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### **Additional file 1: Generating Socio Economic Status**

Socio economic status was generated by location (Bioko Island, Equatorial Guinea and Malawi) and year (2009 and 2010) separately. Assets and utilities were examined for missing values in both years and exclusions were made if an asset was missing for a large number of households in both years.

Bioko Island and continental Equatorial Guinea had almost identical questionnaires and hence the asset and utilities listed were almost identical.

For Bioko Island analysis, the only variable with a large number of missing values was whether or not the household owned agricultural land (Table 1.1). The proportion of the variance explained by the first principal component in 2009 was 0.1517 and in 2010 was 0.151. The loadings for each of the assets and utilities are shown in Table 1.2.

There were seven variables (ownership of chickens, cows, goats or sheep, other animals, computer, camera, VCR or DVD) with large numbers of missing values in continental Equatorial Guinea, but no one variable reduced the number of missing values more than others (Table 1.1). They were also variables which could either be associated with high SES or low SES, so all variables were included in the PCA so as not to introduce bias. The proportion of the variance explained by the first principal component in 2009 was 0.1406 and in 2010 was 0.1309. The loadings for each of the assets and utilities are shown in Table 1.2.

In Malawi there were fewer ownership questions in the malaria indicator survey, but there were also very few missing values (Table 1.3). The proportion of the variance explained by the first principal component in 2009 was 0.1503 and in 2010 was 0.1669. Component loadings are shown in Table 1.4. No loadings could be estimated for source of cooking fuel or for ownership of a motorcycle in 2010 because all households used "other cooking fuel source" and no households owned a motorcycle. Similarly in 2009, no households used other water source and hence this component loading could also not be estimated.

Table 1.1: Numbers of missing values for assets and utilities in Equatorial Guinea

<b>Asset or utility</b>	<b>Bioko</b>	<b>Island</b>	<b>Equatorial</b>	<b>Guinea</b>
	<b>Missing n (%)</b>	<b>Missing n (%)</b>	<b>Missing n (%)</b>	<b>Missing n (%)</b>
	2009	2010	2009	2010
	n=2245	n=2938	n=1742	n=1694
<b>Household size</b>	0 (0%)	0 (0%)	0 (0%)	0 (0%)
<b>Number of rooms</b>	0 (0%)	0 (0%)	0 (0%)	0 (0%)
<b>Number of sleeping rooms</b>	0 (0%)	0 (0%)	0 (0%)	0 (0%)
<b>Household crowding</b>	0 (0%)	0 (0%)	0 (0%)	0 (0%)
<b>Own a radio</b>	30 (1.3%)	23 (0.8%)	19 (1.1%)	46 (2.7%)
<b>Own a television</b>	31 (1.4%)	23 (0.8%)	16 (0.9%)	34 (2%)
<b>Own a VCR or DVD</b>	32 (1.4%)	20 (0.7%)	225 (12.9%)	23 (1.4%)
<b>Own a computer</b>	42 (1.9%)	35 (1.2%)	225 (12.9%)	22 (1.3%)
<b>Own a camera</b>	43 (1.9%)	31 (1.1%)	223 (12.8%)	21 (1.2%)
<b>Own a telephone</b>	40 (1.8%)	34 (1.2%)	16 (0.9%)	22 (1.3%)
<b>Own a clock</b>	35 (1.6%)	25 (0.9%)	11 (0.6%)	16 (0.9%)
<b>Own a watch</b>	56 (2.5%)	20 (0.7%)	12 (0.7%)	19 (1.1%)
<b>Own chairs</b>	33 (1.5%)	24 (0.8%)	11 (0.6%)	14 (0.8%)
<b>Own a sofa</b>	34 (1.5%)	24 (0.8%)	11 (0.6%)	14 (0.8%)
<b>Own a table</b>	34 (1.5%)	24 (0.8%)	12 (0.7%)	17 (1%)
<b>Own a bed</b>	32 (1.4%)	24 (0.8%)	11 (0.6%)	13 (0.8%)
<b>Own an amoire</b>	44 (2%)	25 (0.9%)	12 (0.7%)	22 (1.3%)
<b>Own a cabinet</b>	34 (1.5%)	28 (1%)	13 (0.7%)	20 (1.2%)
<b>Own fans</b>	33 (1.5%)	24 (0.8%)	13 (0.7%)	14 (0.8%)
<b>Own airconditioner</b>	32 (1.4%)	26 (0.9%)	11 (0.6%)	13 (0.8%)
<b>Own a refrigerator</b>	33 (1.5%)	31 (1.1%)	15 (0.9%)	21 (1.2%)
<b>Own a stove</b>	32 (1.4%)	24 (0.8%)	13 (0.7%)	16 (0.9%)
<b>Own a grain grinder</b>	33 (1.5%)	25 (0.9%)	12 (0.7%)	18 (1.1%)
<b>Own a washing machine</b>	32 (1.4%)	26 (0.9%)	12 (0.7%)	20 (1.2%)
<b>Own a bicycle</b>	33 (1.5%)	35 (1.2%)	16 (0.9%)	26 (1.5%)
<b>Own a motorcycle</b>	33 (1.5%)	31 (1.1%)	14 (0.8%)	25 (1.5%)
<b>Own a car</b>	34 (1.5%)	28 (1%)	14 (0.8%)	22 (1.3%)
<b>Own a motorboat</b>	35 (1.6%)	29 (1%)	-	-
<b>Own a sewing machine</b>	34 (1.5%)	26 (0.9%)	13 (0.7%)	19 (1.1%)
<b>Own goats or sheep</b>	58 (2.6%)	26 (0.9%)	24 (1.4%)	89 (5.3%)
<b>Own chickens</b>	61 (2.7%)	24 (0.8%)	27 (1.5%)	111 (6.6%)
<b>Own cows</b>	46 (2%)	31 (1.1%)	28 (1.6%)	95 (5.6%)
<b>Own other animals</b>	81 (3.6%)	31 (1.1%)	28 (1.6%)	125 (7.4%)
<b>Own agricultural land</b>	76 (3.4%)	2936 (99.9%)	2 (0.1%)	48 (2.8%)
<b>Type of toilet</b>	3 (0.1%)	1 (0%)	0 (0%)	0 (0%)
<b>Water source</b>	40 (1.8%)	49 (1.7%)	16 (0.9%)	18 (1.1%)
<b>Lighting source</b>	4 (0.2%)	0 (0%)	0 (0%)	0 (0%)
<b>Type of cooking fuel</b>	4 (0.2%)	0 (0%)	0 (0%)	0 (0%)
<b>Rural area</b>	0 (0%)	0 (0%)	-	-

