AFRICA'S DEMOGRAPHIC STRUCTURE AND ACHIEVEMENT OF SUSTAINABLE DEVELOPMENT GOALS 1 – 3

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ABSTRACT: *The progress of African countries towards achieving the Sustainable Development Goals (SDGs) is uneven, with the Northern African countries and small island states taking the lead. Little is known about the influence of population size, growth, urbanization, age structure/dependency ratio on SDGs 1 – 3, which border on eradication of poverty, hunger and access to healthcare for all. We analysed the relationship between these population-related variables and SDGs 1-3 at the country level, using data extracted from two sources: The United Nations, Department of Economic and Social Affairs' 2017 World Population Prospects, and the Sustainable Development Goals Center for Africa & Sustainable Development Solutions Network 2018 publication – Africa SDG Index and Dashboards Report. Using correlation and multiple regression analyses, we found population growth rate, urbanization and fertility to significantly predict indicators of SDGs 1-3 among African countries. High fertility is associated with a low proportion of births attended by skilled health personnel and high maternal and child mortality. Urbanization is associated with a reduced proportion of the population living in poverty and hunger. The results show that population growth rate is negatively associated with maternal and child mortality. We discussed the implications of the findings for achieving SDGs 1-3 and recommended a multi-level approach to helping African countries achieve these goals.*

KEYWORDS: Africa's Population, Development, Population Growth, Sustainable Development Goals, Urbanization.

INTRODUCTION

Nowhere in the world is the challenge of overcoming underdevelopment as daunting as it isin Africa. Countries in the African continent account for 32 (84%) of the 38 countries listed in

the low human development category (the least developed category) in the 2018 Human Development Index ranking which is a composite indicator with three dimensions – long and healthy life, knowledge and decent standard of living (UN, 2018). Africa and Asia are home to most of the world's poor people (Sharma et al., 2016) and Beegle et al (2016: 3) project that 'the world's poor will be increasingly concentrated in Africa' in particular. Currently, about 56% of the world's 740 million extreme poor live in Sub-Saharan Africa and by 2030, nine in ten extreme poor people will be from Sub-Saharan Africa (World Bank, 2018). Another area where African countries consistently record high statistics are population growth and urbanization. Among regions of the world, Africa's annual urban growth rate is the highest (3.44%), implying that it is urbanizing faster than any other region. The world is urbanizing at an annual rate of 2.16% (UN-Habitat, 2016). Similarly, the world's population grows at an annual rate of 1.09% while Africa's population grows at an annual rate of 2.49% (UN, DESA, 2017), the highest among regions of the world. Also noteworthy is Africa's dependency ratio which stands out among regions of the world. While there are 53.5 dependents per 100 populations (15-64 years) in the world, there are 78 dependents per 100 populations (15-64 years) in Africa.

In 2015, countries of the world set an agenda to end extreme poverty of all forms by 2030- end hunger, achieve food security, improve nutrition and promote sustainable agriculture; and ensure healthy lives and promote well-being for all at all ages, among other goals called Sustainable Development Goals (SDGs) (UN, 2015). African countries have had varying degrees of success in achieving these goals with Morocco leading at 66.1% attainment of the goals and Central African Republic with the least level of attainment of the SDGs at 35.8% (SDG Center for Africa and Sustainable Development Solutions Network, 2018). Generally, Northern African and small island states are the top-ranking countries and the least ranking countries are typically war-ravaged (SDG Center for Africa and Sustainable Development Solutions Network, 2018). Beyond the factor of sub-region of location and unrest, very little is known about the relationship between specific demographic variables such as population size, population growth, spatial distribution/urbanization, age structure and the achievement of SDGs, especially the first three SDGs which borders on wellbeing. Aids given to African countries to ensure the attainment of SDGs tend to ignore the potential influence of these variables on developmental programs and policies (Sinding, 2009). We believe that policies and programs will yield better outcomes if they are built on an understanding of how demographic variables influence attainment of SDGs. Moreover, understanding the relationship may help population policy makers develop or revise population policies in line with evidence based observations on the impact of demographic variables on the SDGs.

LITERATURE REVIEW/THEORETICAL UNDERPINNING

Malthus' explanation remains a popular early attempt at explaining the impact of population growth on development. His assertion that population, if unchecked, grows exponentially while subsistence grows at a much slower rate, suggests that population growth may neutralize economic gains and lead to poverty (Malthus, 1798). While this gives a general guideline to what the expected relationship between population growth and wellbeing may be, it offers little insight about the influence of other demographic variables such as population density, proportion of a population living in urban areas and dependency ratio on indicators of wellbeing such as poverty, hunger and health. Few recent studies have explored the association

between these two sets of variables, both at the micro household level and the macro level. In one study in Ethiopia, the odds of food insecurity increased significantly with family size (Bogale and Shimelis, 2009) and in another study in Pakistan, household poverty increased with family size (Chaudhry, 2009; Chaudhry et al., 2009). Canning & Schofield (2007) explain that births reduce women's labour force participation and by implication the financial resources available to women and their households. At the macro level, a study of selected developing countries shows that the growth rate of per capita GDP is dependent on population growth and age dependency ratio (Dao, 2012). In addition to the influence of population growth on income and poverty, a study by Allen (2007) shows the association between population growth and negative health outcomes such as high maternal and infant mortality especially among the poor.

