Appendix—Food Security Model: Definition and Methodology

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The Food Security Assessment model used in this report was developed by USDA's Economic Research Service for use in projecting food consumption and access and food gaps (previously called food needs) in low-income countries through 2017. The reference to food is divided into three groups: grains, root crops, and a category called "other," which includes all other commodities consumed, thus covering 100 percent of food consumption. All of these commodities are expressed in grain equivalent.

Food security of a country is evaluated based on the gap between projected domestic food consumption (produced domestically plus imported minus nonfood use) and a consumption requirement. Like last year, we use total food aid data (cereal and noncereal food commodities) provided by the World Food Program (WFP). All food aid commodities were converted into grain equivalent based on calorie content to allow aggregation. For example: grain has roughly 3.5 calories per gram and tubers have about 1 calorie per gram. One ton of tubers is therefore equivalent to 0.29 ton of grain (1 divided by 3.5), one ton of vegetable oil (8 calories per gram) is equivalent to 2.29 tons of grain (8 divided by 3.5).

While projection results will provide a baseline for the food-security situation of the countries, results depend on assumptions and specifications of the model. Since the model is based on historical data, it implicitly assumes that the historical trend in key variables will continue in the future.

Two kinds of food gaps are projected:

1) The national average nutrition gap, where the objective is to maintain the minimum daily caloric intake standards of about 2,100 calories per capita per day—depending on the region—recommended by the UN's Food and Agriculture Organization. The caloric requirements (based on total share of grains, root crops, and "other") used in this assessment are those necessary to sustain life with minimum food-gathering activities. They are comparable to the activity level for a refugee—they do not allow for play or work.

2) The distribution gap, where the objective is to let each income group reach the minimum caloric standard. Based on a methodology explained here, food availability by income group is calculated. If food availability in a given income group is lower than minimum requirements, that difference is part of the distribution gap for this country.

This nutrition-based target assists in comparisons of relative well-being. Large nutrition-based needs mean additional food must be provided if improved nutrition levels are the main objective. The national average nutritional gap approach, however, fails to address inequalities of food distribution within a country. Those are addressed by the distribution gap.

Structural framework for projecting food consumption in the aggregate and by income group

Projection of food availability—The simulation framework used for projecting aggregate food availability is based on partial equilibrium recursive models of 70 lower income countries. The country models are synthetic, meaning that the parameters that are used are either cross-country estimates or are estimated by other studies. Each country model includes three commodity groups: grains, root crops and "other." The production side of the grain and root crops are divided into yield and area response. Crop area is a function of 1-year lag return (real price times yield), while yield responds to input use. Commercial imports are assumed to be a function of domestic price, world commodity price, and foreign exchange availability. Food aid received by countries is assumed constant at the base level during the projection period. Foreign exchange availability is a key determinant of commercial food imports and is the sum of the value of export earnings and net flow of credit.

Foreign exchange availability is assumed to be equal to foreign exchange use, meaning that foreign exchange reserve is assumed constant during the projection period. Countries are assumed to be price takers in the international market, meaning that world prices are exogenous in the model. However, producer prices are linked to the international market. The projection of consumption for the "other" commodities is simply based on a trend that follows the projected growth in supply of the food crops (grains plus root crops). Although this is a very simplistic approach, it represents an improvement from the previous assessments where the contribution by commodities to the diet, such as meat and dairy products, was overlooked. The plan is to enhance this aspect of the model in the future.

For the commodity group grains and root crops (*c*), food consumption (*FC*) is defined as domestic supply (*DS*) minus nonfood use (NF). *n* is country index and *t* is time index.

$$FC_{cnt} = DS_{cnt} - NF_{cnt} \quad (1)$$

Nonfood use is the sum of seed use (*SD*), feed use (*FD*), exports (*EX*), and other uses (*OU*).

$$NF_{cnt} = SD_{cnt} + FD_{cnt} + EX_{cnt} + OU_{cnt} \quad (2)$$

Domestic supply of a commodity group is the sum of domestic production (*PR*) plus commercial imports (*CI*), changes in stocks (*CSTK*), and food aid (*FA*).

