

**Full Length Research Paper****Inequality in Human Development between Sudan States****Jamal Eldeen Abd Elrazig Sulieman Jomah***Assistant Professor, Faculty of Administrative Science and Economic, University of Albutana, Rufa'a, Algezira State, (Sudan) – Shaqra University- KSA (Secondment).***Abstract**

There is almost a general consensus that underdevelopment in Sudan is associated largely with regional inequality and urban biased development strategies, which resulted in social conflicts and civil unrest in many parts of the Sudan. The new measurement techniques proposed by Permanyer (2013) is used to estimate the HDIs, and the Gini coefficient is used to estimate the inequality in human development between the Sudan states. The results reveal that some states, namely, Khartoum, Northern, Gezira and Nahr Al-Nil have the highest HDIs, which reflects the concentration of human development programs in these states. On the other hand, Warap, N.B. Gazal, Lakes, E. Equatoria and Unity are found to have the lowest HDIs. This could be attributed to the lower values of wealth index in these states. Considering the northern region alone, the lowest values of HDI are found in Blue Nile, West Darfur, Southern Kordofan and Southern Darfur (war affected areas since 2002). The Gini Coefficient for the wealth index (0.42) indicate that the significant large disparities in the distribution of wealth index between Sudan states is the main cause of inequality in human development between the states of Sudan.

**Keywords:** Human development , wealth, education, health , inequality.

**Introduction**

The Sudan is a multi-culture society, with wide environmental and geographical variations which affect the way of living of its population. It was the largest country in Africa (Before the division happened in 2011) , and among the largest countries in the world. Unlike most countries, however, Sudan has two distinct divisions: the north, which is largely Arabs and Muslims, and the south, which consists predominantly of black Nilotic people, some of whom are members of indigenous faith and others who are Christians. Imperial Britain acknowledged the North-South division by establishing separate administrations for the two regions. As one of the african countries, Sudan suffer more from human underdevelopment that reflected by the values of the human development index (0.447 and 0.470) for the years 2008 and 2012 respectively and ranked 166 in the world in 2012. The human development index has become an important indicator to government and non-governmental organizations in designing development strategies. While a number of studies has been conducted on economic development in Sudan, human development has received little attention.

As far as human development is concerned, there is a general consensus that underdevelopment in Sudan is associated largely with regional inequality and urban biased development strategies. While the social structure provides different forms of advancing development mechanisms, yet the existence of underdevelopment indicates the decreasing capacities of these structures in maintaining social solidarity sufficient to enhance development. The large regional disparities have given rise to social conflicts and civil unrest in many parts of the Sudan, including Southern Sudan which faced a prolonged war ended by the Comprehensive Peace Agreement (2005) that divided the Sudan to two countries in 2011, and western Sudan which facing another war since 2002 up to the present days. These regions are characterized by high death rates at all ages, malnutrition among children, low literacy rates, high levels of morbidity, scarcity in safe drinking water and many other shortages in basic human needs. For all such reasons the researcher argues that, it is very important to know more about the levels of human development between Sudan states, and the inequalities between these states if exist, and suggest measures that would contribute in increasing the levels of human development.

The importance of this study is to help decision makers in the Sudan to know the value of human development index in each of the states of Sudan and the differences between the states in terms of human development, in addition to help them in designing development policies that increase the Human Development Index and develop better strategies that lead to a balanced development between the States.

The objective of this paper is to calculate the human development index in the Sudan. The specific objectives of the paper are: to examine the differentials, if any, in human development between Sudan States, and to suggest some recommendations about reducing the gap in development if any.

**The Meaning of Development and Human Development Index**

At least three basic components or core values should serve as a conceptual basis and practical guideline for understanding the inner meaning of development, namely life-sustenance, self-esteem and freedom (Goulet, 1971). Life-sustenance is the ability to provide basic necessities and needs without which life would be impossible. These life-sustaining needs include, indisputably, food, shelter,

health and protection. When any of these is absent or in critically short supply we have a condition of absolute underdevelopment. Self-esteem is a sense of worth and self-respect, and of not being used as a tool by others for their own ends. All people and societies seek some form of self-esteem, although they may call it authenticity, identity, dignity, respect, honor or decommission. The nature and form of self-esteem may vary from one society to another and from one culture to another.

