

Power, Communications, and Transportation

This chapter provides data on the power, communications, and transportation sectors of the economy.

An adequate and reliable supply of power is a vital ingredient for the economic development of African countries. This chapter presents information on electric power production and distribution losses. Data are from the International Energy Agency's (IEA's) *Energy Statistics and Balances of Non-OECD Countries, 1993–94* (1997).

Telecommunications are also an essential ingredient of a modern economy. In this chapter telephone main lines represent the supply side of the system, which in Africa is well short of demand. In fact, wait-

ing time for telephone lines is the highest of any other geographical region. Data on telecommunications are from the International Telecommunications Union's (ITU) *World Telecommunications Development Report* (1996).

In addition to power and communication, countries must have a solid transportation sector to underpin expansion of their economies and ensure support to the activities of households, producers, and government. This chapter presents data on vehicle use, roads, and railway traffic. Data are from the World Bank databases and from the International World Road Federation's *World Road Statistics* (1996).

9-1. Electric power consumption per capita

	Million KWH									Annual average		
	1980	1990	1991	1992	1993	1994	1995	1996	1997	75-84	85-89	90-MR
SUB-SAHARAN AFRICA	427.7	445.9	441.1	432.5	439.3	430.1	437.9	442.3	446.6	407.6	447.3	439.5
excluding South Africa	133.0	122.8	126.2	126.2	130.1	127.1	125.0	126.1	125.8	128.0	129.9	126.2
excl. S.Africa & Nigeria	157.3	140.1	142.9	141.4	143.4	141.7	140.3	141.7	141.8	151.9	146.9	141.7
Angola	67.2	60.3	65.3	64.1	62.1	60.4	58.8	61.0	63.9	74.9	67.1	62.0
Benin	29.7	36.7	38.7	41.2	41.7	42.3	45.1	48.0	43.2	29.5	34.8	42.1
Botswana	..	..	..	..	..	..	..	..	..	..	..	..
Burkina Faso	..	..	..	..	..	..	..	..	..	..	..	..
Burundi	..	..	..	..	..	..	..	..	..	..	..	..
Cameroon	155.5	204.3	197.9	194.5	196.9	172.6	165.1	170.9	180.7	179.5	215.6	185.4
Cape Verde	..	..	..	..	..	..	..	..	..	..	..	..
Central African Republic	..	..	..	..	..	..	..	..	..	..	..	..
Chad	..	..	..	..	..	..	..	..	..	..	..	..
Comoros	..	..	..	..	..	..	..	..	..	..	..	..
Congo, Democratic Rep. of	147.3	121.8	131.7	130.4	147.4	144.9	132.0	129.6	120.4	138.8	136.1	132.3
Congo, Republic of	94.1	254.1	236.3	224.5	220.3	216.5	212.8	204.7	197.2	100.0	202.1	220.8
Côte d'Ivoire	191.6	158.0	149.6	81.4	139.6	140.3	170.5	174.3	181.3	166.4	164.9	149.4
Djibouti	..	..	..	..	..	..	..	..	..	..	..	..
Equatorial Guinea	..	..	..	..	..	..	..	..	..	..	..	..
Eritrea	..	..	..	..	..	..	..	..	..	..	..	..
Ethiopia	16.2	21.4	21.1	20.4	19.4	22.7	22.1	21.5	21.4	16.3	18.0	21.3
Gabon	617.9	806.3	784.8	762.5	747.4	754.4	736.8	742.2	752.2	603.3	942.4	760.8
Gambia, The	..	..	..	..	..	..	..	..	..	..	..	..
Ghana	423.5	300.5	309.7	323.4	329.9	305.1	283.5	274.9	275.8	335.9	260.7	300.3
Guinea	..	..	..	..	..	..	..	..	..	..	..	..
Guinea-Bissau	..	..	..	..	..	..	..	..	..	..	..	..
Kenya	92.5	114.7	116.2	116.6	119.8	121.8	121.8	127.2	128.7	90.1	105.9	120.9
Lesotho	..	..	..	..	..	..	..	..	..	..	..	..
Liberia	..	..	..	..	..	..	..	..	..	..	..	..
Madagascar	..	..	..	..	..	..	..	..	..	..	..	..
Malawi	..	..	..	..	..	..	..	..	..	..	..	..
Mali	..	..	..	..	..	..	..	..	..	..	..	..
Mauritania	..	..	..	..	..	..	..	..	..	..	..	..
Mauritius	..	..	..	..	..	..	..	..	..	..	..	..
Mozambique	34.0	35.1	48.3	46.2	46.2	41.3	44.1	40.7	46.8	42.4	32.8	43.6
Namibia	..	..	..	..	..	..	..	..	..	..	..	..
Niger	..	..	..	..	..	..	..	..	..	..	..	..
Nigeria	68.2	77.1	81.6	85.5	95.3	88.8	84.8	85.3	84.0	64.6	84.9	85.3
Rwanda	..	..	..	..	..	..	..	..	..	..	..	..
São Tomé and Príncipe	..	..	..	..	..	..	..	..	..	..	..	..
Senegal	93.7	93.6	96.4	95.7	102.4	97.8	103.8	103.3	107.2	87.4	96.2	100.0
Seychelles	..	..	..	..	..	..	..	..	..	..	..	..
Sierra Leone	..	..	..	..	..	..	..	..	..	..	..	..
Somalia	..	..	..	..	..	..	..	..	..	..	..	..
South Africa	3,212.9	3,676.0	3,618.2	3,548.1	3,581.3	3,530.7	3,659.8	3,723.2	3,800.2	3,037.2	3,555.5	3,642.2
Sudan	35.3	52.3	50.6	50.8	48.8	50.8	50.5	51.4	48.5	37.3	49.4	50.5
Swaziland	..	..	..	..	..	..	..	..	..	..	..	..
Tanzania	36.8	51.2	54.4	53.2	51.4	50.7	54.7	58.8	54.3	35.4	41.7	53.6
Togo	..	..	..	..	..	..	..	..	..	..	..	..
Uganda	..	..	..	..	..	..	..	..	..	..	..	..
Zambia	1,015.7	502.8	651.8	623.4	606.2	589.5	574.3	560.0	562.9	1,058.2	807.9	583.9
Zimbabwe	990.4	932.9	829.6	900.2	787.3	824.0	849.1	893.7	918.8	955.4	929.3	866.9
NORTH AFRICA	362.8	675.9	692.6	696.6	715.8	737.1	752.3	745.7	772.9	352.0	601.0	723.6
Algeria	265.3	449.2	467.6	464.2	508.7	509.8	516.9	526.3	570.8	259.8	399.9	501.7
Egypt, Arab Republic	379.9	697.1	722.7	721.1	743.2	765.5	792.5	772.4	803.4	377.8	606.0	752.2
Libya	1,588.2	3,804.3	3,707.0	3,649.7	3,576.2	3,661.8	3,623.9	3,581.7	3,504.6	1,505.7	3,643.7	3,638.7
Morocco	222.8	339.8	355.4	380.9	377.1	398.1	403.7	408.4	423.3	212.1	299.2	385.8
Tunisia	379.2	531.5	543.1	571.8	607.7	646.2	663.7	673.5	709.2	323.6	459.5	618.3
ALL AFRICA	412.5	498.2	498.1	492.0	501.6	498.9	507.9	509.4	518.3	394.4	482.6	503.0