$$DS_{cnt} = PR_{cnt} + CI_{cnt} + CSTK_{cnt} + FA_{cnt} \quad (3)$$

Production is generally determined by the area and yield response functions:

$$PR_{cnt} = AR_{cnt} * YL_{cnt} \quad (4)$$
$$YL_{cnt} = f(LB_{cnt}, FR_{cnt}, K_{cnt}, T_{cnt}) \quad (5)$$
$$RPY_{cnt} = YL_{cnt} * DP_{cnt} \quad (6)$$
$$RNPY_{cnt} = NYL_{cnt} * NDP_{cnt} \quad (7)$$
$$AR_{cnt} = f(AR_{cnt-1}, RPY_{cnt-1}, RNPY_{cnt-1}, Z_{cnt}) \quad (8)$$

where *AR* is area, *YL* is yield, *LB* is rural labor, *FR* is fertilizer use, *K* is an indicator of capital use, *T* is the indicator of technology change, *DP* is real domestic price, *RPY* is yield times real price, *NDP* is real domestic substitute price, *NYL* is yield of substitute commodity, *RNPY* is yield of substitute commodity times substitute price, and *Z* is exogenous policies.

The commercial import demand function is defined as:

$$CI_{cnt} = f\,(WPR_{ct}\,,\, NWPR_{ct}\,,\, FEX_{nt}\,,\, PR_{cnt}\,,\, M_{nt}\,) \qquad (9)$$

where *WPR* is real world food price, *NWPR* is real world substitute price, *FEX* is real foreign exchange availability, and *M* is import restriction policies.

The real domestic price is defined as:

$$DP_{cnt} = f\,(DP_{cnt\text{-}1}\,,\, DS_{cnt}\,,\, NDS_{cnt}\,,GD_{nt}\,,\, EXR_{nt}\,) \qquad (10)$$

where *NDS* is supply of substitute commodity, *GD* is real income, and *EXR* is real exchange rate.

Projections of food consumption by income group—Inadequate access to food is the most important cause of chronic undernutrition among developing countries and is related to income level. Estimates of food gaps at the aggregate or national level fail to take into account the distribution of food consumption among different income groups. Lack of consumption distribution data for the study countries is the key factor preventing estimation of food consumption by income group. An attempt was made to fill this information gap by using an indirect method of projecting calorie consumption by different income groups based on income distribution data.[1] It should be noted that this approach ignores the consumption substitution of different food groups by income class. The procedure uses the concept of the income/consumption relationship and allocates the total projected amount of available food among different income groups in each country (income distributions are assumed constant during the projection period).

[1]The method is similar to that used by Shlomo Reutlinger and Marcelo Selowsky in "Malnutrition and Poverty," World Bank, 1978.

Assuming a declining consumption and income relationship (semi log functional form):

$$C = a + b\ ln\ Y \qquad (11)$$

$$C = C_o/P \qquad (12)$$

$$P = P_1 + \text{.....} + P_i \qquad (13)$$

$$Y = Y_o/P \qquad (14)$$

$$i = 1 \text{ to } 5$$

where *C* and *Y* are known average per capita food consumption (all commodities in grain equivalent) and per capita income (all quintiles), C_o is total food consumption, *P* is the total population, i is income quintile, *a* is the intercept, *b* is the consumption income propensity, and *b/C* is consumption income elasticity (point estimate elasticity is calculated for individual countries). To estimate per capita consumption by income group, the parameter *b* was estimated based on cross-country (70 low-income countries) data for per capita calorie consumption and income. The parameter *a* is estimated for each

country based on the known data for average per capita calorie consumption and per capita income.

Data

Historical supply and use data for 1990-2005 are from FAOSTAT as of March 2008. Food aid data are from the UN World Food Program for 1988-2005, and financial data are from the International Monetary Fund and World Bank. The base year data used for projections are the average for 2004-2006, except export earnings, which are 2003-05.

Endogenous projection variables:

Production, area, yield, commercial imports, domestic producer prices, and food consumption.

Exogenous projection variables:

Agricultural labor—projections are based on United Nations population projections, accounting for urbanization growth.

Export deflator or terms of trade—World Bank (*Commodity Markets--Projection of Inflation Indices for Developed Countries*).

Food exports—FAOSTAT data, projections are either based on the population growth rate or extrapolation of historical trends.

Income—projected based on World Bank report (*Global Economic Prospects and the Developing Countries*, various issues); or extrapolation of historical growth.

Income distribution—World Bank data; Income distributions are assumed constant during the projection period.

Inputs—fertilizer and capital projections are, in general, an extrapolation of historical growth data from FAO.

Net foreign credit—is assumed constant during the projection period.

Population—data are medium-term United Nations population projections as of 2005.

Seed use—USDA data; projections are based on area projections using constant base seed/area ratio.

Stocks—USDA data; assumed constant during the projection period.