Mahboob (1995) argues that *“the basic purpose of development is to enlarge people’s choices”*. In principle, these choices can be infinite and can change over time. People often value achievements that do not show up at all, or not immediately, in income or growth figures. More important achievements should include greater access to knowledge, better nutrition and health services, more secure livelihoods, security against crime and physical violence, more leisure hours, political and cultural freedoms and more participation in community activities. Thus, the objective of development is to create an enabling environment for people to enjoy long, healthy and creative lives.

According to the UNDP (1993) *“Investing in meeting people’s needs and improving the quality of life is considered essential for any country’s development. Hence, economic development is a necessary but not a sufficient condition for attaining overall human development”*. Similarly, the UNESCO (1995) argued that development is a "complex, comprehensive and multidimensional process which extends beyond mere economic growth to incorporate all dimensions of life and all the energies of a community, all of whose members are called upon to make a contribution and can expect to share in the benefits". Development should also be based on the will of each society and should express its fundamental identity.

Along similar lines, Sahl (1997) argues that *“Development should be comprehensive covering all aspects of life (material, non-material and spiritual) in a way that ensures the realization of traditional as well as modern basic needs, vis. food, housing, clothing, education, health care, entertainment, employment, freedom of expression, etc. Although it is basic principle that priority should go to provision of basic needs, these areas should in fact be developed together without favoring one over the other. Development should combine growth with fair distribution to ensure the sufficiency rather than the subsistence level for all citizens, who are treated as human beings irrespective of color, religion, or ethnic group. However, distribution without growth means diffusion of poverty and abundance in production without equitable distribution means monopoly. Similarly, the UN (2003) maintain that “the challenge of development... is to improve the quality of life especially in the world's poor countries, a better quality of life generally calls for high incomes – but it involves much more. It encompasses as ends in themselves better education, high standards of health and nutrition, less poverty, cleaner environment, more equality of opportunities, greater individual freedom, and a richer cultural life”*.

Human development is evidently about enlarging people’s choices on the basis of shared natural resources. Since freedoms and capabilities possess a more expansive notion than basic needs, human development can be adopted as the expansion of people’s freedoms and capabilities to lead lives that they and have reason to value. In this sense, the human development approach is consistently concerned with making sense of the world and addressing challenges now and in the future (UNDP, 2011).

The First Human Development Report (1990) introduced a new measure of human development. Indicators of life expectancy, educational attainment, and income were combined into a composite 'human development index' (HDI). In his speech at the memorial meeting for Mahbub ul Haq in October, Amartya Sen recalled his initial doubts about trying 'to catch in one simple number a complex reality about human development and deprivation'. But Sen explained that he came to accept Haq's view that the HDI was valuable 'as an instrument of public communication'. This 'deliberately constructed crude measure' was a means of 'getting the ear of the world through the high publicity associated with [its] transparent simplicity ...' (Sen 1998).

Human Development Index (HDI) is a composite index that measures average achievement in three basic dimensions of human development such as along and healthy life, knowledge, and a decent standard of living (UNDP, 2011a). The HDI was initially developed to underline that people and their capabilities should be the ultimate criteria for evaluating the development level of a country along with economic growth (UNDP, 2013).

The HDI generally comprises three key components including longevity, knowledge, and income; where longevity is measured by life expectancy at birth, knowledge is measured by adult literacy and mean years of schooling, and the income in the HDI is a proxy for a bundle of goods and services needed for the best use of human capabilities (ul Haq, 2003). In order to keep simplicity and usefulness of the HDI, the Human Development Reports present a variety of relevant information in detail and they provide a summary for some of the major components of human development using the HDI to exhibit an alternative emphasis for several standard measures of economic development (Anand & Sen, 2000).

There have been different attempts to incorporate inequality in the assessment of human development levels, particularly in the last few years. Hicks (1997) proposed an inequality-sensitive Human Development Index whose values are penalized for unequal distributions within a given country. The intuitions put forward in that paper were analyzed axiomatically by Foster et al (2005) and further refined by Seth (2009). These ideas have crystallized in the recent presentation in UNDP’s 2010 Human Development Report of the Inequality-adjusted Human Development Index (IHDI): an index that discounts average achievements in a dimension by the existing inequality in that dimension (see Alkire and Foster 2010 for further details).

**Methodology**

The proposed paper will depend upon secondary data from the Sudan fifth census tabulations for the year 2008. A new measurement techniques called Human Development Index-Like Small Area recently proposed by Permanyer (2013) will be used to estimate the Human Development Indices for the Sudan States as well as for the whole of Sudan. The Gini coefficient developed by Corrado Gini in (1912) will be used to estimate the inequality in human development between Sudan states.