9-2. Energy production and use

	Energy production (KT oil equivalent)		Commercial energy use (KT oil equivalent)		Electric power transmission and distribution losses (% of output)	
	1980	1997	1980	1997	1980	1997
SUB-SAHARAN AFRICA	319,801	517,698	203,560	324,252	..	..
excluding South Africa	246,632	375,724	138,143	213,266	..	..
excl. S. Africa & Nigeria	98,153	184,417	85,297	126,777	..	..
Angola	11,301	41,616	4,437	7,147	25	28
Benin	1,212	1,909	1,363	2,240	220	76
Botswana	..	..	..	..	..	..
Burkina Faso	..	..	..	..	..	..
Burundi	..	..	..	..	..	..
Cameroon	6,707	12,108	3,676	6,183	7	20
Cape Verde	..	..	..	..	..	..
Central African Republic	..	..	..	..	..	..
Chad	..	..	..	..	..	..
Comoros	..	..	..	..	..	..
Congo, Democratic Rep. of	8,697	14,364	8,706	13,711	8	3
Congo, Republic of	3,970	13,546	845	1,206	1	1
Côte d'Ivoire	0	0	0	0	7	16
Djibouti	..	..	..	..	..	..
Equatorial Guinea	..	..	..	..	..	..
Eritrea	..	..	..	..	..	..
Ethiopia	10,588	15,610	11,157	17,429	8	1
Gabon	9,441	19,786	1,493	1,668	1	10
Gambia, The	..	..	..	..	..	..
Ghana	3,305	5,545	4,027	7,270	0	0
Guinea	..	..	..	..	..	..
Guinea-Bissau	..	..	..	..	..	..
Kenya	7,891	11,641	9,791	14,527	16	17
Lesotho	..	..	..	..	..	..
Liberia	..	..	..	..	..	..
Madagascar	..	..	..	..	..	..
Malawi	..	..	..	..	..	..
Mali	..	..	..	..	..	..
Mauritania	..	..	..	..	..	..
Mauritius	..	..	..	..	..	..
Mozambique	7,413	6,441	8,074	6,863	39	31
Namibia	..	..	..	..	..	..
Niger	..	..	..	..	..	..
Nigeria	148,479	191,307	52,846	86,489	36	32
Rwanda	..	..	..	..	..	..
São Tomé and Príncipe	..	..	..	..	..	..
Senegal	1,046	1,655	1,921	2,822	11	17
Seychelles	..	..	..	..	..	..
Sierra Leone	..	..	..	..	..	..
Somalia	..	..	..	..	..	..
South Africa	73,169	141,974	65,417	110,986	8	8
Sudan	7,089	13,057	8,406	14,899	14	31
Swaziland	..	..	..	..	..	..
Tanzania	9,502	13,529	10,280	14,660	14	14
Togo	..	..	..	..	..	..
Uganda	..	..	..	..	..	..
Zambia	4,198	5,556	4,551	6,088	7	11
Zimbabwe	5,793	8,053	6,570	10,065	9	13
NORTH AFRICA	205,303	270,225	43,937	97,650	..	..
Algeria	66,741	126,400	12,089	26,506	11	15
Egypt, Arab Republic	34,168	57,732	15,970	41,798	13	12
Libya	96,550	78,494	7,193	12,420	..	..
Morocco	877	837	4,778	9,344	10	4
Tunisia	6,966	6,761	3,907	7,582	12	11
ALL AFRICA	525,103	787,923	247,497	421,903	..	..