Value of exports—projections are based on World Bank (*Global Economic Prospects and the Developing Countries*, various issues), IMF (*World Economic Outlook*, various issues), or an extrapolation of historical growth.

World price—data are USDA/baseline projections.

Appendix table 1a

List of countries and their food gaps in 2007

	2007 food gaps			2007 food gaps	
	Nutrition[1]	Distribution[2]		Nutrition	Distribution
			1,000 tons		
Angola	0	47	Algeria	0	0
Benin	115	234	Egypt	0	0
Burkina Faso	350	578	Morocco	0	16
Burundi	611	699	Tunisia	0	0
Cameroon	357	679	**North Africa**	0	16
Cape Verde	0	7			
Central African Repubic	147	276	Afghanistan	338	882
Chad	122	375	Bangladesh	0	1,811
Congo, Dem. Rep.	6,454	6,866	India	0	13,399
Cote d'Ivoire	189	587	Indonesia	0	0
Eritrea	598	623	Korea, Dem. Rep.	1,380	1,567
Ethiopia	716	1,487	Nepal	0	288
Gambia	31	66	Pakistan	0	384
Ghana	0	195	Philippines	0	292
Guinea	0	111	Sri Lanka	0	51
Guinea-Bissau	98	121	Vietnam	0	0
Kenya	961	1,428	**Asia**	1,717	18,675
Lesotho	39	102			
Liberia	151	211	Bolivia	0	226
Madagascar	427	816	Colombia	0	704
Malawi	0	28	Dominican Republic	0	128
Mali	0	125	Ecuador	0	90
Mauritania	58	97	El Salvador	0	51
Mozambique	0	154	Guatemala	0	204
Niger	60	582	Haiti	358	548
Nigeria	0	986	Honduras	0	96
Rwanda	296	344	Jamaica	0	0
Senegal	372	500	Nicaragua	0	147
Sierra Leone	296	579	Peru	0	268
Somalia	894	927	**Latin America and the Caribbean**	358	2,461
Sudan	0	399			
Swaziland	0	25			
Tanzania	219	862	Armenia	0	0
Togo	167	234	Azerbaijan	0	0
Uganda	0	282	Georgia	0	20
Zambia	203	404	Kazakhstan	0	0
Zimbabwe	459	647	Kyrgyzstan	0	9
Sub-Saharan Africa	14,392	22,684	Tajikistan	160	194
			Turkmenistan	0	19
			Uzbekistan	0	54
			Commonwealth of Independent States	160	295
			Total	16,627	44,131

[1] Nutrition gap: gap between available food and food needed to support a minimum per capita nutritional standard.
[2] Distribution gap: amount of food needed to raise consumption in each income quintile to the minimum nutritional requirement.

Source: USDA, Economic Research Service.

Appendix table 1b

List of countries and their food gaps in 2017

	2017 food gaps			2017 food gaps	
	Nutrition[1]	Distribution[2]		Nutrition	Distribution
			1,000 tons		
Angola	0	66	Algeria	0	0
Benin	298	417	Egypt	0	30
Burkina Faso	413	727	Morocco	0	0
Burundi	828	944	Tunisia	0	0
Cameroon	744	1,042	**North Africa**	0	30
Cape Verde	17	24			
Central African Republic	237	379	Afghanistan	1,725	2,214
Chad	777	985	Bangladesh	0	932
Congo, Dem. Rep.	9,720	10,238	India	0	15,280
Cote d'Ivoire	70	592	Indonesia	0	0
Eritrea	960	986	Korea, Dem. Rep.	1,141	1,357
Ethiopia	2,762	3,337	Nepal	0	308
Gambia	76	110	Pakistan	0	539
Ghana	0	92	Philippines	0	448
Guinea	171	349	Sri Lanka	0	32
Guinea-Bissau	166	196	Vietnam	0	0
Kenya	66	996	**Asia**	2,866	21,110
Lesotho	0	76			
Liberia	507	569	Bolivia	0	167
Madagascar	970	1,354	Colombia	0	547
Malawi	0	165	Dominican Rep.	0	9
Mali	0	347	Ecuador	0	60
Mauritania	197	232	El Salvador	0	44
Mozambique	0	211	Guatemala	0	233
Niger	1,006	1,476	Haiti	366	598
Nigeria	0	1,291	Honduras	0	85
Rwanda	470	530	Jamaica	0	0
Senegal	667	818	Nicaragua	0	114
Sierra Leone	285	663	Peru	0	190
Somalia	1,080	1,125	**Latin America and**		
Sudan	119	894	**the Caribbean**	366	2,048
Swaziland	0	8			
Tanzania	351	1,144	Armenia	0	0
Togo	236	316	Azerbaijan	0	0
Uganda	0	797	Georgia	0	0
Zambia	18	329	Kazakhstan	0	0
Zimbabwe	104	421	Kyrgyzstan	0	0
Sub-Saharan Africa	23,314	34,246	Tajikistan	0	24
			Turkmenistan	0	0
			Uzbekistan	0	0
			Commonwealth of		
			Independent States	0	24
			Total	26,546	57,458