Table 1.2: Component loadings for assets and utilities in Equatorial Guinea

<b>Asset or utility</b>	<b>Bioko</b>	<b>Island</b>	<b>Equatorial</b>	<b>Guinea</b>
	<b>Loading 2009</b>	<b>Loading 2010</b>	<b>Loading 2009</b>	<b>Loading 2010</b>
	n=2041	n=2755	n=1459	n=1413
Household size	0.0715	0.0447	0.0422	0.0434
Number of rooms	0.1581	0.107	0.1139	0.11
Number of sleeping rooms	0.0852	0.0824	0.0793	0.0677
Household crowding	-0.0756	-0.0884	-0.0589	-0.0559
Own a radio	0.1768	0.1908	0.1843	0.1877
Own a television	0.2495	0.2469	0.272	0.2742
Own a VCR or DVD	0.2345	0.2482	0.2563	0.2768
Own a computer	0.1699	0.1805	0.1507	0.1458
Own a camera	0.141	0.1605	0.1291	0.1259
Own a telephone	0.1976	0.1697	0.1891	0.1978
Own a clock	0.2154	0.214	0.205	0.2149
Own a watch	0.1884	0.1775	0.1551	0.1826
Own chairs	0.0941	0.1321	0.1181	0.1369
Own a sofa	0.2028	0.2006	0.2419	0.2282
Own a table	0.1223	0.1595	0.1386	0.1471
Own a bed	0.0573	0.0638	0.0602	0.0721
Own an amoire	0.188	0.202	0.214	0.2104
Own a cabinet	0.1982	0.1915	0.1114	0.1072
Own fans	0.2387	0.2366	0.2498	0.2138
Own airconditioner	0.1211	0.1361	0.1167	0.1153
Own a refrigerator	0.2382	0.2513	0.2563	0.2615
Own a stove	0.19	0.1833	0.1473	0.1206
Own a grain grinder	0.1353	0.1495	0.0321	0.0555
Own a washing machine	0.1448	0.1432	0.0733	0.0663
Own a bicycle	0.0873	0.0791	0.0586	0.0219
Own a motorcycle	0.0366	0.0408	0.0732	0.0583
Own a car	0.1578	0.1573	0.1996	0.1799
Own a motorboat	0.034	0.0499	-	-
Own a sewing machine	0.0308	0.0524	0.0646	0.0333
Own goats or sheep	0.0345	0.0164	0.0799	0.0491
Own chickens	0.0199	0.0224	0.0255	0.0563
Own cows	0.0193	0.0149	0.0056	0.0473
Own other animals	0.0329	0.0367	0.0368	0.0145
Own agricultural land	-	-	-0.108	-0.074
Flush toilet	0.1753	0.1698	0.1516	0.2087
Pit or VIP toilet	-0.119	-0.1342	-0.1692	-0.1756
Other toilet	-0.075	-0.0629	0.0766	0.0012
Private piped water	0.0662	0.0655	0.0695	0.007
Private well or borehole	0.0426	0.0232	0.025	0.0618
Community piped water	-0.0737	-0.0317	0.0886	0.1038
Community well or borehole	0.0386	0.0001	-0.0367	-0.0423