**Human Development Index**

Following Permanyer (2013), we briefly present the methodology used in this paper to compute the contribution of the different components to overall inequality in human development. For each administrative unit (state) ‘i’ let HDi, Hi, Ei and Wi be the corresponding human development, health, education and wealth indices.

The health index and can be written as:  $H_i = (P_i - P_{min}) / (P_{max} - P_{min})$ , where  $P_i$  is defined as the percentage of surviving children born to women in that administrative unit between ages 20-39,  $P_{min}$  and  $P_{max}$  (in the standard normalization methodology used in the construction of the classic HDI are the minimal and maximal benchmark values), but in our empirical results, we have chosen  $P_{min}=50$  and  $P_{max}=100$  (see Permanyer et al(2014)). The education index can be written as:  $E_i = (2/3) * ALR_i + (1/3) * GER_i$ , where ALR is the Adult Literacy Rate (defined as the percentage of individuals aged 15 or more who are available to read and write) and GER is the Gross Enrolment Ratio (defined as the number of students enrolled in primary, secondary and tertiary levels of education, regardless of age, expressed as a percentage of the population of theoretical school age for the three levels), while the standard of living index can be written as:  $W_i = (\sum_{j=1}^k a_{ij}) / k$  where  $a_{ij}$  is the percentage of households in state i having asset j and k is the number of assets we are taking into account. The Human Development Index for a state (i) is therefore can be calculated using the additive form as:

$$HDI_1 = \frac{H_i}{3} + \frac{E_i}{3} + \frac{W_i}{3} \dots\dots\dots(1)$$

And the multiplicative using form as:

$$HDI_2 = \sqrt[3]{H_i \cdot E_i \cdot W_i} \dots\dots\dots(2)$$

where Hi, Ei and Wi are as mentioned above.

**Inequality**

The Gini coefficient is a measure of inequality developed by the Italian statistician Corrado Gini in (1912). It is usually used to measure income inequality, but can be used to measure any form of uneven distribution.

The Gini coefficient is a summary statistic of the Lorenz curve and a measure of inequality in a population. According to sen(1973); the Gini coefficient is most easily calculated from unordered plant size data as the ‘‘relative mean difference,’’ i.e., the mean of the difference between every possible pair of individuals, divided by the mean size:

$$G = \frac{\sum_{i=1}^n \sum_{j=1}^n |x_i - x_j|}{2n^2\mu} \dots\dots\dots(3)$$

Alternatively, if the data is ordered by increasing size of individuals (Dixon et al. 1987, Damgaard and Weiner 2000), G is given by:

$$G = \frac{\sum_{i=1}^n (2i - n - 1)x_i}{n^2\mu} \dots\dots\dots(4)$$

where n is the total number of states;  $x_i$  is the (human development, health, education or wealth index) of the state i, and  $\mu$  is the mean of the desired index.

**The Empirical Results**

**The Human Development Index**

This section reports the empirical results on human development in Sudan and the results of the gini coefficient applied to examine the inequality in human development.

The values of the wealth index ranged between 1.33 and 40.51 with an average of 11.27 percent (table 2), compared to ranges of 13.29-78.52 and 57.00-85.30 for the education index and the health index, with averages of 43.41 and 75.30 percent, respectively. These results may suggest that  $W_i$  and  $E_i$  are the major cause of the low human development index in Sudan. The estimated values of the human development index and its three components suggest larger disparities between states in income measured by ( $W_i$ ) with a coefficient of variation of 0.89 compared to 0.41 and 0.10 for ( $E_i$ ) and ( $H_i$ ), respectively (table 2); the coefficient of variation of the HDI2 estimated at 0.46 is very large close to the double that of HDI2.

In line with common beliefs, the concentration of services, particularly those related to health and education, in the capital city ranks Khartoum state at the top of the list of the States with the highest HDI1 of 66.86 percent and HDI2 of 63.78 percent (table 1). Northern State and Gezira rank second and third, with values of HDI1 estimated at 60.79 and 59.62 and rank third and second in HDI2 with values estimated at 54.24 and 54.04 respectively (table 1). The relatively high HDI values in Khartoum states correspond to the high values of  $W_i$  and  $E_i$  while that for Northern and Gezira states are due to the high value of  $H_i$ . In line with commonly held views, the

states with lowest HDI1 are Warap (26.26%), North Bahr Al-Gazal (27.66%), Lakes (30.96%), Unity (31.94%), East Equatoria(32.08%), and Jonglei (34.15%), these are the same states with lowest HDI2 with some changes in the ranking.