[1] Nutrition gap: gap between available food and food needed to support a minimum per capita nutritional standard.
[2] Distribution gap: amount of food needed to raise consumption in each income quintile to the minimum nutritional requirement.

Source: USDA, Economic Research Service.

Appendix table 2

Country indicators

Region and country	Population, 2007	Population annual growth rate	Grain production: Annual growth rate, 1990-2006	Grain production: Coefficient of variation, 1990-2006	Root production annual growth rate, 1980-2005	Projected annual growth in supply, 2007-17
	1,000	*Percent*				
North Africa:						
Algeria	33,858	1.5	3.5	47.1	-1.6	1.3
Egypt	75,455	1.8	3.6	3.3	1.0	1.4
Morocco	31,236	1.2	1.7	49.2	0.5	4.1
Tunisia	10,325	1.1	0.1	44.9	4.5	1.8
Central Africa:						
Cameroon	18,520	2.0	4.0	9.3	4.9	1.4
Central African Rep.	4,347	1.8	6.4	5.0	1.7	1.1
Congo, Dem. Rep.	62,651	3.3	0.3	3.1	-2.2	2.6
West Africa:						
Benin	9,018	3.1	4.8	5.8	5.0	2.4
Burkina Faso	14,761	2.9	3.7	12.7	-0.1	2.9
Cape Verde	530	2.3	-0.9	72.0	-1.3	0.5
Chad	10,747	2.9	5.8	18.6	-1.5	1.6
Côte d'Ivoire	19,281	1.9	1.9	6.8	1.6	2.1
Gambia	1,705	2.7	6.5	17.1	2.0	2.2
Ghana	23,449	2.0	3.1	11.7	4.2	2.3
Guinea	9,400	2.2	4.8	4.1	2.4	1.7
Guinea-Bissau	1,695	3.0	0.1	16.3	2.7	2.5
Liberia	3,766	4.6	3.6	35.4	4.7	1.3
Mali	12,335	2.8	3.6	12.0	3.5	2.1
Mauritania	3,117	2.6	1.6	31.2	-0.1	1.1
Niger	14,222	3.5	3.8	16.0	-7.2	2.0
Nigeria	147,909	2.3	1.9	7.1	5.9	2.1
Senegal	12,364	2.5	1.6	18.2	6.0	1.9
Sierra Leone	5,818	2.1	-1.0	25.0	8.3	2.6
Togo	6,578	2.7	3.7	6.6	3.9	2.4
East Africa:						
Burundi	8,373	3.2	-0.2	7.9	1.0	2.8
Eritrea[1]	4,830	3.3	1.7	70.0	--	1.7
Ethiopia[1]	83,059	2.5	6.4	15.3	2.4	2.2
Kenya	37,538	2.7	2.3	10.8	3.2	3.1
Rwanda	9,758	2.8	3.1	27.1	1.4	2.4
Somalia	8,689	3.0	-0.9	36.1	6.7	2.7
Sudan	38,575	2.2	3.1	28.0	4.5	1.6
Tanzania	40,429	2.5	2.4	11.2	2.6	2.2
Uganda	30,886	3.3	3.0	7.8	2.0	2.4

See footnotes at end of table.

