of options in Chad.
10	The Congo terminal has been installed and CAF is requesting ADB for financing of its terminal.
11	A microwave system on this route is not justified by the traffic forecast and a more economic solution should be selected.
12	The early implementation of this route is supported.
13	This is a national route which might be extended to provide direct routes to Niger.
14	The Guinea section is included in Phase II of its Development Programme.
15	Included in Phase II of the Guinea Development Programme.
16	The Mauritania requirements should be reviewed with the government to ascertain relative priorities. It is understood for instance that the Choum. Nouadhibou route has been dropped in favour of direct route between Nouadhibou and Nouakchott.
17	Alignment being re-considered.
18	Std 'B' Earth Station proposed at Praia.

PANAFTTEL ROUTES TO BE SURVEYED WITH ESTIMATES OF COST OF SUCH SURVEYS

Route	Route length Kms	\$ Cost of survey	Remarks
Antananarivo (MAG) - Comoros	560	20,000	Note 1
Comoros-Mtwara (URT)	340	20,000	Note 2
Djibouti-Assab (ETH)	140	42,000	Note 3
Djibouti-Hargeisa (SOM)	275	82,500	Note 3
Hargeisa-Mogadiscio (SOM route)	1,300	390,000	Note 4
Gondar (ETH) -Gedarif (SUD)	290	87,000	Note 5
Raga-Wau (SUD) -Obo-Bambari (CAF)	1,250	375,000	Note 6
Juba (SUD) -Kitale (KEN)	700	210,000	Note 8
Juba (SUD) -Kampala (UGA)	390	117,000	Note 7
Kampala (UGA) -Kigali (RWA)	380	114,000	Note 9
Kampala (UGA) -Goma (ZAI)	480	144,000	Note 7
Kalabo (ZAM) -Gago Coutinho (ANG)	180	54,000	Note 1
El Geneina (SUD) -Abéché-Ati-N'Djamena (CHD)	793	237,900	Note 10
Massaguet-Bol-Mao (CHD route)	272	81,600	Note 10
Bambari-Bria-Birao (CAF route)	600	180,000	Note 18
Bambari-Sibut-Bangui (CAF route)	370	111,000	Note 18
Luanda (ANG) -Kinshasa (ZAI)	530	159,000	Note 7
Cabinda (ANG) -Pointe Noire (PRC)	90	27,000	Note 1
Kigoma (URT) -Kalemie (ZAI)	140	42,000	Note 19
Douala (CMR) -San Antonio-Sao Tome (STP)	550	165,000	Note 1 & 20
Libreville (GAB) -Sao Tome (STP)	300	90,000	Note 1 & 20
Kribi (CMR) -Camp -Bata (EGQ)	120	36,000	Note 11
Bata (EGQ) -Libreville (GAB)	170	51,000	Note 11
Zinder-Goure-Diffa (NER route)	400	120,000	Note 12
Ouagadougou (UPV) -Dolgatanga (GHA)	200	60,000	Note 19
	<u>10,820</u>	<u>3,016,000</u>	
Niger-Mali (direct route)	1130	339,000	Note 13
Mali-Algeria (direct route)	3000	900,000	Note 14
Niger-Algeria (direct route)	2600	780,000	Note 15
Mauritania-Mali (direct route)	1050	315,000	Note 16
Mauritania-Algeria (direct route)	2900	870,000	Note 17
	<u>10680</u>	<u>3,204,000</u>	

Revised: June 1980

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Notes	Remarks
1	To be surveyed by ITU with BADEA Funds.
2	Presume also to be surveyed together with Antananarivo - Comoros route.
3	Requested in connection with links to Middle East and Mediterranean Area Network Project.
4	Assistance should be provided to Somalia to identify sources of financing to survey and implement this main trunk route.
5	Ethiopia and Sudan have requested ITU for assistance in surveying.
6	Priority not being maintained by at least one government.
7	Priority should be confirmed with the governments concerned.
8	Both countries are negotiating with sources of bilateral aid for this project.
9	This concerns only up-grading of route from VHF to SHF. Kampala-Mbarara Specification prepared.
10	The government is re-examining its options for its national network.
11	Both countries giving high priority to this route.
12	This is mainly required for national service.
13	Traffic Niamey - Bamako could be handled by the routes being provided with CIDA assistance.
14	Mali has now direct satellite circuits with Algeria and thus this route is not necessary at this time.
15	A more economical and reliable solution would be for Niger to rent circuits through the Mali satellite earth station.
16	Traffic Nouakchott to Bamako could best be routed via Senegal but assistance may be requested to develop national trunk circuits, however they need not be of PANAFTEL standard.
17	A terrestrial route would not be a practical solution. A satellite communication earth station could be obtained for practically the same cost of a route survey. In any case the Arab Regional Satellite Project will take care of this requirement.
18	The Central African Republic being strategically located in the centre of the continent and of course being completely landlocked should be given assistance to establish and operate its major trunk routes for the benefit of transit traffic as well as national traffic.
19	This route is clearly required for to support surface transportation but does not seem to receive high priority from the countries concerned.
20	A multi-channel (e.g. 4) HF radio system would appear an appropriate solution.