If we exclude the states of the southern region which separated from Sudan in 2011, we find that the lowest values of HDI1 and HDI2 in the northern region are found in the states of Blue Nile, West Darfur, Southern Kordofan and Southern Darfur, are the same the war affected areas since 2002.

**Table 1:** Human Development Index (%) by States, Sudan, 2008

State	Hi	Ei	Wi	HDI	Rank	HD2	Rank
<b>Northern Sudan</b>							
Northern	83.62	72.88	25.89	60.79	2	54.04	3
Nahr El Nil	82.92	68.31	25.81	59.01	4	52.68	4
Red Sea	84.70	40.77	12.12	45.86	10	34.73	8
Kassala	80.06	40.14	12.56	44.26	11	34.31	9
Gadarif	73.84	53.60	15.16	47.54	8	39.15	7
Khartoum	81.56	78.52	40.51	66.86	1	63.78	1
Gezira	82.88	67.42	28.57	59.62	3	54.24	2
White Nile	79.04	57.12	18.77	51.64	5	43.92	5
Sinnar	75.22	56.32	18.23	49.92	6	42.58	6
Blue Nile	62.34	43.08	10.26	38.56	17	30.22	14
N. Kordofan	79.50	41.22	09.83	43.52	12	31.81	11
S. Kordofan	73.40	42.84	09.21	41.82	15	30.72	13
N. Darfur	85.30	50.11	07.53	47.64	7	31.81	10
W. Darfur	77.08	38.04	04.81	39.98	16	24.16	17
S. Darfur	83.20	38.87	06.98	43.02	13	28.27	15
<b>Southern Sudan</b>							
Upper Nile	68.06	32.70	05.34	35.37	19	22.83	18
Jonglei	78.26	21.78	02.42	34.15	20	16.01	22
Unity	71.60	21.53	02.70	31.94	22	16.13	21
Warap	64.16	13.29	01.33	26.26	25	10.32	25
N.B. Gazal	57.00	23.60	02.37	27.66	24	14.74	23
W.B. Gazal	64.90	37.88	06.15	36.31	18	24.72	16
Lakes	70.14	19.24	03.50	30.96	23	16.75	20
W. Equatoria	74.08	49.41	02.97	42.15	14	22.17	19
C. Equatoria	73.68	57.80	07.30	46.26	9	31.45	12
E. Equatoria	75.96	18.77	01.52	32.08	21	13.01	24

Source: Own calculation based on data from tables (A1-A3) for the final tabulations of the 2008 population census.

**Table 2:** Descriptive Statistics for HDI and the Sub-Indices

	Number	Minimum	Maximum	Mean	Std. Deviation	Coefficient of Variation
Hi	25	57.00	85.3	75.3	7.58	0.1006
Ei	25	13.29	78.52	43.41	17.91	0.4126
Wi	25	01.33	40.51	11.27	10.03	0.8897
HDI <sub>1</sub>	25	26.26	66.86	43.33	10.64	0.2454
HDI <sub>2</sub>	25	10.32	63.78	31.38	14.30	0.4557

Source: Own calculations based on data from table (1).

Although wealth index as measured by  $W_i$  exhibits relatively higher variation among states, its low mean may suggest that it is one of the important causes reducing the human development index in the southern states of Sudan, with an index estimated at an average of 3.45 percent (table 3). By examining the human development index by regions as reported in table (3) we observe that, there is highly significant difference in all HDI components between North and South Sudan. For Southern Sudan, the values for  $H_i$ ,  $E_i$  and  $W_i$  are estimated at 70.24, 29.40 and 3.45, respectively, compared to 77.84, 50.07 and 15.62 respectively for Northern Sudan. These significant difference have given rise to difference in HDI for Northern and Southern Sudan, estimated at 51.25 and 34.36 in HDI1 and 39.34 and 19.22 in HDI2 respectively.

**Table 3:** Human Development Index by Regions, Sudan, 2008

Region	Hi	Ei	Wi	HDI1	HDI2
Sudan	77.84	50.07	15.62	47.84	39.34
North	79.98	55.10	18.68	51.25	43.50
South	70.24	29.40	03.45	34.36	19.22

Source: Own calculation based on data from final tabulations of the 2008 population census.