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Appendix table 2

Country indicators—Continued

Region and country	Macroeconomic indicators					
	Per capita GNI, 2005	Per capita GDP annual growth, 2005	GDP annual growth, 2005	Export earnings annual growth, 2005	Official development assistance as a share of GNI[3], 2005	External debt Present value as a share of GNI[3], 2005
	U.S. dollars	*Percent*				
North Africa:						
Algeria	2,730	3.7	5.3	5.8	0.4	17.3
Egypt	1,260	3.0	4.9	22.5	1.0	38.3
Morocco	1,740	0.6	1.7	9.8	1.3	32.8
Tunisia	2,880	3.2	4.2	3.2	1.4	65.5
CentralAfrica:						
Cameroon	1,000	0.3	2.0	-3.9	2.5	43.6
Central African Rep.	350	0.9	2.2	..	7.0	74.3
Congo, Dem. Rep.	120	3.4	6.5	8.80	26.9	156.0
West Africa:						
Benin	510	0.7	3.9	5.0	8.2	43.5
Burkina Faso	400	1.6	4.8	3.3	12.8	39.6
Cape Verde	1,930	3.4	5.8	..	16.9	57.5
Chad	400	2.3	5.6	17.7	8.6	36.8
Côte d'Ivoire	870	0.2	1.8	1.5	0.8	68.7
Gambia	290	2.3	5.0	27.3	13.0	150.7
Ghana	450	3.8	5.9	9.3	10.6	63.6
Guinea	420	1.1	3.3	3.8	5.6	100.2
Guinea-Bissau	180	0.5	3.5	5.0	27.4	239.6
Liberia	130	3.9	5.3	..	54.1	591.4
Mali	380	3.0	6.1	8.7	13.6	58.5
Mauritania	580	2.4	5.4	6.2	9.9	119.1
Niger	240	1.1	4.5	..	15.2	58.1
Nigeria	560	4.7	6.9	-1.8	7.4	25.6
Senegal	700	2.7	5.1	3.1	8.5	46.9
Sierra Leone	220	3.8	7.5	..	29.6	144.9
Togo	350	0.2	2.8	7.5	4.0	78.8
East Africa:						
Burundi	100	-2.6	0.9	..	46.8	169.4Eri-
trea[1]	170	-3.4	0.5	-0.1	36.9	76.5
Ethiopi[1]	160	6.8	8.7	-2.5	17.4	56.2
Kenya	540	3.4	5.8	4.7	4.1	33.1
Rwanda	230	4.2	6.0	-2.2	27.1	71.3
Somalia	..	..	..	..	..	..
Sudan	640	5.9	8.0	13.0	7.1	72.1
Tanzania	340	5.0	7.0	-1.0	12.5	64.4
Uganda	280	2.9	6.6	4.4	14.0	52.2

See footnotes at end of table.

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Appendix table 2

Country indicators—Continued

Region and country	Population, 2007	Population annual growth rate	Grain production: Annual growth rate, 1990-2006	Grain production: Coefficient of variation, 1990-2006	Root production annual growth rate, 1980-2005	Projected annual growth in supply, 2007-17
	1,000	*Percent*				
Southern Africa:						
Angola	17,014	2.8	6.7	15.5	5.8	2.5
Lesotho	2,006	0.6	-0.3	38.3	4.0	1.4
Madagascar	19,663	2.7	2.3	8.8	0.7	2.1
Malawi	13,923	2.6	3.1	28.1	8.8	1.8
Mozambique	21,349	2.0	10.0	16.8	0.8	1.6
Swaziland	1,139	0.6	-2.0	27.7	0.5	1.4
Zambia	11,924	1.9	0.4	29.7	3.8	2.8
Zimbabwe	13,372	1.0	-2.3	42.0	3.6	1.9
Asia:						
Afghanistan	27,074	3.9	2.7	25.4	0.6	2.3
Bangladesh	158,490	1.7	3.3	6.5	5.3	1.8
India	1,167,966	1.5	1.3	4.1	1.5	1.5
Indonesia	231,384	1.2	1.2	2.9	-0.6	1.2
Korea, Dem. Rep.	27,702	1.0	-3.7	35.1	11.0	0.0
Nepal	28,183	2.0	2.5	5.3	3.3	2.0
Pakistan	164,021	1.9	2.8	5.0	3.2	1.8
Philippines	87,844	1.9	2.5	8.1	-0.9	1.7
Sri Lanka	19,302	0.5	1.9	9.4	-3.2	0.7
Vietnam	87,309	1.3	4.8	2.5	-0.7	2.2
Latin America and the Caribbean:						
Bolivia	9,513	1.8	4.1	10.3	0.3	2.2
Colombia	46,101	1.3	1.3	14.0	-0.7	1.3
Dominican Republic	9,752	1.5	2.6	11.5	-0.1	4.2
Ecuador	13,342	1.1	1.5	10.7	-0.6	1.5
El Salvador	6,854	1.4	0.1	9.3	3.9	1.3
Guatemala	13,352	2.5	-1.3	9.9	1.9	2.5
Haiti	9,594	1.6	-0.4	8.8	-0.6	0.3
Honduras	7,105	2.0	-2.1	9.1	4.7	1.7
Jamaica	2,711	0.5	-7.5	27.9	-3.8	-0.3
Nicaragua	5,608	1.3	4.7	11.2	6.7	1.5
Peru	27,911	1.2	6.6	8.9	3.6	1.5
Commonwealth of Independent States:[2]						
Armenia	3,006	-0.2	2.6	21.4	0.8	1.7
Azerbaijan	8,478	0.8	4.5	22.0	13.4	1.3
Georgia	4,403	-0.8	-3.0	25.4	5.3	2.4
Kazakhstan	15,428	0.7	-2.0	37.3	-2.9	-0.6
Kyrgyzstan	5,319	1.1	1.6	13.8	8.7	1.6
Tajikistan	6,750	1.5	9.5	19.9	10.3	2.0
Turkmenistan	4,962	1.3	13.1	21.7	18.9	2.4
Uzbekistan	27,371	1.5	9.0	8.9	0.8	1.9

