

Appendix—Food Security Model: Definition and Methodology

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 2016. 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).

It should be noted that 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 (FAO). 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 below, 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:

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

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:

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

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).

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

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

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

$$P = P_1 + \dots + P_i \quad (13)$$

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

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

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 (67 low-income countries) data for per capita calorie consumption and income. The parameter a is estimated for each

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

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 2007. Food aid data are from the UN's World Food Program (WFP) 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 2003-2005, except export earnings, which are 2002-04.

Endogenous projection variables:

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

Exogenous projection variables:

Population—data are medium United Nations population projections as of 2004.

World price—data are USDA/baseline projections.

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

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

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

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

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

Net foreign credit—is 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.

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

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.

(Shahla Shapouri)

List of countries and their food gaps in 2006

	2006 food gaps		2006 food gaps	
	Nutrition ¹	Distribution ²	Nutrition	Distribution
			<i>1,000 tons</i>	
Angola	0	150	Algeria	0
Benin	0	1	Egypt	0
Burkina Faso	0	41	Morocco	0
Burundi	485	568	Tunisia	0
Cameroon	0	153	North Africa	0
Cape Verde	24	28		
Central African Republic	104	238	Afghanistan	1,372
Chad	0	87	Bangladesh	0
Congo, Dem. Rep.	5,251	5,664	India	0
Côte d'Ivoire	0	328	Indonesia	0
Eritrea	486	514	Korea, Dem. Rep.	503
Ethiopia	3,029	3,444	Nepal	0
Gambia	0	31	Pakistan	0
Ghana	0	49	Philippines	0
Guinea	0	82	Sri Lanka	0
Guinea-Bissau	30	65	Vietnam	0
Kenya	184	796	Asia	1,874
Lesotho	0	40		
Liberia	148	207	Bolivia	0
Madagascar	0	398	Colombia	0
Malawi	0	90	Dominican Republic	0
Mali	0	198	Ecuador	0
Mauritania	0	11	El Salvador	0
Mozambique	74	399	Guatemala	0
Niger	0	399	Haiti	133
Nigeria	0	312	Honduras	0
Rwanda	51	132	Jamaica	0
Senegal	0	32	Nicaragua	17
Sierra Leone	156	449	Peru	0
Somalia	1,308	1,346	Latin America and the Caribbean	150
Sudan	0	135		
Swaziland	0	5	Armenia	0
Tanzania	0	267	Azerbaijan	0
Togo	79	146	Georgia	0
Uganda	0	252	Kazakhstan	0
Zambia	0	137	Kyrgyzstan	0
Zimbabwe	99	373	Tajikistan	0
Sub-Saharan Africa	11,507	17,569	Turkmenistan	0
			Uzbekistan	0
			Commonwealth of Independent States	0
			Total	13,531
				27,072

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.

List of countries and their food gaps in 2016

	2016 food gaps		2016 food gaps	
	Nutrition ¹	Distribution ²	Nutrition	Distribution
			<i>1,000 tons</i>	
Angola	0	303	Algeria	0
Benin	0	0	Egypt	0
Burkina Faso	82	414	Morocco	0
Burundi	318	451	Tunisia	0
Cameroon	0	89	North Africa	0
Cape Verde	37	42		
Central African Republic	212	342	Afghanistan	1,868
Chad	0	222	Bangladesh	0
Congo, Dem. Rep.	6,815	7,367	India	0
Cote d'Ivoire	0	273	Indonesia	0
Eritrea	829	858	Korea, Dem. Rep.	372
Ethiopia	312	1,403	Nepal	0
Gambia	41	78	Pakistan	0
Ghana	0	22	Philippines	0
Guinea	0	83	Sri Lanka	0
Guinea-Bissau	111	143	Vietnam	0
Kenya	0	72	Asia	2,240
Lesotho	0	19		
Liberia	418	478	Bolivia	0
Madagascar	138	732	Colombia	0
Malawi	66	474	Dominican Rep.	0
Mali	0	202	Ecuador	0
Mauritania	30	87	El Salvador	0
Mozambique	0	190	Guatemala	0
Niger	587	1,025	Haiti	174
Nigeria	0	647	Honduras	0
Rwanda	109	197	Jamaica	0
Senegal	0	38	Nicaragua	0
Sierra Leone	179	534	Peru	0
Somalia	1,428	1,492	Latin America and the Caribbean	174
Sudan	0	248		
Swaziland	0	2	Armenia	0
Tanzania	0	642	Azerbaijan	0
Togo	0	34	Georgia	0
Uganda	0	647	Kazakhstan	0
Zambia	0	113	Kyrgyzstan	0
Zimbabwe	0	186	Tajikistan	0
Sub-Saharan Africa	11,714	20,150	Turkmenistan	0
			Uzbekistan	0
			Commonwealth of Independent States	42
			Total	14,128
				25,715

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.