### The Inequality in Human Development:

One of the aims of this paper As mentioned earlier is to measure inequality in human development between the states of the Sudan, for that purpose Gini Coefficient has been calculated. The Gini coefficient measures the inequality among values of a frequency distribution. A Gini coefficient of zero expresses perfect equality, where all values are the same while of one (or 100%) expresses maximal inequality among values.

Equation (4) in paragraph (3.2) above is applied to the data in table (1)above, the gini coefficients for the human development index and its sub-components are as shown in table

**Table 4:**Gini Coefficients

Index	Hi	Ei	Wi	HDI1	HDI2
Gini Coefficient	0.06	0.22	0.42	0.14	0.24

Source: Own calculations based on data from table (2).

Table (4) shows that the value of Gini Coefficient for HDI2 (0.24)is higherthan that of HDI1(0.14). This result indicate that there is an inequality in human development between the states of Sudan, this inequality is mainly due to the significantlarge disparities in the distribution of wealth index between Sudan states as it shown by the high value of Gini coefficient (0.42), while the value of gini coefficient of (0.06) indicate high equality between Sudan states in term of health index.

### Conclusion

There is almosta general consensus that underdevelopment in Sudan is associated largely with regional inequality and urban biased development strategies, which resulted in social conflicts and civil unrest in many parts of the Sudan. This study calculated the human development index for the Sudan states,and estimated the differentials in development that exist between these states, and suggested some recommendations that would contribute in reducing the gap in human development between states.The study employed secondary data obtained from the Sudan Fifth Population Census Tabulations for the year 2008. The new measurement techniques proposed by Permanyer (2013) is used to estimate the Human Development Indice an the Gini coefficient is used to estimate the inequality in human development between the states.

The results reveal that some states, namely, Khartoum, Northern, Gezira and Nahr Al-Nil have the highest HDIs, which reflects the concentration of human development programs in these states. On the other hand, Warap, N.B. Gazal, Lakes, E. Equatoria and Unity are found to have the lowest HDIs. This could be attributed to the lower values of wealth index in these states. Considering the northern region alone, the lowest values of HDI1 and HDI2 are found in Blue Nile, West Darfur, Southern Kordofan and Southern Darfur and are the states of war affected since 2002. Concentration of wealth and education services in the north is the main reason of the higher gap in human development index between the north and the south regions of Sudan.

The values of Gini Coefficient for HDI2 and HDI1 are (0.24) and (0.14) respectively. This result indicate that there is an inequality in human development between the states of Sudan, which is mainly due to the significant large disparities in the distribution of wealth index between Sudan states as it shown by the high value of Gini coefficient (0.42), while the value of gini coefficient for health index of (0.06) indicate high equality between Sudan states in that term.Based on these results, peace achievement in all over the country is the more important step that enhances promoting human development programs. More attention should be given to the policies that encourage educationand that improve income, especially in the ware affected areas like encouragement of agriculture the main craft of the rural population in the Sudan. All of this can be achieved only through concerted effort, the government, private sector and citizens of the areas.

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## Appendices

Table A.1: Health variables by States of Northern Sudan, 2008

State	Surviving children to women ages 20-39	children born alive to women ages 20-39	$P_i$	$H_i$
Sudan	14530513	12920177	0.8892	0.7784
North	11328037	10194272	0.8999	0.7998
South	3202476	2725905	0.8512	0.7024
Northern	201967	185418	0.9181	0.8361
Nahr El Nil	353619	323416	0.9146	0.8292
Red Sea	476151	439715	0.9235	0.8470
Kassala	556512	501051	0.9003	0.8007
Gadarif	587398	510587	0.8692	0.7385
Khartoum	1545023	1402551	0.9078	0.8156
Gezira	1276201	1166973	0.9144	0.8288
White Nile	631752	565530	0.8952	0.7904
Sinnar	500273	438293	0.8761	0.7522
Blue Nile	391359	317664	0.8117	0.6234
N. Kordofan	1190309	1068320	0.8975	0.7950
S. Kordofan	621067	538490	0.8670	0.7341
N. Darfur	817150	757059	0.9265	0.8529
W. Darfur	553715	490249	0.8854	0.7708
S. Darfur	1625541	1488958	0.9160	0.8320
Upper Nile	374795	314931	0.8403	0.6806
Jonglei	454265	404872	0.8913	0.7825
Unity	227939	195573	0.8580	0.7160
Warap	412752	338781	0.8208	0.6416
N.B. Gazal	331255	260030	0.7850	0.5700
W.B. Gazal	121270	99989	0.8245	0.6490
Lakes	274330	233373	0.8507	0.7014
W. Equatoria	203374	177017	0.8704	0.7408
C. Equatoria	409594	355684	0.8684	0.7368
E. Equatoria	392902	345656	0.8798	0.7595

Source: Own calculation based on data from final tabulations of the 2008 population census.