See footnotes at end of table.

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Appendix table 2

Country indicators—Continued

Region and country	Macroeconomic indicators					
	Per capita GNI, 2005	Per capita GDP annual growth, 2005	GDP annual growth, 2005	Export earnings annual growth, 2005	Official development assistance as a share of GNI[3], 2005	External debt Present value as a share of GNI[3], 2005
	U.S. dollars	*Percent*				
Southern Africa:						
Angola	1,410	17.2	20.6	..	1.5	40.9
Lesotho	950	1.4	1.2	-2.6	3.9	38.9
Madagascar	290	1.8	4.6	8.1	18.7	69.6
Malawi	160	0.4	2.6	20.2	28.4	155.6
Mozambique	310	5.7	7.7	8.3	20.7	82.3
Swaziland	2,280	0.8	1.8	6.0	1.7	19.0
Zambia	500	3.5	5.2	12.3	13.9	83.3
Zimbabwe	350	-7.0	-7.0	-4.0	11.0	132.2
Asia:						
Afghanistan	..	..	14.0	31.4	37.8	..
Bangladesh	470	4.0	6.0	15.6	2.1	30.0
India	730	7.7	9.2	21.9	0.2	15.4
Indonesia	1,280	4.2	5.6	8.6	0.9	49.7
Korea, Dem. Rep.	..	..	..	..	..	..
Nepal	270	0.7	2.7	..	5.8	44.3
Pakistan	690	5.2	7.8	7.6	1.5	31.1
Philippines	1,320	3.2	5.0	4.2	0.5	57.3
Sri Lanka	1,160	4.4	5.3	7.5	5.1	49.3
Vietnam	620	7.2	8.4	16.5	3.7	37.7
Latin America and the Caribbean:						
Bolivia	1,010	2.1	4.1	9.6	6.5	71.3
Colombia	2,290	3.5	5.1	4.6	0.4	32.2
Dominican Republic	2,460	7.7	9.3	6.1	0.3	26.7
Ecuador	2,620	3.3	4.7	7.4	0.6	49.6
El Salvador	2,450	1.0	2.8	0.4	1.2	43.2
Guatemala	2,400	0.8	3.2	-1.1	0.8	17.1
Haiti	450	0.5	2.0	..	12.1	31.0
Honduras	1,120	1.8	4.0	6.0	8.6	65.9
Jamaica	3,390	1.3	1.8	..	0.4	72.7
Nicaragua	950	3.4	4.0	5.3	15.4	107.3
Peru	2,650	4.9	6.4	14.9	0.5	38.6
Commonwealth of Independent States:[2]						
Armenia	1,470	14.4	14.0	15.9	3.9	37.6
Azerbaijan	1,240	25.0	26.2	58.5	2.0	17.2
Georgia	1,320	10.3	9.3	4.8	4.8	29.5
Kazakhstan	2,940	8.7	9.7	1.4	0.4	83.8
Kyrgyzstan	450	-1.6	-0.6	-6.8	11.4	86.1
Tajikistan	330	6.2	7.5	11.6	10.9	46.0
Turkmenistan	..	..	..	25.0	0.4	14.6
Uzbekistan	520	5.8	7.0	7.1	1.2	30.3

[1] Data start in 1993.
[2] Data start in 1992.
[3] GNI = Gross national income.
-- = data unavailable or not applicable due to inconsistent data set.

Source: Population = FAOSTAT, macroeconomic indicators = World Development Indicators, 2007, World Development Report 2007, World Bank.