Apart from population growth, studies have also considered the impact of other population-related macro level variables on wellbeing. A recent study concluded that urbanization reduces the impact of material deprivation for most of the causes of death (Santana, 2015). Another study found that young people living in rural areas have lower weights and body mass index than those in urban areas (Hadley et al., 2011). Yet another study concludes that mortality is generally lower in urban areas than rural areas due to greater access to improved medical care, higher socioeconomic status and better nutrition (Garenne, 2009). In spite of the evidence in support of the positive influence of urbanization on human development, Cobbinah et al (2015) argued that the influence is negative in many of Africa's cities due to unsustainable land development and widespread urban poverty. This new position on the relationship between urbanization and human development deserves to be explored. Dependency ratio may also be associated with poverty and other indicators of human development. As Hadley et al (2011) demonstrated in Ethiopia, high dependency ratio is associated with poor nutritional indicators (Hadley et al., 2011). It helps also to understand how this explanation fits into the general African context.

There is a need for an analysis of the relationships between macro-level population-related variables (population size, population growth, urbanization, age structure/dependency ratio) and sustainable development indicators of wellbeing (i.e., poverty, hunger and health). This analysis is the objective of this study. Although a few studies have explored two-way relationships between selected indicators (usually, population growth and poverty), there is a need for exploring beyond these two. For instance, dependency ratio is a very likely determinant of the burden borne by people in a population. How this relates to poverty, hunger and health remains unclear, particularly among African countries, within the context of the SDGs. The influence of the proportion living in urban areas on overall wellbeing also deserves attention within the context of the SDGs against the backdrop of the conclusion by Cobbinah et al (2015) that urbanization impacts wellbeing negatively. Whether countries in Africa, and those in sub-Saharan Africa in particular, will achieve the SDGs partly depends on how well policymakers, programmers and researchers understand the impact of population-related variables on the SDG indicators. This study contributes to the achievement of the SDGs by African countries by improving knowledge of key stakeholders about population dynamics and the SDGs.

METHODOLOGY

Sources of Data

We extracted data from two sources. From the United Nations, Department of Economic & Social Affairs, Population Division's 2017 World Population Prospects, we extracted data for 54 countries (18 from Eastern Africa, 9 from Middle Africa, 6 from Northern Africa, 5 from Southern Africa and 16 from Western Africa) on the following variables: Population size, population growth, population density, percent urban, Total Fertility Rate and Dependency ratio. The data can be accessed at https://population.un.org/wpp/DataQuery/. The second source is the Africa SDG Index and Dashboards Report 2018, a joint publication by two organizations, the Sustainable Development Goals Center for Africa and Sustainable Development Solutions Network. The Sustainable Development Goals Center for Africa is an international organization that supports governments, civil society, businesses and academic institutions to accelerate progress towards the attainment of the SDGs in Africa. The Sustainable Development Solutions Network works under the auspices of the UN Secretary-General to mobilize global scientific and technological expertise for the implementation of the SDGs. From this joint publication, we extracted data on percent of people living on less than 1.9 USD per day, percent of population living below national poverty line, undernourishment, prevalence of stunting, maternal mortality rate, percent of births attended by skilled health personnel, under-5 mortality and SDG index score.

The SDG index score was computed for each country based on their performance in achieving all 17 SDGs using 97 indicators across the SDGs. The score represents a country's position between the worst (0) and best (100) outcomes in achieving the SDGs (See full report by Sustainable Development Goals Center for Africa and Sustainable Development Solutions Network, 2018 for list of indicators and scoring method).

Analysis

We developed a correlation matrix for all the variables in the study. We used multiple regression models to predict our study outcome variables which are the SDG indicators: percent living under 1.9 USD, percent living below national poverty line, prevalence of undernourishment, prevalence of stunting, maternal mortality rate, percent of births attended by skilled health personnel, under-5 mortality and SDG index score. The predictor variables in the study are Population size, population growth, population density, percent urban, Total Fertility Rate and Dependency ratio. Only variables found to be significantly correlated with the outcome variables were included as predictor variables in the multiple regression analyses. For countries with unavailable SDG indicators, regional averages were used. Only test results with p-values below 0.05 were considered significant and reported.

RESULTS/FINDINGS

Demographic profiles of African states

Table 1 is a summary of the demographic profiles of African countries.