Table A.2: Education variables by States of Northern Sudan, 2008

State	$GER_i$	$ALR_i$	$E_i$
Sudan	0.4989	0.5017	0.5007
North	0.5389	0.5571	0.5510
South	0.3462	0.2679	0.2940
Northern	0.7214	0.7325	0.7288
Nahr El Nil	0.6522	0.6986	0.6831
Red Sea	0.3901	0.4165	0.4077
Kassala	0.3729	0.4157	0.4014
Gadarif	0.5196	0.5441	0.5360
Khartoum	0.7611	0.7972	0.7852
Gezira	0.6418	0.6905	0.6742
White Nile	0.5889	0.5623	0.5712
Sinnar	0.5428	0.5735	0.5632
Blue Nile	0.4530	0.4197	0.4308
N. Kordofan	0.4359	0.4004	0.4122
S. Kordofan	0.4378	0.4238	0.4284
N. Darfur	0.5800	0.4617	0.5011
W. Darfur	0.3973	0.3719	0.3804
S. Darfur	0.4071	0.3794	0.3887

Upper Nile	0.4237	0.2786	0.3270
Jonglei	0.2726	0.1904	0.2178
Unity	0.2474	0.1993	0.2153
Warap	0.1483	0.1252	0.1329
N.B. Gazal	0.2937	0.2072	0.2360
W.B. Gazal	0.4423	0.3470	0.3788
Lakes	0.2523	0.1624	0.1924
W. Equatoria	0.5868	0.4478	0.4941
C. Equatoria	0.6402	0.5469	0.5780
E. Equatoria	0.2120	0.1755	0.1877

Source: Own calculation based on data from final tabulations of the 2008 population census.

Table A.3: Income variables by States of Northern Sudan, 2008

State	TV	Radio	Mobile Phone	Fixed Phone	Computer	Refrigerator	Satellite Dish
Sudan	0.2491	0.4717	0.3518	0.0503	0.0308	0.1344	0.1052
North	0.3082	0.5247	0.4169	0.0623	0.0374	0.1672	0.1308
South	0.0148	0.2621	0.0941	0.003	0.0048	0.0048	0.0037
Northern	0.5275	0.6034	0.7386	0.1807	0.0206	0.2872	0.2371
Nahr El Nil	0.4439	0.6442	0.6437	0.1266	0.0304	0.2636	0.2203
Red Sea	0.2101	0.2697	0.3136	0.04	0.0198	0.1041	0.1352
Kassala	0.1746	0.3439	0.3056	0.0353	0.0128	0.1014	0.0924
Gadarif	0.241	0.5544	0.3828	0.0384	0.0134	0.1029	0.0653
Khartoum	0.7139	0.6431	0.7895	0.1316	0.1455	0.4617	0.3286
Gezira	0.4692	0.547	0.546	0.098	0.0405	0.2698	0.2123
White Nile	0.3177	0.5604	0.4902	0.0734	0.0219	0.1517	0.1343
Sinnar	0.3018	0.5872	0.458	0.0573	0.0128	0.1425	0.0967
Blue Nile	0.1827	0.5643	0.2979	0.0231	0.0047	0.0377	0.0288
N. Kordofan	0.1359	0.5243	0.2768	0.0355	0.0095	0.0485	0.0477
S. Kordofan	0.144	0.5166	0.2707	0.0297	0.0064	0.0342	0.0396
N. Darfur	0.0972	0.4866	0.1932	0.0146	0.007	0.0261	0.0259
W. Darfur	0.0531	0.3257	0.1035	0.0073	0.0025	0.01	0.0156
S. Darfur	0.0812	0.5066	0.1515	0.0094	0.0037	0.0191	0.0127
Upper Nile	0.0388	0.2623	0.1719	0.0048	0.0049	0.0114	0.0113
Jonglei	0.0069	0.2382	0.046	0.0019	0.0036	0.0033	0.0014
Unity	0.0113	0.1676	0.1257	0.0035	0.0011	0.0008	0.0013
Warap	0.0012	0.1432	0.0167	0.0004	0.0015	0.001	0.0002
N.B. Gazal	0.0065	0.2053	0.0707	0.0012	0.0025	0.0008	0.0018
W.B. Gazal	0.0447	0.4264	0.1986	0.0056	0.0039	0.0082	0.0129
Lakes	0.0045	0.3309	0.0513	0.0012	0.0087	0.0017	0.0007
W. Equatoria	0.0003	0.3244	0.0267	0.0008	0.0017	0.0001	0.0001
C. Equatoria	0.0385	0.4815	0.2387	0.009	0.0155	0.0157	0.0093
E. Equatoria	0.0035	0.1226	0.0356	0.0014	0.0016	0.0007	0.0004