9-3. Telephone, radio, and television availability, 1994-98

	<i>Telephones</i>				<i>Radios</i>	<i>Television</i>
	<i>Mainlines</i> (per 1,000 persons)	<i>Waiting list</i> (Thousands)	<i>Average cost of call</i> US\$ per three minutes	<i>Mobile phones</i> (per 1,000 persons)	(per 1,000 persons)	<i>sets</i> (per 1,000 persons)
SUB-SAHARAN AFRICA	11	1,440	..	5	198	52
excluding South Africa	5	1,303	..	1	190	46
excl. S. Africa & Nigeria	5	1,213	..	1	181	41
Angola	5	..	0.14	1	54	14
Benin	5	3	0.12	1	108	10
Botswana	41	12	0.03	15	156	20
Burkina Faso	3	..	0.10	0	33	9
Burundi	3	5	0.03	0	71	4
Cameroon	5	45	0.06	0	163	32
Cape Verde	56	10	0.04	3	180	5
Central African Republic	2	0	0.20	0	83	5
Chad	1	1	0.17	0	242	1
Comoros	9	..	0.17	0	138	4
Congo, Democratic Rep. of	1	6	..	0	375	135
Congo, Republic of	8	1	0.12	1	124	12
Côte d'Ivoire	9	82	0.11	6	164	70
Djibouti	13	0	0.19	0	84	45
Equatorial Guinea	6	..	..	1	429	162
Eritrea	5	42	0.03	0	91	14
Ethiopia	3	207	0.03	0	195	5
Gabon	29	10	0.15	8	183	55
Gambia, The	18	22	0.32	4	168	3
Ghana	4	28	0.09	1	238	99
Guinea	2	2	0.10	3	47	41
Guinea-Bissau	9	1	0.14	0	44	..
Kenya	9	77	0.05	0	104	21
Lesotho	9	9	0.03	5	49	25
Liberia	..	2	..	0	274	24
Madagascar	2	10	0.09	1	192	21
Malawi	3	31	0.03	1	249	2
Mali	2	..	0.14	0	54	12
Mauritania	4	1	0.10	0	151	91
Mauritius	132	23	0.04	53	368	226
Mozambique	4	17	0.04	0	40	5
Namibia	51	7	0.05	12	144	37
Niger	1	1	0.15	0	69	27
Nigeria	4	98	0.26	0	223	66
Rwanda	2	..	0.04	1	102	0
São Tomé and Príncipe	19	1	0.02	0	275	227
Senegal	10	17	0.13	2	142	41
Seychelles	176	2	0.16	49	545	149
Sierra Leone	4	14	0.04	0	253	13
Somalia	2	..	..	0	46	13
South Africa	100	116	0.07	56	317	125
Sudan	3	320	0.02	0	271	87
Swaziland	22	15	0.14	5	164	111
Tanzania	3	37	0.09	1	279	21
Togo	5	13	0.10	2	218	18
Uganda	2	6	0.18	1	128	27
Zambia	9	12	0.06	1	121	137
Zimbabwe	14	109	0.03	4	93	30
NORTH AFRICA	47	2,187	..	2	278	131
Algeria	42	732	0.02	1	241	105
Egypt, Arab Republic	9	12	0.06	1	121	122
Libya	14	109	0.03	4	93	126
Morocco	42	732	0.02	1	241	160
Tunisia	47	1,310	0.01	1	324	198
ALL AFRICA	18	2,338	..	5	212	66

9-4. Vehicle ownership

	Units per 1000 persons									Annual average		
	1980	1990	1991	1992	1993	1994	1995	1996	1997	75-84	85-89	90-MR
SUB-SAHARAN AFRICA	..	23	24	24	26	22	23	22	..	..	..	23
excluding South Africa	..	9	15	15	16	14	15	15	..	..	..	14
excl. S.Africa & Nigeria	..	9	10	10	11	11	12	12	..	..	..	11
Angola	..	19	20	20	20	20	20	20	..	..	..	20
Benin	..	3	4	5	6	6	7	8	..	..	..	6
Botswana	27	19	23	28	33	36	41	45	..	27	..	32
Burkina Faso	..	4	4	5	5	5	5	5	..	..	..	5
Burundi	..	0	..	..	..	..	..	..	..	..	..	0
Cameroon	8	10	10	10	11	11	12	12	..	8	..	11
Cape Verde	..	8	8	8	8	9	9	10	..	..	..	9
Central African Republic	8	..	1	1	1	1	1	0	1	8	..	1
Chad	..	5	5	6	7	7	8	8	..	..	..	6
Comoros	..	10	12	13	14	17	18	21	..	..	..	15
Congo, Democratic Rep. of	..	22	25	28	28	29	30	31	..	..	..	27
Congo, Republic of	..	18	19	19	20	19	20	20	..	..	..	19
Côte d'Ivoire	24	23	24	26	27	27	28	28	..	24	..	26
Djibouti	..	16	17	18	19	19	20	21	..	..	..	18
Equatorial Guinea	..	3	4	4	4	4	4	5	..	..	..	4
Eritrea	..	1	1	1	1	1	2	2	..	..	..	1
Ethiopia	2	1	1	1	1	1	1	2	2	2	1	1
Gabon	..	26	27	27	28	28	29	29	..	..	..	28
Gambia, The	..	14	14	15	15	16	16	17	..	..	..	15
Ghana	..	..	..	..	..	8	7	7	..	..	..	7
Guinea	..	4	4	5	5	5	5	5	..	..	..	5
Guinea-Bissau	..	7	8	8	8	9	10	10	..	..	..	9
Kenya	8	13	14	14	14	14	14	14	..	8	12	14
Lesotho	10	11	12	13	14	15	16	17	..	10	..	14
Liberia	1	15	14	13	12	13	12	12	..	1	..	13
Madagascar	..	6	5	5	5	5	5	5	..	..	..	5
Malawi	5	4	4	4	5	5	5	5	..	5	..	4
Mali	..	4	4	4	4	5	5	5	..	..	..	4
Mauritania	..	9	10	10	10	11	11	12	..	..	..	11
Mauritius	44	60	63	68	71	75	79	83	84	44	54	75
Mozambique	..	4	4	5	5	3	2	1	..	..	..	3
Namibia	..	71	85	74	79	82	81	82	..	..	..	79
Niger	6	6	6	6	6	6	6	5	..	6	5	6
Nigeria	4	..	33	32	32	24	28	26	..	4	..	29
Rwanda	2	2	3	3	3	3	3	3	..	2	1	3
São Tomé and Príncipe	..	35	36	36	38	39	41	42	..	..	..	38
Senegal	19	11	11	12	13	13	13	14	..	19	..	13
Seychelles	..	102	103	106	107	116	116	123	..	..	..	110
Sierra Leone	..	10	10	11	11	11	9	6	..	..	10	10
Somalia	..	2	2	1	1	1	1	1	..	..	..	1
South Africa	133	160	132	132	157	134	132	121	..	133	160	138
Sudan	..	9	9	9	10	10	10	10	..	..	..	10
Swaziland	52	72	77	70	64	62	66	68	66	52	63	68
Tanzania	3	5	4	5	5	5	5	5	..	3	..	5
Togo	..	24	24	25	25	26	27	27	..	..	1	25
Uganda	1	2	3	3	3	3	4	4	..	1	..	3
Zambia	..	15	16	18	19	20	22	23	..	..	..	19
Zimbabwe	..	..	..	..	31	31	31	31	..	..	..	31
NORTH AFRICA	..	32	32	33	34	45	49	48	..	..	38	39
Algeria	..	..	..	..	..	54	53	52	..	..	54	53
Egypt, Arab Republic	..	26	27	27	26	28	28	30	..	..	26	27
Libya	..	..	..	..	..	148	259	209	..	..	..	206
Morocco	..	37	38	41	43	46	48	48	..	..	..	43
Tunisia	38	48	50	51	52	60	60	64	..	38	62	55
ALL AFRICA	..	25	25	25	27	26	28	27	..	..	..	26