Country indicators

Region and country	Population, 2006 <i>1,000</i>	Population growth rate	Grain production		Root production growth, 1980-2004	Projected annual growth in supply, 2006-16
			Growth, 1990-2005	Coefficient of variation, 1990-2006		
			<i>Percent</i>			
North Africa:						
Algeria	33,395	1.6	2.9	47.2	-2.5	2.7
Egypt	76,361	2.0	3.5	3.7	0.5	1.8
Morocco	32,049	1.5	0.7	49.1	0.7	2.6
Tunisia	10,148	1.1	-0.4	42.3	3.6	3.0
Central Africa:						
Cameroon	16,799	1.4	4.3	6.8	4.0	1.8
Central African Rep.	4,021	1.5	6.5	6.0	1.7	0.7
Congo, Dem. Rep.	57,709	2.9	0.1	3.7	-2.3	3.1
West Africa:						
Benin	7,286	2.6	5.1	5.4	5.4	4.2
Burkina Faso	14,216	3.0	3.6	13.0	-0.3	1.5
Cape Verde	491	1.9	-0.7	71.5	-0.9	1.5
Chad	9,386	2.9	5.4	18.2	-1.4	2.7
Côte d'Ivoire	17,429	1.5	1.5	11.1	0.7	1.9
Gambia	1,534	2.3	6.4	17.8	2.0	1.6
Ghana	22,272	2.0	3.6	11.7	5.1	2.3
Guinea	9,016	2.6	4.4	5.7	9.6	2.5
Guinea-Bissau	1,630	2.9	-0.7	16.3	2.7	1.9
Liberia	3,703	2.8	2.0	39.8	4.8	0.2
Mali	14,275	2.8	3.2	11.3	3.6	3.5
Mauritania	3,154	2.8	1.4	31.9	0.0	1.1
Niger	13,341	3.6	3.3	15.2	-6.2	2.0
Nigeria	133,232	2.3	1.7	6.6	6.0	1.8
Senegal	10,832	2.3	1.6	18.0	6.8	2.4
Sierra Leone	5,440	1.9	-4.0	23.8	8.8	1.9
Togo	5,244	2.2	3.6	8.0	4.2	3.5
East Africa:						
Burundi	7,555	3.2	-0.4	7.7	1.0	4.7
Eritrea ¹	4,606	3.4	0.5	73.2	--	1.7
Ethiopia ¹	75,970	2.4	5.9	12.8	1.5	3.9
Kenya	33,262	1.3	2.0	10.3	4.1	3.6
Rwanda	8,789	2.1	2.8	27.1	1.4	1.5
Somalia	11,151	3.8	2.3	32.6	6.7	4.2
Sudan	35,673	1.8	2.4	27.6	2.6	1.4
Tanzania	39,053	1.8	2.2	12.6	2.7	1.6
Uganda	28,623	3.6	3.0	7.9	2.2	2.9

See footnotes at end of table.

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Country indicators—Continued

Region and country	Macroeconomic indicators					
	Per capita GNI, 2004	Per capita GDP growth, 2004	GDP growth, 2004	Export earnings growth, 2004	Official development assistance as a share of GNI, 2004	External debt Present value as a share of GNI, 2004
	<i>U.S. dollars</i>	<i>Percent</i>				
North Africa:						
Algeria	2,270	3.6	5.2	3.4	0.4	27.1
Egypt	1,250	2.2	4.2	27.6	1.9	38.5
Morocco	1,570	0.7	4.2	4.7	1.4	35.8
Tunisia	2,650	4.9	5.8	5.2	1.2	69.4
Central Africa:						
Cameroon	810	2.4	4.3	1.7	5.4	67.7
Central African Rep.	310	0.0	1.3	0.00	7.9	81.8
Congo, Dem. Rep.	110	3.2	6.3	0.00	28.6	186.4
West Africa:						
Benin	450	-0.5	2.7	7.1	9.3	47.3
Burkina Faso	350	0.6	3.9	2.4	12.7	40.8
Cape Verde	1,720	3.1	5.5	3.6	14.9	55.2
Chad	250	25.5	29.8	200.8	11.8	63.0
Côte d'Ivoire	760	0.1	1.6	15.7	1.0	79.8
Gambia	280	5.4	8.3	5.4	16.0	171.4
Ghana	380	3.6	5.8	3.5	15.4	80.0
Guinea	410	0.4	2.6	1.2	7.3	92.4
Guinea-Bissau	160	1.2	4.3	4.1	28.3	283.9
Liberia	120	1.8	2.4	0.0	53.4	687.1
Mali	330	-0.8	2.2	-5.0	12.2	71.4
Mauritania	530	3.7	6.9	0.0	11.1	141.9
Niger	210	-2.4	0.9	0.0	17.5	63.6
Nigeria	430	3.7	6.0	3.1	1.0	59.5
Senegal	630	3.7	6.2	4.8	13.9	52.2
Sierra Leone	210	3.0	7.4	0.0	34.3	164.4
Togo	310	0.4	3.0	3.0	3.0	89.6
East Africa:						
Burundi	90	1.9	5.5	8.9	54.6	215.6
Eritrea ¹	190	-2.5	1.8	-7.4	28.5	74.8
Ethiopia ¹	110	10.9	13.1	28.5	23.0	82.8
Kenya	480	2.0	4.3	19.8	4.0	42.8
Rwanda	210	2.5	4.0	4.6	25.8	91.3
Somalia		--	--			
Sudan	530	4.0	6.0	14.0	4.5	98.6
Tanzania	320	4.3	6.3	-7.0	16.2	72.2
Uganda	250	2.1	5.7	6.2	17.3	72.2

See footnotes at end of table.