Table 1: Demographic profile of African states

	Population (in thousand)	Growth rate	Population density	% Urban	TFR	Dependency ratio
Africa	1 287 921	2.49	43.4	42.5	4.43	78
Eastern Africa	433 643	2.71	65	28.0	4.48	81.3
Burundi	11 216	3.15	436.8	13.0	5.58	91.4
Comoros	832	2.24	447.3	29.0	4.24	72.8
Djibouti	971	1.5	41.9	77.8	2.76	51.8
Eritrea	5 188	2.28	51.4	40.1	4.03	79
Ethiopia	107 535	2.43	107.5	20.8	4.02	74.1
Kenya	50 951	2.49	89.5	27.0	3.77	72.4
Madagascar	26 263	2.67	45.1	37.2	4.11	75.9
Malawi	19 165	2.87	203.3	16.9	4.49	85
Mauritius	1 268	0.23	624.8	40.8	1.43	41.7
Mozambique	30 529	2.86	38.8	36.0	5.14	89.1
Rwanda	12 501	2.36	506.7	17.2	3.78	72.9
Seychelles	95	0.5	207	56.7	2.26	47.3
Somalia	15 182	2.93	24.2	45.0	6.12	95.3
South Sudan	12 919	2.72	21.1	19.6	4.74	79.6
Uganda	44 271	3.23	221.6	23.8	5.46	95.7
Tanzania	59 091	3.06	66.7	33.8	4.92	89.8
Zambia	17 609	2.97	23.7	43.5	4.9	86.1
Zimbabwe	16 913	2.28	43.7	32.2	3.63	76.2
Middle Africa	168 538	3.04	25.9	49.5	5.54	91.8
Angola	30 774	3.28	24.7	65.5	5.59	94.8
Cameroon	24 678	2.56	52.2	56.4	4.6	82.2
Central African Republic	4 737	1.58	7.6	41.4	4.75	84.3
Chad	15 353	3.01	12.2	23.1	5.8	95.1
Congo	5 400	2.59	15.8	66.9	4.56	82.2
Democratic Republic of the Congo	84 005	3.22	37.1	44.5	5.96	95.4
Equatorial Guinea	1 314	3.59	46.8	72.1	4.55	65.2
Gabon	2 068	2.17	8	89.4	3.68	67.1

Sao Tome and Principe	209	2.18	217.5	72.8	4.36	79.9
Northern Africa	237 785	1.78	30.6	52.0	3.09	61.1
Algeria	42 008	1.66	17.6	72.6	2.65	57.6
Egypt	99 376	1.86	99.8	42.7	3.15	62.6
Libya	6 471	1.32	3.7	80.1	2.21	46.8
Morocco	36 192	1.26	81.1	62.5	2.42	52.3
Sudan	41 512	2.38	23.5	34.6	4.43	76.8
Tunisia	11 659	1.09	75	68.9	2.15	49.2
Southern Africa	65 974	1.28	24.9	63.6	2.49	53
Botswana	2 333	1.79	4.1	69.4	2.65	53.9
Lesotho	2 263	1.31	74.5	28.2	3.01	65.4
Namibia	2 588	2.12	3.1	50.0	3.31	66.1
South Africa	57 398	1.2	47.3	66.4	2.41	51.7
Swaziland	1 391	1.74	80.9	23.8	3.01	66
Western Africa	381 981	2.65	63	46.4	5.2	85.2
Benin	11 486	2.73	101.9	47.3	4.87	82.6
Burkina Faso	19 752	2.87	72.2	29.4	5.23	87.9
Cape Verde	553	1.25	137.3	65.7	2.29	50.7
Côte d'Ivoire	24 906	2.49	78.3	50.8	4.81	81.7
Gambia	2 164	2.96	213.8	61.3	5.32	88.2
Ghana	29 464	2.16	129.5	56.1	3.89	70.3
Guinea	13 053	2.57	53.1	36.1	4.74	81.1
Guinea-Bissau	1 907	2.44	67.8	43.4	4.51	78.8
Liberia	4 854	2.52	50.4	51.2	4.48	78.4
Mali	19 108	2.99	15.7	42.4	5.92	97.9
Mauritania	4 540	2.69	4.4	53.7	4.58	73.9
Niger	22 311	3.81	17.6	16.4	7.15	110.3
Nigeria	195 875	2.58	215.1	50.3	5.42	85.9
Senegal	16 294	2.77	84.6	47.2	4.65	83
Sierra Leone	7 720	2.12	107	42.1	4.32	76.9
Togo	7 991	2.45	146.9	41.7	4.35	77

Population Size and Growth

Africa has a 2018 total population of 1.3 billion people, with Eastern Africa accounting for about a third (34%) of the population. Within Eastern Africa, populations range from 95,000 in Seychelles to 108 million in Ethiopia. Middle Africa has a population of 169 million. The least and most populous countries within the sub-region are Sao Tome and Principe (209,000) and Democratic Republic of Congo (84 million). Northern Africa has a total population of 238 million. About 99 million of this population are from Egypt, the largest country in the sub-region. In Northern Africa, Libya is the least populated country, with a population of 6 million

people. Southern Africa is the least populated sub-region in Africa, with a total population of 66 million. Within the sub-region, South Africa is the most populous country with a population of 57 million (87% of the sub-region's total). The Western African sub-region has the second largest population (382 million) and is home to the most populous country in Africa (Nigeria, with a population of 196 million). The smallest country within the region is Cape Verde (with a population of 553,000 people).