9-5. Road-to-population ratio

	Road 1000 km/1 million persons									Annual average		
	1980	1990	1991	1992	1993	1994	1995	1996	1997	75-84	85-89	90-MR
SUB-SAHARAN AFRICA	3.3	2.5	..	..	2.5	2.4	2.9	2.4	..	3.3	3.1	2.5
excluding South Africa	3.1	2.2	..	..	2.5	2.4	2.5	2.4	..	3.1	2.8	2.4
excl. S.Africa & Nigeria	3.5	2.6	..	..	2.8	2.6	2.7	2.6	..	3.5	3.3	2.6
Angola	10.3	7.9	..	7.3	7.1	6.8	6.6	6.4	6.2	11.1	9.0	6.9
Benin	2.1	1.8	1.2	1.2	1.3	1.3	1.2	1.2	..	2.1	1.6	1.3
Botswana	9.1	7.0	..	..	13.2	12.9	12.5	12.4	..	11.7	9.8	11.6
Burkina Faso	1.1	..	..	1.4	1.1	1.1	1.3	1.2	..	1.7	1.2	1.2
Burundi	1.2	1.2	..	2.5	2.5	2.4	2.4	2.3	..	1.8	0.6	2.2
Cameroon	7.2	6.1	..	..	2.7	2.7	2.6	..	..	6.6	5.5	3.5
Cape Verde	..	..	..	..	3.0	3.0	2.9	2.8	..	..	..	2.9
Central African Republic	9.8	8.0	7.9	7.7	7.5	7.4	7.3	7.2	..	9.8	7.9	7.6
Chad	6.0	4.7	..	..	5.0	5.0	4.9	4.8	..	6.6	5.3	4.9
Comoros	..	..	..	..	1.8	1.8	1.8	1.8	..	2.3	..	1.8
Congo, Democratic Rep. of	5.4	..	3.8	3.6	3.6	3.6	3.5	3.5	..	5.4	4.6	3.6
Congo, Republic of	5.0	..	5.6	5.4	5.3	5.1	5.0	4.9	..	5.5	4.5	5.2
Côte d'Ivoire	5.0	4.2	..	..	3.9	3.8	3.7	3.6	..	5.6	4.8	3.9
Djibouti	..	5.6	5.4	..	5.1	5.0	4.8	4.7	..	7.6	6.7	5.1
Equatorial Guinea	..	..	..	..	7.2	7.1	7.1	7.0	..	5.2	..	7.1
Eritrea	..	..	..	..	1.1	1.1	1.1	1.1	..	..	..	1.1
Ethiopia	1.0	0.5	0.5	..	0.5	0.5	0.5	0.5	..	0.9	0.7	0.5
Gabon	10.2	..	7.6	7.4	7.2	7.1	7.0	6.8	..	10.9	9.3	7.2
Gambia, The	3.4	2.6	..	..	2.4	2.4	2.4	2.4	..	3.0	4.2	2.4
Ghana	3.0	2.6	..	..	2.3	2.2	2.2	2.2	..	2.8	2.7	2.3
Guinea	5.4	..	..	2.6	0.0	4.7	4.6	4.5	..	4.2	5.8	3.3
Guinea-Bissau	..	..	..	..	4.1	4.1	4.0	4.0	..	4.7	..	4.0
Kenya	3.1	2.6	2.6	..	2.5	2.4	2.4	2.3	..	3.2	3.0	2.5
Lesotho	3.0	..	..	2.9	2.9	2.8	2.6	2.5	..	2.7	2.7	2.7
Liberia	2.9	2.4	..	..	3.8	3.8	3.8	3.8	..	3.9	3.2	3.5
Madagascar	5.7	..	2.9	2.8	4.0	3.9	3.7	3.6	..	4.8	4.0	3.5
Malawi	1.7	3.2	..	..	1.5	1.5	1.5	1.5	1.6	1.9	1.5	1.8
Mali	2.0	1.7	1.7	..	1.6	1.5	1.5	1.5	..	2.1	1.8	1.6
Mauritania	4.7	3.6	..	..	3.4	3.3	3.3	3.2	..	4.7	4.1	3.4
Mauritius	1.8	1.7	1.7	..	1.8	1.7	1.7	1.7	1.7	2.2	1.7	1.7
Mozambique	2.9	2.5	..	..	1.9	1.9	1.9	1.9	..	3.3	2.0	2.0
Namibia	..	28.7	..	..	42.8	42.2	41.0	39.9	39.0	..	..	38.9
Niger	2.8	1.5	..	..	1.6	1.1	1.1	1.1	..	2.4	2.7	1.3
Nigeria	1.5	1.2	..	..	1.6	1.6	1.7	1.7	..	1.5	1.3	1.5
Rwanda	2.1	1.9	..	..	1.9	2.3	2.3	2.2	..	1.7	1.9	2.1
São Tomé and Príncipe	..	..	..	..	2.4	2.3	2.3	2.4	..	..	..	2.4
Senegal	2.5	2.0	..	..	1.8	1.8	1.8	1.7	..	2.4	2.2	1.8
Seychelles	..	..	..	..	3.6	3.5	3.6	3.7	..	..	..	3.6
Sierra Leone	2.4	..	..	2.8	2.7	2.7	2.5	2.4	2.4	2.5	2.3	2.6
Somalia	2.9	2.8	..	..	2.6	2.6	2.7	2.6	..	3.5	3.3	2.7
South Africa	6.7	5.3	5.1	..	..	..	8.5	..	..	7.1	5.5	6.3
Sudan	0.5	0.4	..	..	0.4	0.4	0.4	0.4	..	0.7	0.4	0.4
Swaziland	5.8	3.6	3.5	3.6	3.3	3.3	4.1	4.1	..	5.1	4.4	3.7
Tanzania	2.5	..	2.1	2.1	3.1	3.1	3.0	2.9	..	2.5	3.8	2.7
Togo	2.7	2.1	2.1	2.0	1.9	1.9	1.8	1.8	..	2.8	2.3	2.0
Uganda	2.1	1.8	..	1.7	..	..	..	..	..	2.1	2.0	1.7
Zambia	6.3	4.8	4.7	4.5	4.4	4.4	7.4	7.2	7.1	6.4	5.3	5.6
Zimbabwe	12.0	..	..	8.9	8.7	1.8	1.7	1.6	..	12.0	9.4	4.5
NORTH AFRICA	2.1	..	1.9	1.6	2.5	..	..	..	..	2.1	1.6	2.0
Algeria	3.9	..	3.5	3.6	3.7	3.6	3.7	3.6	..	4.1	3.6	3.6
Egypt, Arab Republic	0.7	0.9	0.9	0.9	0.8	..	..	..	..	0.7	0.7	0.9
Libya	..	..	..	..	16.5	16.5	16.4	4.8	..	..	..	13.6
Morocco	3.0	..	2.4	1.1	2.4	2.3	2.3	2.3	2.1	2.9	2.6	2.1
Tunisia	3.7	..	..	..	2.4	2.5	2.5	2.5	..	3.4	3.6	2.5
ALL AFRICA	3.1	2.3	..	..	2.5	2.6	3.0	2.5	..	3.1	2.9	2.6