Source: Own calculation based on data from final tabulations of the 2008 population census.

Table A.3 continued: Income variables by States of Northern Sudan, 2008

State	Fan	Air cooler/AC	Piped water	Flush toilet	Electricity	Has a car	Quality house	Wi
Sudan	0.1622	0.0353	0.1453	0.0398	0.2151	0.0606	0.1356	0.1562
North	0.2017	0.044	0.1722	0.0492	0.2661	0.0711	0.1630	0.1868
South	0.0054	0.0011	0.0331	0.0028	0.0131	0.0190	0.0213	0.0345
Northern	0.2458	0.0347	0.2262	0.0339	0.3299	0.0926	0.0661	0.2589
Nahr El Nil	0.2979	0.0408	0.3182	0.0388	0.3470	0.0803	0.1181	0.2581
Red Sea	0.1185	0.0278	0.0748	0.0483	0.1210	0.0505	0.1634	0.1212
Kassala	0.1272	0.0100	0.2147	0.0460	0.1645	0.0626	0.0673	0.1256
Gadarif	0.1373	0.0070	0.2230	0.0193	0.2423	0.0535	0.0423	0.1516
Khartoum	0.5357	0.1891	0.4429	0.1600	0.6183	0.1850	0.3271	0.4051
Gezira	0.3945	0.0396	0.1988	0.0403	0.5518	0.0999	0.4926	0.2857
White Nile	0.1808	0.0238	0.2298	0.0262	0.2479	0.0694	0.0996	0.1877
Sinnar	0.1895	0.0116	0.0705	0.0117	0.3091	0.0525	0.2512	0.1823



Blue Nile	0.0557	0.0048	0.0845	0.0093	0.0762	0.0198	0.0469	0.1026
N. Kordofan	0.0454	0.0056	0.0754	0.0231	0.0764	0.0332	0.0395	0.0983
S. Kordofan	0.0272	0.0011	0.0146	0.0200	0.0703	0.0224	0.0924	0.0921
N. Darfur	0.0291	0.0028	0.0303	0.0216	0.0611	0.0216	0.0366	0.0753
W. Darfur	0.0132	0.0006	0.0270	0.0110	0.0373	0.0155	0.0509	0.0481
S. Darfur	0.0169	0.0011	0.0473	0.0167	0.0480	0.0145	0.0478	0.0698
Upper Nile	0.0154	0.0011	0.1442	0.0072	0.0291	0.0146	0.0305	0.0534
Jonglei	0.0025	0.0010	0.0105	0.0003	0.0039	0.0147	0.0043	0.0242
Unity	0.0023	0.0011	0.0148	0.0010	0.0158	0.0093	0.0217	0.0270
Warap	0.0001	0.0002	0.0059	0.0012	0.0005	0.0102	0.0032	0.0133
N.B. Gazal	0.0001	0.0004	0.0170	0.0003	0.0021	0.0153	0.0072	0.0237
W.B. Gazal	0.0084	0.0004	0.0394	0.0003	0.0099	0.0220	0.0809	0.0615
Lakes	0.0006	0.0001	0.0042	0.0007	0.0001	0.0443	0.0403	0.0350
W. Equatoria	0.0003	0.0000	0.0140	0.0034	0.0004	0.0193	0.0245	0.0297
C. Equatoria	0.0193	0.0043	0.0606	0.0098	0.0354	0.0388	0.0458	0.0730
E. Equatoria	0.0005	0.0003	0.0117	0.0000	0.0230	0.0062	0.0048	0.0152

Source: Own calculation based on data from final tabulations of the 2008 population census.