<b>Other water source</b>	0.0115	-0.0108	-0.0835	-0.1215
<b>Electricity for light</b>	0.1962	-0.2052	-0.2265	-0.216
<b>Generator for light</b>	-0.0462	0.1105	0.2287	0.2029
<b>Other light source</b>	-0.1921	0.0299	-0.0198	0.0154
<b>Electricity or gas for cooking</b>	0.2192	0.2201	0.1657	0.1674
<b>Kerosene for cooking</b>	-0.089	-0.1023	0.1028	0.1029
<b>Other cooking source</b>	-0.167	-0.1611	-0.2081	-0.2226
<b>Rural area</b>	-0.1673	-0.1805	-	-

Table 1.3: Number of missing values for assets and utilities in Malawi

<b>Asset or utility</b>	<b>2009</b>	<b>2010</b>
	<b>Missing n (%)</b>	<b>Missing n (%)</b>
	n=693	n=568
<b>Number of rooms</b>	11 (0.9%)	0 (0%)
<b>Number of sleeping rooms</b>	11 (0.9%)	0 (0%)
<b>Own a radio</b>	11 (0.9%)	0 (0%)
<b>Own a television</b>	11 (0.9%)	0 (0%)
<b>Own a mobile or phone</b>	11 (0.9%)	0 (0%)
<b>Own a bicycle</b>	11 (0.9%)	0 (0%)
<b>Own a motorcycle</b>	11 (0.9%)	0 (0%)
<b>Own a car</b>	11 (0.9%)	0 (0%)
<b>Toilet type</b>	11 (0.9%)	0 (0%)
<b>Water source</b>	11 (0.9%)	0 (0%)
<b>Source of cooking fuel</b>	11 (0.9%)	0 (0%)
<b>Has electricity</b>	11 (0.9%)	0 (0%)

Table 1.4: Component loadings for assets and utilities in Malawi

<b>Variable</b>	<b>2009</b>	<b>2010</b>
	n=682	n=568
<b>Household size</b>	0.2266	0.3635
<b>Number of rooms</b>	0.421	0.4411
<b>Number of sleeping rooms</b>	0.371	0.421
<b>Household crowding</b>	-0.1802	-0.0422
<b>Own a radio</b>	0.2986	0.3418
<b>Own a television</b>	0.2847	0.1894
<b>Own a mobile or phone</b>	0.3446	0.2951
<b>Own a bicycle</b>	0.3066	0.3238
<b>Own a motorcycle</b>	-0.0185	-
<b>Own a car</b>	0.1295	0.0436
<b>Flush toilet</b>	0.0089	-0.0125
<b>Pit or VIP toilet</b>	0.2244	0.1308
<b>Other toilet</b>	-0.2318	-0.1302
<b>Private piped water</b>	0.0454	0.0874
<b>Borehole water source</b>	-0.1312	-0.1707
<b>Community piped water</b>	0.0986	0.1562
<b>Well water</b>	0.1	0.0338
<b>Other water source</b>	-	0.0118
<b>Electricity for cooking</b>	0.0846	-
<b>Other cooking fuel source</b>	-0.0846	-
<b>Has electricity</b>	0.2093	0.2258