9-6. Paved primary roads

	Percentage of roads							Percent in good condition
	1992	1993	1994	1995	1996	1997	1998	1989
SUB-SAHARAN AFRICA	16.5	16.4	17.1	16.0	15.8	19.0	11.8	39
excluding South Africa	16.5	16.4	17.1	15.5	15.8	19.0	49.4	39
excl. S. Africa & Nigeria	16.0	15.8	16.1	15.0	15.0	13.7	49.4	41
Angola	25.0	25.0	25.0	25.0	25.0	25.0	..	..
Benin	20.0	20.0	20.0	20.0	20.0	..	..	13
Botswana	19.9	21.1	22.2	23.3	23.5	..	..	94
Burkina Faso	17.6	18.2	18.7	16.0	..	..	..	70
Burundi	7.1	7.1	7.1	7.1	..	..	..	75
Cameroon	11.3	11.7	12.1	12.5	..	..	..	25
Cape Verde	78.0	78.0	78.0	78.0	..	..	..	14
Central African Republic	..	..	2.1	2.1	2.1	2.4	2.7	30
Chad	0.8	0.8	0.8	0.8	..	..	..	..
Comoros	72.1	73.5	75.0	76.5	..	..	..	43
Congo, Democratic Rep. of	..	..	..	..	..	..	..	20
Congo, Republic of	9.7	9.7	9.7	9.7	9.7	..	..	50
Côte d'Ivoire	9.1	9.2	9.4	9.6	9.7	..	..	75
Djibouti	12.6	12.6	12.6	12.6	12.6	..	..	51
Equatorial Guinea	..	..	..	..	..	..	..	27
Eritrea	20.2	20.6	21.0	21.4	21.8	..	..	..
Ethiopia	15.0	15.0	15.0	15.0	15.0	..	..	47
Gabon	8.2	8.2	8.2	8.2	8.2	..	..	30
Gambia, The	33.3	34.0	34.6	35.3	35.4	..	..	22
Ghana	23.5	23.9	24.4	24.9	24.1	..	..	28
Guinea	15.5	15.8	16.1	16.4	16.5	..	..	50
Guinea-Bissau	9.1	9.4	9.8	10.2	10.3	..	..	39
Kenya	13.8	14.3	13.6	13.8	13.9	..	..	32
Lesotho	16.0	15.0	15.0	17.9	17.9	..	..	53
Liberia	5.7	5.9	6.0	6.1	6.2	..	..	85
Madagascar	15.4	11.5	18.7	11.5	11.6	..	..	56
Malawi	17.0	18.0	18.0	20.0	20.0	19.0	..	56
Mali	11.3	11.5	11.8	12.0	12.1	..	..	70
Mauritania	11.1	11.1	11.1	11.2	11.3	..	..	58
Mauritius	93.0	93.0	93.0	93.0	93.0	93.0	96.0	95
Mozambique	17.5	17.8	18.2	18.6	18.7	..	..	19
Namibia	10.9	7.3	7.9	7.9	8.2	8.3	..	..
Niger	..	..	7.9	7.9	7.9	..	..	67
Nigeria	30.0	30.0	21.3	18.8	18.8	30.9	..	34
Rwanda	9.4	9.6	9.7	9.9	9.1	..	..	41
São Tomé and Príncipe	64.1	65.4	66.7	68.0	68.1	..	..	..
Senegal	28.3	28.3	28.4	28.5	29.3	..	..	28
Seychelles	59.1	60.3	61.5	62.8	62.9	..	..	..
Sierra Leone	11.0	11.0	11.0	8.0	8.0	8.0	..	62
Somalia	11.5	11.8	11.8	11.8	11.8	..	..	52
South Africa	..	..	..	41.5	..	..	11.8	..
Sudan	33.7	34.5	35.4	36.2	36.3	..	..	27
Swaziland	58.6	59.8	28.2	..	..	..	..	35
Tanzania	37.0	4.2	4.2	4.2	4.2	..	..	39
Togo	31.0	31.6	31.6	31.6	31.6	..	..	75
Uganda	..	..	..	..	..	..	..	10
Zambia	17.3	17.6	18.0	..	..	..	..	40
Zimbabwe	16.0	17.0	54.9	48.0	47.4	..	..	70
NORTH AFRICA	66.0	66.7	68.0	68.9	78.1	52.3	52.3	..
Algeria	66.0	66.7	68.0	68.9	..	..	..	..
Egypt, Arab Republic	73.0	72.0	75.0	78.0	78.1	..	..	..
Libya	53.8	54.9	56.0	57.1	..	..	..	..
Morocco	49.5	49.6	50.2	50.2	50.2	52.3	52.3	..