Additional PANAFTEL routes proposed by the PANAFTEL Project team for consideration during the Decade

The routes appearing on the attached table have been selected on the assumption that those already surveyed and found viable will be implemented early in the Decade.

In principle most of the routes proposed are intended to provide alternative and shorter routes for transit traffic. Whereas, route distance is not a great problem, the number of switching or mod/demod points might be critical.

The adoption of some of these routes might reduce the importance of one or two others, however, it is suggested that all be surveyed before final decisions are taken.

Most of the proposed systems will require large investments and will require considerable national and international traffic in order to become viable. However one of the aims of the Transport and Communications Decade is to increase the penetration of telecommunications in each country e.g. "opening the various regions of African countries" as stated in Resolution ECO (XVIII) Res 2 of ECA and thus a sufficient amount of long distance traffic might be generated earlier than previously anticipated.

Additional PANAFTEL routes proposed for consideration
during the Transport and Communications Decade 1978 - 1988

<u>Route details</u>	<u>Route length</u> (Kms)	<u>Cost of survey</u> (US \$)
1. Kosti-Malakal-Wau-Juba (SUD route)	Kosti-Malakal - 470 kms Malakal-Wau - 525 kms Wau-Juba - <u>730 kms</u>	
	1725 kms	517,500
2. Kampala (UGA) -Kisangani (ZAI) -Bangassou (CAF)	1157,5 kms	472,500
3. Kalemie-Kabalo-Kamina (ZAI route)	650 kms	195,000
4. Maseru (LES) -Lobatse (BOT)	500 kms	20,000
5. Huambo-Moxico-Gago Coutinho (ANG route)	875 kms	262,500
6. (i) Maputo-Inhambane-Beira)	925 kms	277,500
(ii) Beira-Quelimane-Nampula) MOZ routes	825 kms	247,500
(iii) Beira-Tete)	475 kms	142,500
7. Douala (CMR) -Calabar (NIR)	210 kms	63,000
8. Mao (CHD) -Nguigmi (NER) -Diffa (NER)	<u>435 kms</u>	<u>130,500</u>
Grand Total	<u>8195 kms</u>	<u>2,328,500</u>

Note: See next page for remarks against each of the items

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R E M A R K S

- 1 (i) If the Central African Republic (Bambari) to Sudan (Wau) link and Juba (SUD) to Kampala (UGA) link are implemented it will be natural and necessary to connect Wau with Sennar (via Malakal and Kosti) and also Juba with Sennar via Wau, Malakal and Kosti. Direct linkage of Juba to Malakal may not be feasible due to the intervening Sudd.
- (ii) This artery when implemented will provide a useful east-west linkage.
- 2 The Trans African highway will, it is expected, be a reality within a few years. No doubt the operation of this international highway will cause a rapid development in areas which have always been isolated. It will be necessary therefore to bring telecommunications to the areas served by the highway. The area for which no plans seem, at present, to be under consideration is the Kampala-Kisangani-Bangassou section. This route could also be considered as an east-west route.
- 3 This route is intended to interconnect the Tanzanian microwave route to the Kinshasa-Lubumbashi route at Kamina and would follow the railway route. A trade route, that will be developed, follows the railway and proceeds to Dar-es-Salaam via Kalemie and Kigoma.
- 4 This could be a medium capacity troposcatter system and match a similar one between Lesotho and Swaziland for which a request for study has already been received. Such a pair of systems would provide the three sister countries (Lesotho, Botswana, Swaziland) with intercommunications independent of the network of the Republic of South Africa.
- 5 Angola has earlier contemplated operating a domestic satellite system to provide telecommunications between Luanda and Gago Coutinho. Whether or not this solution is selected, in the long run it will be necessary to establish a terrestrial system for national requirements as well as to permit handling of international terminal and transit traffic.
- 6 These links are essential to provide a national telecommunications network and are in fact under consideration by the Mozambique government. The present troposcatter systems though recently up-graded and extended do not have the traffic capacity to meet more than the present day traffic.
- 7 This is an obvious route that would provide a short link between an important centre in Central Africa Sub-Region to an equally important centre in the West African Sub-Region.
- 8 This is a natural extension of the national network of Niger, if that network is implemented as planned, to the Chad network via north of Lake Chad.