At an annual growth rate of 2.49%, Africa's population will double in about 28 years (by 2046). The highest Total Fertility Rates, the average number of live births per woman throughout her reproductive years, in Africa come from Niger (7.15), Somalia (6.12), Demographic Republic of Congo (5.96), Mali (5.92), Chad (5.8), Angola (5.59), Burundi (5.58), Uganda (5.46), Nigeria (5.42) and Gambia (5.32). Mauritius has the lowest TFR (1.43). Other countries with relatively low TFRs are Tunisia (2.15), Libya (2.21), Seychelles (2.26), Cabo Verde (2.29), South Africa (2.41), Morocco (2.42), Algeria (2.65), Botswana (2.65) and Djibouti (2.76). The Eastern African sub-region has a growth rate of 2.71%, with Seychelles and Uganda having the lowest and highest growth rates of 0.5% and 3.23% respectively. Middle Africa is the sub-region with the highest growth rate (3.04%) with Central African Republic and Equatorial Guinea having the lowest (1.58%) and highest (3.59) rates respectively. Northern Africa has a growth rate of 1.78%. Within this region, growth rates range from 1.09% in Tunisia to 2.38% in Sudan. Southern Africa is the region with the least growth rate (1.28%), ranging from 1.2% in South Africa to 2.12 in Namibia. In Western Africa, growth rates range from 1.25% in Cape Verde to 3.81% in Niger, with a sub-regional growth rate of 2.65%.

Urbanization and Population Density

About 42.5% of Africa's population is urban. Sub-regional levels of urbanization are 28% in Eastern Africa (the least urbanized sub-region), 49.5% in Middle Africa, 52% in Northern Africa, 63.6% in Southern Africa (the most urbanized sub-region) and 46.4% in Western Africa. Despite Southern Africa's high level of urbanization, Swaziland and Lesotho have very low levels of urbanization, 23.8% and 28.2% respectively. On the other hand, Djibouti stands out as the most urbanized country in Eastern Africa with 77.8% of its population living in urban communities, and the third most urbanized in Africa, behind Gabon (89.4%) and Libya (80.1%). On the whole, the least urbanized countries in Africa are Burundi (13% urban), Niger (16.4% urban) and Malawi (16.9% urban). On the average, there are about 43 persons per square kilometre in Africa. Population density ranges widely, however, from 3 persons per square kilometre in Namibia to 624 persons per square kilometre in Mauritius. Southern Africa and Eastern Africa have the lowest (25 persons per square kilometre) and highest (65 persons per square kilometre) among the regions.

Dependency Ratio

At the sub-regional level, dependency ratio is highest in Middle Africa (91.8 dependents per 100 population). This is followed by Western Africa with a dependency ratio of 85.2 dependents per 100 population, and Eastern Africa with a dependency ratio of 81.3 dependents per 100 population. Southern Africa has the least dependency ratio among the regions of Africa (53 dependents per 100 population). At the national level, Mauritius, Libya and Tunisia have the lowest dependency ratios (41.7, 46.8 and 49.2 dependents per 100 population respectively). Countries with the highest dependency ratios are Niger (110.3 dependents per 100 population),

Mali (97.9 persons per 100 population), both in Western Africa, and Uganda (95.7 dependents per 100 population) in Eastern Africa.