Tunisia	74.6	76.0	77.4	78.8	78.9	..	..	..
ALL AFRICA	17.5	17.8	18.2	18.3	17.9	22.0	32.0	39

	Ton-km per million of \$PPP GDP									Annual average		
	1980	1990	1991	1992	1993	1994	1995	1996	1997	75-84	85-89	90-MR
SUB-SAHARAN AFRICA	..	..	..	..	..	..	..	..	..	..	..	..
excluding South Africa	..	..	..	..	..	..	..	..	..	..	..	..
excl. S.Africa & Nigeria	..	..	..	..	..	..	..	..	..	..	..	..
Angola	..	..	..	..	..	..	..	..	..	..	..	..
Benin	..	..	..	..	..	..	..	..	..	..	..	..
Botswana	..	..	..	..	..	..	..	..	..	..	..	..
Burkina Faso	..	..	..	..	..	..	..	..	..	..	..	..
Burundi	..	..	..	..	..	..	..	..	..	..	..	..
Cameroon	60,200	37,699	32,480	34,159	29,663	38,283	38,711	27,318	37,719	57,898	37,959	34,504
Cape Verde	..	..	..	..	..	..	..	..	..	..	..	..
Central African Republic	..	..	..	..	..	..	..	..	..	..	..	..
Chad	..	..	..	..	..	..	..	..	..	..	..	..
Comoros	..	..	..	..	..	..	..	..	..	..	..	..
Congo, Democratic Rep. of	52,689	32,460	..	..	..	4,367	..	..	..	48,570	35,919	18,413
Congo, Republic of	..	..	189,871	109,802	82,885	73,671	..	..	..	230,730	221,938	114,057
Côte d'Ivoire	54,623	15,674	14,590	13,648	8,451	8,507	13,829	..	19,827	47,220	33,751	13,504
Djibouti	..	..	..	..	..	..	..	..	..	..	..	..
Equatorial Guinea	..	..	..	..	..	..	..	..	..	..	..	..
Eritrea	..	..	..	..	..	..	..	..	..	..	..	..
Ethiopia	..	..	2,120	..	..	..	..	..	..	8,510	5,540	2,120
Gabon	8,327	..	..	51,885	57,461	55,195	72,779	..	67,137	17,872	41,887	60,892
Gambia, The	..	..	..	..	..	..	..	..	..	..	..	..
Ghana	10,710	6,191	..	..	..	..	..	..	..	8,391	6,675	6,191
Guinea	..	..	..	..	..	..	..	..	..	..	..	..
Guinea-Bissau	..	..	..	..	..	..	..	..	..	..	..	..
Kenya	216,646	80,740	72,062	56,064	48,334	46,797	..	..	41,917	183,062	100,010	57,652
Lesotho	..	..	..	..	..	..	..	..	..	..	..	..
Liberia	..	..	..	..	..	..	..	..	..	..	..	..
Madagascar	..	..	..	..	..	..	..	..	..	..	..	..
Malawi	95,747	15,207	14,848	12,312	10,064	10,949	11,185	..	..	72,219	23,511	12,427
Mali	41,564	53,612	51,060	45,934	..	..	..	..	34,053	44,181	54,124	46,165
Mauritania	..	..	..	..	..	..	..	..	..	..	..	..
Mauritius	..	..	..	..	..	..	..	..	..	..	..	..
Mozambique	..	..	..	..	..	..	..	..	..	..	..	..
Namibia	..	285,327	184,822	169,879	149,047	136,942	129,941	..	..	..	..	175,993
Niger	..	..	..	..	..	..	..	..	..	..	..	..
Nigeria	22,511	3,359	..	608	..	1	..	..	4,834	29,236	8,105	2,201
Rwanda	..	..	..	..	..	..	..	..	..	..	..	..
São Tomé and Príncipe	..	..	..	..	..	..	..	..	..	..	..	..
Senegal	68,169	61,227	51,331	47,088	38,987	36,421	..	..				