ANNEX 6

ITU World-wide Technical Cooperation



LATIN AMERICA

- Netherlands Antilles** 1
Assistance - Financial Department - Maintenance
- Argentina** 2
Message switching Centre
- Bermuda** 3
Telecommunications legislation
- Brazil** 4
Telecommunications research and development
- Chile** 5
National telecommunications planning
- Cuba** 6
Development of telecommunications services and equipment
- Ecuador** 7
National Telecommunications Training Centre and national development plan
- El Salvador** 8
Expansion of the telecommunications system
- Guatemala** 9
Preparation of short, medium and long term training plans
- Haiti** 10
Telecommunications development
- Honduras** 11
Training Centre of the Central Honduras de Telecomunicaciones (HONDUTEL)
- British Virgin Islands** 12
Advice on telecommunications services
- Nicaragua** 13
Training Centre
- Panama** 14
Training Centre
Monitoring telecommunications system
- Paraguay** 15
Expansion of telephone network
- Suriname** 16
Assistance to TELESUR in Organization, Training, Switching and introduction of new services
- Trinidad and Tobago** 17
Telecommunications Training Centre
- Uruguay** 18
National Telecommunications Training Centre
Data communications
- Venezuela** 19
Tariffs, frequency management, planning
Centre of Laboratory

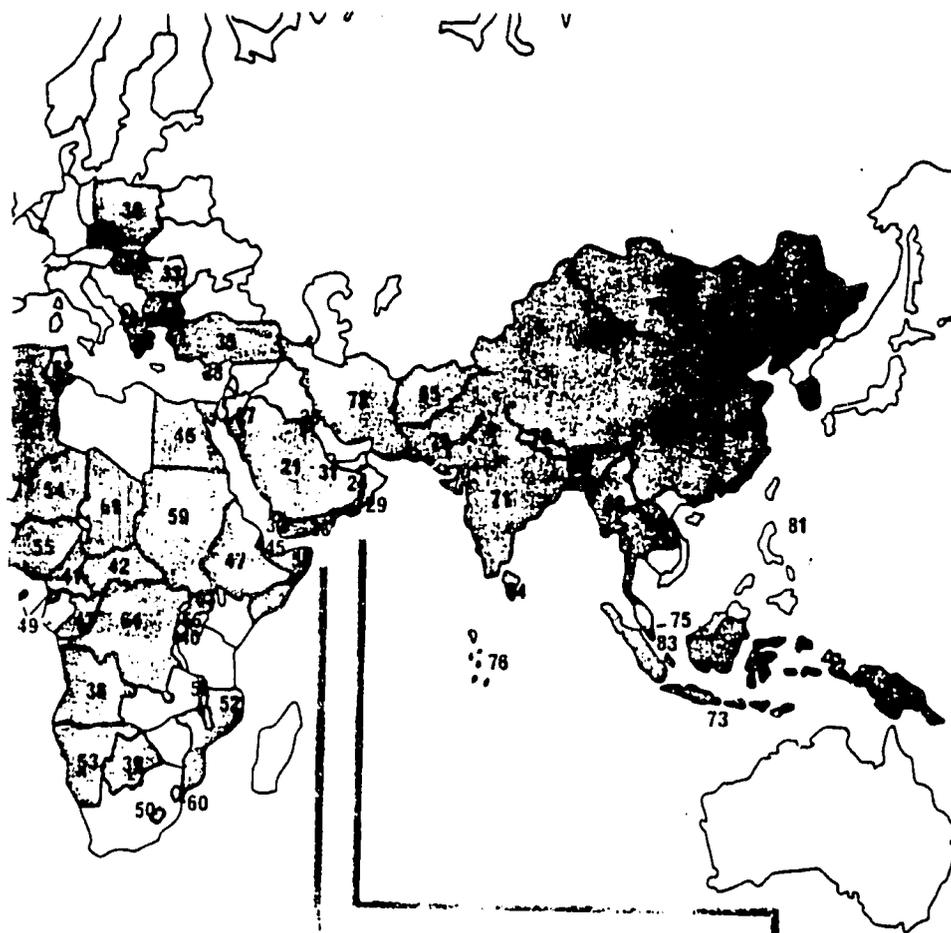
EUROPE AND MIDDLE EAST

- Albania** 20
Fellowship in telecommunications and broadcasting
Development of telecommunications network
- Saudi Arabia** 21
Telecommunications broadcasting training institutes (Jeddah and Riyadh)
Telecommunications experts and advisors
Special telecommunications network for the Ministry of Foreign Affairs
Advisory services for the satellite broadcasting system project
Advisory services to the Ministry of Information
Technical assistance to the Ministry of PTT
- Bulgaria** 22
Expanding the activities of the Telecom Research Institute e.g.
1) computer aided network planning
2) computer aided maintenance
- Cyprus** 23
Radio frequency management and reporting
- United Arab Emirates** 24
Telecommunications advice to EMTEL
- Greece** 25
Upgrading of the telecommunications maintenance organization
Reorganization of telecom maintenance
- Hungary** 26
Mobile telecommunications techniques
- Jordan** 27
Development of the Telecom Maintenance Training College
Assistance to Administration in Energy and Air Conditioning
- Kuwait** 28
OPAS experts
- Oman** 29
Expert in frequency management
- Poland** 30
Fellowship in advanced telecommunications techniques
- Qatar** 31
Development of radio and television broadcasting
Telecommunications development (frequency management)
- Yemen (A.R.)** 32
Telecommunications training institute
Organization and operation of telecommunications projects
- Romania** 33
Improvement of telecommunications services
- Czechoslovakia** 34
Modern telecommunications techniques
- Turkey** 35
Development of training in telecommunications
- Yemen (P.D.R. of)** 36
Telecommunications Development
- Regional Projects**