Fig. 1 illustrates the dependency situation in sub-regions of Africa in population pyramids. It shows very similar population pyramids for Eastern, Middle and Western Africa, with very heavy base and a steady thinning out into the older years. This paints a picture of high dependency resulting from a high proportion of children within these populations. The pyramid for Northern Africa is less heavy at the base, and it begins a steady thinning out only at about age thirty. For Southern Africa, the pyramid, a comparatively small bottom and five age groups above the bottom category are only slightly smaller than the youngest category. Gradual thinning out begins at about age thirty-five. For the entire African population, we observe a proper pyramid, with a heavy, which begins to thin out gradually from the first age group.
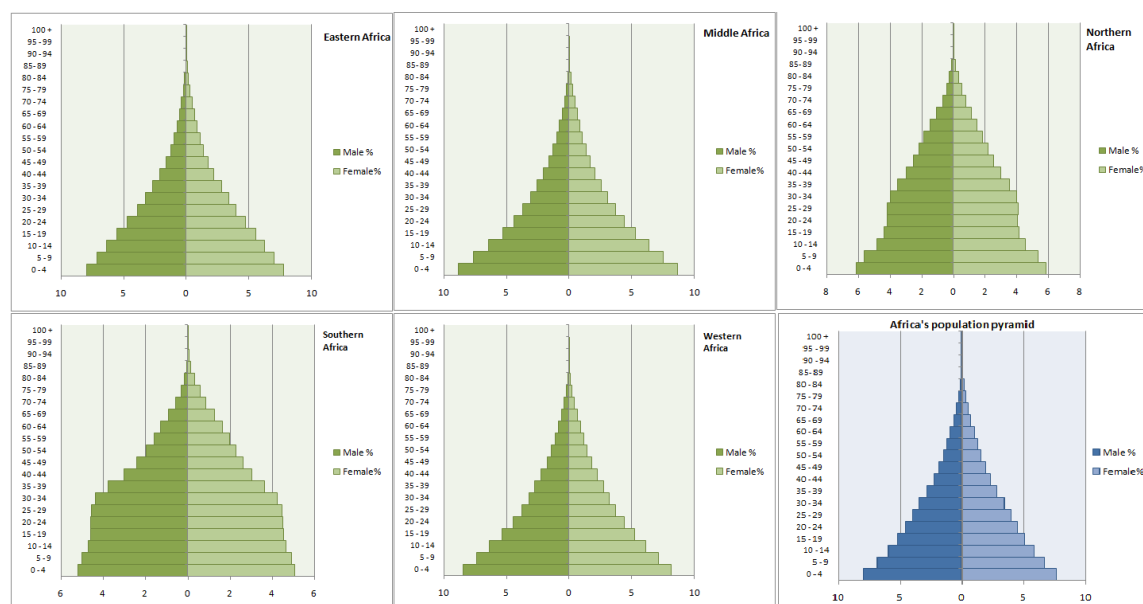

Fig. 1: Population pyramids of Africa and its sub-regions

SDG Indicators

Countries with the highest proportions of people living under USD 1.9 per day are Central African Republic (77.8%) Madagascar (76.6%) and Burundi (74.3%). On the other hand, Mauritius (0.2%), Algeria (0.3%) and Tunisia (0.6%) have the lowest proportions of people living under 1.9 USD. The national poverty line indicator of poverty indicates that the situation of extreme poverty is most severe in Equatorial Guinea (76.8%), Madagascar (76.6%) and Zimbabwe (72.3%); and least severe in Morocco (8.9%), Tunisia (15.5%) and Botswana (19.3%). Undernourishment is most prevalent in the Central African Republic (58.6%), Zambia (45.9%) and Zimbabwe (44.7%); and least prevalent in Seychelles (1.2%), Mali (4%) and Egypt (4.5%). Table 2 further shows that stunting is least prevalent in Seychelles (7.9%), Tunisia (10.1%) and Algeria (11.7%); and most prevalent in Burundi (57.5%), Eritrea (50.3%) and Madagascar (49.2%) all in Eastern Africa.

Maternal Mortality rate per 100,000 live births range from 9 (in Libya) to 1360 in Sierra Leone. Following Sierra Leone are Central African Republic and Chad with 856 and 882 maternal deaths per 100,000 live births respectively. Other countries with relatively low maternal mortality rates are Egypt (33) and Cape Verde (42). Countries with the least proportions of births attended by skilled health personnel are Somalia (9.4%), Chad (20.2%) and Ethiopia (27.7%). In Libya, Botswana and Mauritius, almost all births are attended by skilled health personnel. Under-5 mortality rate is highest in Somalia (132.5 per 1,000 live births), Chad (127.3 per 1,000 live births) and Central African Republic (123.6 per 1,000 live births). Libya has the lowest under-5 mortality rate (12.9 per 1,000 live births), followed by Tunisia (13.6 per 1,000 live births) and Mauritius (13.7 deaths per 1,000 live births). The highest overall SDG performance index scores in Africa are those for Morocco (66.1%), Tunisia (65.9%), Algeria (64%) and Mauritius (64%). Central African Republic, Somalia and Chad have the lowest performance scores of 35.8%, 36.2% and 40.5% respectively. See Table 2 for a summary of the SDG performances of African countries.