9-8. Rail load-to-locomotive ratio

	Million rail ton-km/locomotive									Annual average		
	1980	1990	1991	1992	1993	1994	1995	1996	1997	75-84	85-89	90-MR
SUB-SAHARAN AFRICA	..	20.5	18.5	16.8	..	19.1	..	..	..	14.9	15.2	18.7
excluding South Africa	..	..	..	..	..	..	..	..	..	..	..	..
excl. S.Africa & Nigeria	..	..	..	..	..	..	..	..	..	..	..	..
Angola	..	..	..	..	..	..	..	..	..	..	..	..
Benin	..	..	..	..	..	..	..	..	..	..	..	..
Botswana	..	..	..	..	..	..	..	..	19.9	..	..	19.9
Burkina Faso	..	..	..	..	..	..	..	18.0	24.9	..	..	21.4
Burundi	..	..	..	..	..	..	..	..	..	..	..	..
Cameroon	10.9	10.1	8.9	9.6	8.6	12.4	13.3	10.0	14.2	9.8	8.4	10.9
Cape Verde	..	..	..	..	..	..	..	..	..	..	..	..
Central African Republic	..	..	..	..	..	..	..	..	..	..	..	..
Chad	..	..	..	..	..	..	..	..	..	..	..	..
Comoros	..	..	..	..	..	..	..	..	..	..	..	..
Congo, Democratic Rep. of	11.7	11.2	..	..	..	1.0	..	..	1.7	12.0	11.5	4.6
Congo, Republic of	..	..	14.8	9.4	..	5.8	..	..	3.0	11.3	9.4	8.3
Côte d'Ivoire	12.8	8.0	6.7	6.8	4.5	4.5	5.7	..	17.4	12.3	12.3	7.7
Djibouti	..	..	..	..	..	..	..	..	..	..	..	..
Equatorial Guinea	..	..	..	..	..	..	..	..	..	..	..	..
Eritrea	..	..	..	..	..	..	..	..	..	..	..	..
Ethiopia	..	..	2.3	..	..	..	..	..	..	..	6.1	2.3
Gabon	2.1	..	..	4.8	5.2	5.3	7.6	..	30.8	4.2	6.6	10.7
Gambia, The	..	..	..	..	..	..	..	..	..	..	..	..
Ghana	..	3.3	..	..	..	..	..	..	..	..	1.6	3.3
Guinea	..	..	..	..	..	..	..	..	..	..	..	..
Guinea-Bissau	..	..	..	..	..	..	..	..	..	..	..	..
Kenya	6.9	8.8	9.0	..	..	..	..	..	..	9.2	8.7	8.9
Lesotho	..	..	..	..	..	..	..	..	..	..	..	..
Liberia	..	..	..	..	..	..	..	..	..	..	..	..
Madagascar	..	..	..	..	..	..	..	..	..	..	..	..
Malawi	..	1.4	1.5	1.1	1.0	0.9	1.1	..	..	3.5	1.9	1.2
Mali	..	7.8	7.8	7.9	..	..	..	..	11.2	6.6	9.0	8.7
Mauritania	..	..	..	..	..	..	..	..	..	..	..	..
Mauritius	..	..	..	..	..	..	..	..	..	..	..	..
Mozambique	..	..	..	..	..	..	..	..	5.9	..	..	5.9
Namibia	..	27.7	21.4	22.3	19.9	20.3	21.6	..	..	..	..	22.2
Niger	..	..	..	..	..	..	..	..	..	..	..	..
Nigeria	3.8	..	..	0.3	..	0.0	..	..	..	5.0	2.5	0.2
Rwanda	..	..	..	..	..	..	..	..	..	..	..	..
São Tomé and Príncipe	..	..	..	..	..	..	..	..	..	..	..	..
Senegal	13.3	20.9	18.0	16.4	14.6	16.1	..	..	..	14.3	18.0	17.2
Seychelles	..	..	..	..	..	..	..	..	..	..	..	..
Sierra Leone	..	..	..	..	..	..	..	10.8	15.4	..	..	13.1
Somalia	..	..	..	..	..	..	..	..	..	..	..	..
South Africa	..	25.4	23.6	22.6	25.8	26.4	26.9	..	..	18.2	20.5	25.1
Sudan	8.0	..	4.5	..	..	..	11.1	14.2	12.3	7.0	4.8	10.5
Swaziland	..	..	..	..	..	..	..	..	..	..	..	..
Tanzania	..	..	11.7	11.4	13.9	12.2	14.9	..	17.4	7.7	8.1	13.6
Togo	..	..	..	..	..	..	..	..	..	..	..	..
Uganda	..	3.1	2.7	2.0	2.3	3.5	4.1	..	8.3	..	1.5	3.7
Zambia	16.1	7.5	15.4	14.6	15.1	9.9	6.8	..	7.2	17.2	21.1	10.9
Zimbabwe	21.7	13.6	14.0	16.0	17.5	27.9	27.5	..	..	20.7	20.0	19.4
NORTH AFRICA	9.9	10.2	10.6	9.7	10.3	10.4	..	..	10.3	9.9	10.3	10.2
Algeria	9.8	12.2	12.5	10.7	11.1	10.8	..	..	7.7	10.9	13.6	10.8
Egypt, Arab Republic	3.9	3.7	6.1	3.6	4.9	4.9	..	..	5.1	3.7	3.8	4.7
Libya	..	..	..	..	..	..	..	..	..	..	..	..
Morocco	19.5	20.4	17.3	19.6	17.4	19.2	19.8	..	22.3	19.1	20.3	19.4
Tunisia	13.9	9.3	9.3	10.3	14.0	12.7	13.4	..	13.5	12.7	10.4	11.8
ALL AFRICA	..	16.0	15.2	13.9	16.4	15.5	..	..	..	12.9	13.9	15.4