MEDARABTEL (Middle East and Mediterranean Telecom multilateral Network project) implementation phase of Master Plan
Transition and Arbitration of Telecommunications Concessions Terms
Radio propagation study and frequency planning
ITU/GULFVISION project (FM)
European Regional Project for International Telecommunications (Eurotel) studies
TCDC
Cooperation in telecommunications training among Arab States
Interregional Projects
Coiled Development in the field of telecommunications (CODETEL)



AFRICA

- Algeria** 37
Telecommunications Institute, Oran
- Angola** 38
Telecommunication training
Telecommunications engineering assistance
- Botswana** 39
Assistance in radio frequency management
Assistance in sound and television broadcasting
- Burundi** 40
Telecommunications Adviser
- Cameroon** 41
Technical assistance for the development of a national television network
National telecommunications network rehabilitation unit
- Central African Republic** 42
Planning
Assistance for initial investment in the Master Plan
- Congo** 43
Telecommunications planning, maintenance and operation
- Ivory Coast** 44
Telecommunications planning
INTELCI - Informatics and telecommunications studies
- Djibouti** 45
Establishment of a telecommunications training centre
- Egypt** 46
Training in television and broadcasting
- Ethiopia** 47
Upgrading of the Telecommunications Training Institute
- Gambia** 48
Rural Telecommunication Development
- Equatorial Guinea** 49
Telecommunications development
- Lesotho** 50
Assistance to Lesotho Telecommunications
Two way radio network for rural health delivery
- Malawi** 51
Radio frequency management and radio monitoring
- Mozambique** 52
Assistance in telecommunications
Assistance in broadcasting
- Namibia** 53
Preparation of Plans for Telecommunications
- Niger** 54
Assistance in telecommunications planning
Assistance in the inspection of equipment



Maldives	78	Transt and Transport (Facilities and Equipment) for LDCs - Procurement of Equipment for Coastal Radio Station for Maldives.
Morgolla	77	Development of Rural Telecommunications
Nepal	78	Telecommunications Training Centres Telecommunications Maintenance and Management
Pakistan	79	Survey and System Design for Telecommunication links for remote areas
Papua New Guinea	80	Advanced Training in Telecommunications
Philippines	81	Development study of telecommunication sector
Western Samoa	82	Telecommunications development Telecommunications Training (Fellowships)
Singapore	83	Telecommunications Training Programme
Sri Lanka	84	Telecommunications Training Centres Development of Telecommunications
Tokelau	85	Telecommunications Development
Tonga	86	Telecommunications Development
Regional Projects		Telecommunications Training (South Pacific) Telecommunications Development (South Pacific) Support to Telecommunications (Study, Training, etc.) - ASEAN Rural Telecommunications in the Least developed countries of Asia and the Pacific Telecommunication Maintenance Radio Frequency Monitoring and Management Teletraffic engineering training Course development in the field of telecommunications (CODEVTEL)