Table 2: Country performance using selected Global Goal Indicators

	% Living under 1.90 USD	% Living below national poverty line	Prevalence of under-nourishment	Prevalence of stunting	Maternal Mortality Rate	% of births attended by skilled health personnel	U-5 Mortality rate	SDG Index score
Africa								
Eastern Africa								
Burundi	74.3	64.6		57.5	712	60.3	71.7	50.9
Comoros	21.4	44.8		32.1	335	82.2	73.3	49
Djibouti	14.8		12.8	33.5	229	87.4	64.2	47.9
Eritrea	38			50.3	501	34.1	44.5	45
Ethiopia	16.4	29.6	28.8	40.4	353	27.7	58.4	51.8
Kenya	29	45.9	19.1	26	510	61.8	49.2	56.2
Madagascar	76.6	75.3	42.3	49.2	353	44.3	46.4	46.7
Malawi	66.6	50.7	25.9	42.4	634	89.8	55.1	52.7
Mauritius	0.2		5.2		53	99.8	13.7	64
Mozambique	66.5	54.7	26.6	43.1	489	54.3	71.3	51.1
Rwanda	45.5	44.9	41.1	44.3	290	90.7	38.5	57.9
Seychelles	0.9	39.3	1.2	7.9		99	14.3	
Somalia	52.6			25.3	732	9.4	132.5	36.2
South Sudan	85	50.6		31.1	789	19.4	90.7	
Uganda	32	19.5	39	33.7	343	57.4	53	56.8
Tanzania	37.7	28.2	32.3	34.8	398	63.7	56.7	54.7
Zambia	53.6	60.5	45.9	40	224	63.3	63.4	52.8
Zimbabwe	34.3	72.3	44.7	27.6	443	78.1	56.4	55
Middle Africa								
Angola	30.5	36.6	14	29.2	447	47.3	82.5	47.6
Cameroon	22	37.5	7.9	31.7	596	64.7	79.7	53.3

CAR	77.8	62	58.6	40.7	882	40	123.6	35.8
Chad	43.6	46.7	32.5	39.9	856	20.2	127.3	40.5
Congo	50.8	46.5	28.2	21.2	442	94.4	54.1	48.6
DRC	70.5	63.6		42.6	693	80.1	94.3	42.8
Eq. Guinea		76.8		26.2	342	68.3	90.9	41.6
Gabon	2.6	32.7	7	17.5	291	89.3	47.4	59
Sao Tome and Principe	23.7	61.7	13.5	17.2	156	92.5	33.8	59
Northern Africa								
Algeria	0.3		4.6	11.7	140	96.6	25.2	64
Egypt	0.7	25.2	4.5	22.3	33	91.5	22.8	60.9
Libya	12.5			21	9	99.9	12.9	
Morocco	0.4	8.9	3.5	14.9	121	73.6	27.1	66.1
Sudan	17.8	46.5	25.6	38.2	311	77.7	65.1	44.8
Tunisia	0.6	15.5	5	10.1	62	73.6	13.6	65.9
Southern Africa								
Botswana	16.8	19.3	26	31.4	129	99.9	40.6	57
Lesotho	53.1	57.1	14.5	33.2	487	77.9	93.5	51
Namibia	22.8	28.7	28.8	23.1	265	88.2	45.2	56.1
South Africa	24.6	53.8	4.6	23.9	138	94.3	43.3	59
Swaziland	44.8	63	19.6	25.5	389	88.3	70.4	51.7
Western Africa								
Benin	47	36.2	10.3	34	405	77.2	97.6	50.9
Burkina Faso	30.4	40.1	20.2	35.1	371	65.9	84.6	51.5
Cabo Verde	16.3	26.6	13.7		42	92.3	21.4	63.4
Côte d'Ivoire	23	46.3	15.4	29.6	645	59.4	91.8	56.3
Gambia	39.5	48.4	10.9	25	706	57.2	65.3	50.2
Ghana	10	24.2	7.6	18.7	319	70.8	58.8	62.5
Guinea	31.3	55.2	17.5	35.8	679	45.3	89	62.5
Guinea-Bissau	58.2	69.3	28.3	27.6	549	45	88.1	50.3
Liberia	34.3	63.8	42.8	32.1	725	61.1	67.4	46.4
Mali	28.1	43.6	4	38.5	587	58.6	110.6	51.2
Mauritania	6.2	42	5.3	22	602	65.1	81.4	51.2
Niger	41	48.9	11.3	43	553	39.7	91.3	48.4
Nigeria	42.6	46	7.9	32.9	814	35.2	104.3	48
Senegal	30.9	46.7	11.3	19.4	315	53.2	47.1	56.4
Sierra Leone	41.6	52.9	30.9	37.9	1360	59.7	113.5	50.1
Togo	44.1	55.1	11.5	27.5	368	44.6	75.7	51.2

Demographic Variables and SDG Indicators

Table 3 shows that population growth, TFR and dependency ratio are correlates of all the SDG indicators included in the study, including the overall SDG index score. Percent urban is also significantly correlated with all the SDG indicators included in the study, but not with the overall SDG index score.