Technical notes

Tables

Table 9-1. Electric power consumption per capita.

This table refers to per capita electricity consumption, which means the production of power plants and combined heat and power plants, less distribution losses, and own use by heat and power plants (IEA and UN *Energy Statistics Yearbook*).

Table 9-2. Energy production and use, 1980 and 1996. This table presents three indicators. *Energy production* refers to commercial forms of primary energy—petroleum (crude oil, natural gas liquids, and oil from nonconventional sources), natural gas, solid fuels, and primary electricity—all converted into oil equivalent (IEA and UN *Energy Statistics Yearbook*). *Commercial energy use* is indigenous production plus imports and stock changes, minus exports and international marine bunkers (IEA and UN *Energy Statistics Yearbook*). *Electric power transmission* includes losses in transmission between sources of supply and points of distribution and in the distribution to consumers, including pilferage. Production less transmission and distribution losses, own-use, and transformation losses is equal to end-use electricity consumption (IEA and UN *Energy Statistics Yearbook*).

Table 9-3. Telephone, radio, and television availability, 1994–97.

This table presents data for six communication indicators. Telephone mainlines (ITU) refer to telephone lines connecting a customer's equipment to the public switched telephone network, where mainline is normally identified by a unique number. Mainlines are presented for every 1,000 people (Table 1.2). *Waiting list* shows the number of applications (in thousands) for a connection to a mainline that have been held up by a lack of technical capacity (ITU). *Cost of local call* is the cost of a three-minute call within the same exchange area using the subscriber's equipment (that is, not from a public phone) (ITU). *Mobile phones* refer to users of portable telephones who subscribe to an automatic public mobile telephone service using cellular technology that provides access to the public switched-telephone network, per 1,000 people (Table 1.2)(ITU). *Radios* are the estimated number of radio receivers in use for broadcast to the general public, per 1,000 people (Table 1.2) (*UNESCO Statistical Yearbook*). *Television sets* are the estimated number of television sets in use, per 1,000 people (Table 1.2) (ITU).

Table 9-4. Vehicle ownership. Vehicles (International Road Federation) include all forms of road transportation, except buses. They are expressed as a ratio of 1,000 people (Table 1.2).

Table 9-5. Road-to-population ratio. This table presents the ratio of 1,000 kilometers of paved or unpaved road (International Road Federation) per 1 million people (Table 1.2).

Table 9-6. Paved primary roads. This table presents paved primary roads, that is, those that have been sealed with asphalt or similar road-bonding material (International Road Federation) as a ratio to total roads and then shows the percentage that is in good condition (World Bank data).

Table 9-7. Rail goods traffic-to-\$ PPP GDP ratio. This measures the tonnage of goods per million dollars of GDP measured in PPP terms (World Bank data).

Table 9-8. Rail load-to-locomotive ratio. This is the volume of rail transported goods (measured in millions of metric tons times kilometers traveled) per single locomotive (World Bank data).

Methodology used for regional aggregations and period averages in chapter 9

Table	Aggregations ^a				Period averages ^b
	(1)	(6)	(7)	(8)	(1)
9-1		x			x
9-2					
Columns 1-4	x				
Columns 5-6				x	
9-3					x
Columns 1-2, 4-6		x			
Column 3				x	
9-4		x	x		
9-5		x	x		x
9-6					x
Columns 1-8				x	
Column 9		x			
9-7				x	x
9-8		x	x		

Note: Regional aggregations are shown in the rows for Sub-Saharan Africa, North Africa, and All Africa. Period averages are shown in the last three columns. This table shows only the methodologies used in this chapter.

a. Regional aggregations: (1) simple total; (2) simple total of the first indicator divided by the simple total of the second indicator (same country coverage); (3) simple total of the gap-filled indicator; (4) simple total of the gap-filled main indicator divided by the simple total of the gap-filled secondary indicator; (5) simple total of the first gap-filled main indicator less the simple total of the second gap-filled main indicator, all divided by the simple total of the secondary indicator; (6) weighted total (by population); (7) median; (8) no aggregation; (9) simple arithmetic mean.

b. Period averages: (i) arithmetic mean (using the same series as shown in the table i.e., ratio if the rest of the table is shown as ratio, level if the rest of the table is shown as level, growth rate if the rest is shown as growth rate); (2) least-squares growth rate (using main indicator); (3) least-squares growth rate (using main indicator in constant terms, with the rest of the table in current terms).