Korea (Republic of) 70
Korea Telecommunications Research Institute

India 71
Follow-up support to Advanced Level Telecommunications Training Centre
Expansion and modernization of telecommunication services
Research and development programme of experimental satellite earth station, Ahmedabad

Expansion of monitoring facilities for UHF/microwave and satellite transmissions
Augmentation of training facilities at experimental satellite communication earth station, Ahmedabad

Telecommunication Research Centre for development of new techniques and technologies

Modernization / augmentation of the existing facilities for radio frequency spectrum monitoring, radio direction finding and in-service training

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In-house data processing facilities for monitoring organization/wireless planning and coordination wing

Research and development programme of Space Applications Centre, Ahmedabad

Training programme on video technology

Iran 72
Tehran - Isfahan Coastal cable installation

Indonesia 73
Telecommunication Test and Development Centre

Laos (P.D.N.) 74
Telecommunication Training and Planning

Malaysia 75
Telecommunication Planning and Development

ASIA AND PACIFIC

Afghanistan 55
Telecommunication Training Centre

Bangladesh 68
Telecommunication Training Centre
Development of Broadcasting Services

Bhutan 67
Manpower Development Telegraphic Services

Burma 68
Telecommunication and Postal Training Centre
Development of Telecommunications

China 69
Improvement of training capability of the Beijing Institute of P and T

Development of Telecommunications

Swaziland 60
Engineering assistance to the Posts and Telecommunications Department

Chad 61
National telecommunication school at Sarh

Tunisia 62
Postal and telecommunication school Tunis

Uganda 63
Rehabilitation of the telecommunication network (Phase II)
Establishment of a Central Repair Depot

Zaire 64
Assistance in the rehabilitation of plant and training

Regional Projects

Preparatory assistance for the development of broadcasting in Africa (Nairobi, Kenya)

Development of the Pan-African News Agency (PANA)
PANAFTEL - Telecommunications maintenance - Pan-African network

PANAFTEL - Pan-African telecommunication network
Multi-country post and telecommunication training scheme (Phase II), Blantyre, Malawi (For Botswana, Lesotho, Malawi and Swaziland)

Advanced multinational telecommunication school, Dakar - Senegal

Assistance in telecommunications at Luptako Gourma
African regional satellite communication system (Telecommunications for rural development)

Nigeria 55
Telecommunications planning (Phase II)
Course development for telecommunications

Rwanda 58
Integrated programme of assistance in telecommunications

Senegal 57
Planning, development of services, and further training of telecommunication personnel

Somalia 58
National Telecommunication Training Institute (Phase II)
Telecommunication Development Planning

Sudan 59
Establishment of a Telecommunications Test, Repair and Maintenance Centre, Khartoum

ANNEX 7

Components for Local Manufacture or Assembly

LIST OF EQUIPMENT/PLANT WHICH MAY BE CONSIDERED FOR
MANUFACTURE OR ASSEMBLY IN AFRICA

1. EXTERNAL PLANT

- poles (wooden, steel, concrete)
- cable ducts (concrete, plastic)
- cabinets, pillars, distribution points
- overhead accessories (arms, spindles, insulators, straps, stays, etc.)

2. INTERNAL AND EXTERNAL STRUCTURES

- towers
- masts
- antennas
- earthdigging accessories
- prefabricated buildings and containers
- frames
- runways
- racks
- airconditioning ducts

3. CABLES

- open-wire (copper, copper-covered steel, copperweld, aluminum)
- aerial and underground drop-wire cables
- internal cabling for buildings
- open and insulated power cables

4. SUBSCRIBER APPARATUS

- radios (HF, UHF)
- telephone instruments
- field sets
- basic switchboards
- concentrators and repeaters
- speakers and condensers

Partially adapted from ITU, Transport and Communications Decade in Africa: ITU Proposals for the Telecommunications Sector (Geneva: ITU, 1981) p. 101 (Annex 10.1)

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