Table 3: Correlation matrix for population and SDG profile variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Population	1													
2. Growth rate	.150	1												
3. Population density	-.013	-.209	1											
4. % Urban	-.130	-.359**	-.300*	1										
5. TFR	.171	.905**	-.158	-.410**	1									
6. Dependency ratio	.163	.876**	-.142	-.496**	.972**	1								
7. % living under USD 1.9	-.026	.517**	-.052	-.519**	.567**	.598**	1							
8. % below national poverty line	-.171*	.303*	.048	-.303*	.343*	.333*	.657**	1						
9. Undernourishment	-.120	.330*	-.026	-.461**	.307*	.376**	.619**	.436**	1					
10. Prevalence of stunting	.086	.434**	.199	-.639**	.470**	.509**	.623**	.431**	.547**	1				
11. Maternal mortality rate	.053	.445**	-.106	-.393**	.628**	.613**	.569**	.444**	.341*	.397**	1			
12. % of births attended by skilled health personnel	-.200	-.547**	.231	.420**	-.662**	-.638**	-.480**	-.256	-.316*	-.379**	-.603**	1		
13. Under-5 mortality rate	.059	.567**	-.258	-.336*	.743**	.685**	.560**	.444**	.290*	.402**	.785**	-.657**	1	

14. SDG Index score	.007	-.483**	.227	.262	-.610**	-.554**	-.606**	-.566**	-.487**	-.456**	-.607**	.533**	-.724**	1

Only percent urban significantly predicts the proportion of people living under 1.9 USD with a coefficient of -0.377 (p value < 0.05) when other explanatory variables are controlled. Percent urban is a significant predictor of prevalence of undernourishment (B= -0.216, p value < 0.05) and the prevalence of stunting (B = -0.299, p value < 0.001) after controlling the effect of other variables in the model. Table 4 further reveals that growth rate is a significant predictor of maternal mortality (B = -240.398, p value < 0.01) when other variables in the model are controlled. TFR also predicts maternal mortality significantly within the model (B = 329.839, p value < 0.01). The regression model on percent of births attended by skilled health personnel shows that only dependency ratio is a significant predictor (B = -25.750, p value < 0.05) when we control the effect of other variables. TFR is a significant predictor of U-5 Mortality rate, with a regression coefficient of 53.952 (p value < 0.001) and overall SDG index score, with a regression coefficient of -10.675 (p value < 0.01). Growth rate is a significant predictor of U-5 mortality rate within the model (B = -24.119, p value < 0.01).

Table 4: Multiple regression coefficients for SDG performance indicators

	% Living under 1.90USD	% Living below national poverty line	Prevalence of under-nourishment	Prevalence of stunting	Maternal Mortality Rate	% of births attended by skilled health personnel	U-5 Mortality rate	SDG Index score
Constant	6.647	52.356*	3.843	35.807**	207.943	80.253**	47.940	54.116***
Growth rate	1.429	-0.634	5.850	1.213	-240.398**	8.890	-24.119**	3.726
% Urban	-0.370*	-0.210	-0.216*	-0.299***	-2.748	0.295	-0.231	0.046
TFR	1.937	9.245	-10.810	1.563	329.839***	-25.750*	53.952***	-10.675**
Dependency ratio	0.432	-0.462	0.773	-0.009	-6.230	0.804	-1.888	0.434
Adjusted R^2	0.377	0.089	0.223	0.417	0.465	0.449	0.625	0.393

DISCUSSION

An unexpected finding from this analysis is the negative relationship between population growth and maternal mortality rate. A similar direction was also observed between population growth and under-5 mortality. High population growth rates are associated with lower maternal mortality rates and lower under-5 mortality. An explanation for this is that rapid population growth can be achieved only within a setting where mortality is controlled and significantly lower than fertility. For this reason, we see reduced maternal mortality and under-5 mortality

as requirements for population growth, in which case, population growth rate can be a predictor of reduced rates of mortality for mothers and children. The impact of urbanization on the attainment of the SDGs is positive for three indicators. A high level of urbanization is associated with: reduced proportion of people living below 1.9 USD per day; lower prevalence of undernourishment; and lower prevalence of stunting. This finding supports the position by earlier studies (Garenne, 2009; Hadley, 2011) that urbanization improves people's quality of life. We argue that in spite of the apparent urban poverty to which Cobbinah et al (2015) refer, urban dwellers have relatively better well-being than rural dwellers in Africa. The implication is that increased urbanization leads to the attainment of the SDGs.

TFR relates with the SDGs variably. We found a positive effect on MMR, implying that where women have many children (TFR), maternal deaths are also high in Africa. The analysis further shows that high TFR is indicative of low proportions of births attended by skilled health personnel in Africa and high under-5 mortality rates. These observations are quite predictable considering the poor state of health facilities across many countries of Africa. It suggests that a major indicator of child and maternal health across Africa is the fertility rate, since the provision of healthcare facilities is largely poor. Relatively better maternal and child health outcomes are recorded in those countries where the demand for maternal and child healthcare are lower due to low fertility. As also expected, TFR is a significant predictor of the overall SDG score.

IMPLICATION TO RESEARCH AND PRACTICE

An interesting finding from the study is that contrary to popular conjecture, dependency ratios in Africa do not differ enough to significantly influence poverty, hunger or health. Many North African countries are beginning to record significantly lower dependency ratios but this is yet to significantly influence poverty, hunger or health. Lee and Mason (2009) contributed to the debate on age dependency ratio and growth indicators by showing that it is not sufficient to be concerned with the number or proportion of people in various age categories, but it is important to focus on the proportion of those people that are economically productive. This is very important in many African countries where unemployment rates are high. The implication is that dependency ratios may be misleading as a large proportion of people within economically productive years may have no opportunity to be productive and contribute to poverty reduction. Our study did not control for the effect of unemployment rate which may have a confounding effect on the relationship between dependency ratio and the SDGs. This is a limitation of this study.

CONCLUSION

Indicators of SDGs 1-3 can be reliably predicted by population growth rate, level of urbanization and fertility and achieving the goals may benefit from multi-level programming that successfully reduce fertility and growth rates, and increase the level of urbanization in African countries. Rural life currently signifies poor wellbeing partly because of the concentration of amenities and services in cities. Progress towards achieving the SDGs can also benefit from deliberate programming for improved quality of life in rural settings. Benefits from demographic transition takes some time and policymakers need to understand this in order

to sustain controlled fertility in settings where they presently exist in Africa as there are signs that the gains made in fertility control will soon begin to yield results in terms of improved wellbeing of people.

REFERENCES

Allen, R. H. (2007). The Role of Family Planning in Poverty Reduction. *Obstetrics & Gynecology*, 110 (5), 999-1002. https://doi.org/10.1097/01.AOG.0000287063.32004.23

Beegle, K., Christiaensen, L., Dabalen, A. &Gaddis, I. (2016). *Poverty in a Rising Africa*. Washington, DC: World Bank. doi:10.1596/978-1-4648-0723-7.

Bogale, A. &Shimelis, A. (2009). Household level determinants of food insecurity in rural areas of Dire Dawa, Eastern Ethiopia. *African Journal of Food, Agriculture, Nutrition and Development,* 9(9), 1914-1926.

Chaudhry, I. S. (2019). Poverty Alleviation in Southern Punjab (Pakistan): An Empirical Evidence from the Project Area of Asian Development Bank. *International Research Journal of Finance and Economics*, 23, 23-32.

Chaudhry, I. S., Malik, S. & Hassan, A. (2009). The Impact of Socioeconomic and Demographic Variables on Poverty: A Village Study. *The Lahore Journal of Economics*, 14(1), 39-68.

Cobbinah, P. B., Erdiaw-Kwasie, M. O. &Amoateng, P. (2015). Africa's urbanization: Implications for sustainable development. *Cities,* 47, 62-72. http://dx.doi.org/10.1016/j.cities.2015.03.013

Dao, M. Q. (2012). Development and economic growth in developing countries. *International Journal of Academic Research in Business & Social Sciences,* 2 (1), 6-17.

Garenne, M. (2010). Urbanisation and child health in resource poor settings with special reference to under-five mortality in Africa. *Archives of Disease in Childhood,* 95**,**464-468.

Hadley, C., Belachew, T., Lindstrom, D. & Tessema, F. (2011). The shape of things to come? household dependency ratio and adolescent nutritional status in rural and urban Ethiopia. *American Journal of Physical Anthropology,* 144(4), 643-652. https://doi.org/10.1002/ajpa.21463

Lee, R. & Mason, A. (2009). Fertility, Human Capital, and Economic Growth over the Demographic Transition. *European Journal of Population,* 26(2), 159-182.

Santana, P., Costa, C., Marí-Dell'Olmo, M.,Gotsens, M., &Borrell C. (2015). Mortality, material deprivation and urbanization: exploring the social patterns of a metropolitan area. *International Journal for Equity in Health,* 14, 55, https://doi.org/10.1186/s12939-015-0182-y

Sharma P., Dwivedi S., Singh D. (2016) Global Poverty, Hunger, and Malnutrition: A Situational Analysis. In: Singh U., Praharaj C., Singh S., Singh N. (eds) Biofortification of Food Crops. Springer, New Delhi. https://doi.org/10.1007/978-81-322-2716-8_2

Sinding, S. W. (2009). Population, poverty and economic development. *Philosophical Transactions of the Royal Society,* 264, 3023-3030.

World Bank. 2018. Poverty and Shared Prosperity 2018: Piecing Together the Poverty Puzzle. Washington, DC: World Bank.