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Country indicators—Continued

Region and country	Population, 2006 <i>1,000</i>	Population growth rate	Grain production		Root production growth, 1980-2004	Projected annual growth in supply, 2006-16
			Growth, 1990-2005	Coefficient of variation, 1990-2006		
			<i>Percent</i>			
Southern Africa:						
Angola	14,968	3.0	7.5	17.6	5.3	2.3
Lesotho	1,789	-0.4	2.7	32.7	4.2	1.7
Madagascar	18,917	2.8	2.0	9.0	0.5	2.5
Malawi	12,808	1.9	2.6	27.1	9.3	1.3
Mozambique	19,789	1.5	10.5	16.9	0.5	2.5
Swaziland	1,086	-0.1	-1.7	27.4	0.6	1.0
Zambia	11,184	1.3	-0.6	29.6	3.8	2.4
Zimbabwe	12,975	0.1	-3.3	42.4	3.6	1.4
Asia:						
Afghanistan	26,947	3.8	2.3	22.2	1.1	3.0
Bangladesh	155,403	1.8	3.4	6.4	5.0	2.8
India	1,111,881	1.4	1.3	4.3	1.9	1.7
Indonesia	227,867	1.1	1.5	2.6	-0.5	1.1
Korea, Dem. Rep.	27,424	1.1	-4.4	34.7	11.6	0.0
Nepal	26,837	2.1	2.7	4.9	3.2	2.5
Pakistan	165,076	2.4	2.8	4.9	3.5	2.2
Philippines	84,139	1.6	2.3	7.5	-0.8	2.1
Sri Lanka	19,500	0.7	1.5	8.8	-3.0	0.7
Vietnam	84,665	1.3	5.0	3.2	-1.1	4.3
Latin America and the Caribbean:						
Bolivia	9,302	1.8	3.8	10.5	0.4	2.2
Colombia	46,253	1.4	1.3	15.0	0.3	2.7
Dominican Republic	9,114	1.3	2.5	15.9	1.3	3.3
Ecuador	13,553	1.3	2.6	13.1	-0.6	2.5
El Salvador	6,796	1.3	-0.2	8.8	4.7	3.2
Guatemala	13,284	2.4	-1.6	9.2	1.7	2.4
Haiti	8,663	1.3	-0.6	9.7	-0.6	0.2
Honduras	7,405	2.0	-1.7	9.3	3.3	2.4
Jamaica	2,727	1.0	-8.8	28.1	-3.8	-0.6
Nicaragua	5,852	2.2	5.0	11.2	6.2	2.0
Peru	28,361	1.4	6.8	10.6	3.9	2.5
Commonwealth of Independent States:²						
Armenia	3,033	-0.3	2.7	20.5	0.4	3.1
Azerbaijan	8,616	1.0	4.2	19.5	13.4	1.9
Georgia	4,989	-0.7	2.0	20.0	5.0	2.1
Kazakhstan	15,317	0.0	-2.8	35.9	-3.0	-0.1
Kyrgyzstan	5,345	1.3	2.0	13.5	8.8	1.4
Tajikistan	6,432	1.2	9.7	17.0	10.3	1.7
Turkmenistan	5,092	1.5	13.0	19.1	19.6	1.6
Uzbekistan	27,251	1.4	9.1	10.1	0.7	2.7

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Country indicators—Continued

Region and country	Macroeconomic indicators					
	Per capita GNI, 2004	Per capita GDP growth, 2004	GDP growth, 2004	Export earnings growth, 2004	Official development assistance as a share of GNI, 2004	External debt Present value as a share of GNI, 2004
	<i>U.S. dollars</i>	<i>Percent</i>				
Southern Africa:						
Angola	930	7.9	11.1	0.0	6.6	55.2
Lesotho	730	2.5	2.3	0.7	6.3	46.8
Madagascar	290	2.4	5.2	-5.6	28.8	80.7
Malawi	160	4.4	6.7	-4.6	25.9	186.3
Mozambique	270	5.1	7.2	23.8	21.4	80.9
Swaziland	1,660	0.8	2.1	1.1	4.9	20.0
Zambia	400	2.9	4.6	12.6	21.2	142.8
Zimbabwe	620	-4.7	-4.0	2.0	4.0	103.4
Asia:						
Afghanistan	--	--	--	--	--	--
Bangladesh	440	4.3	6.3	12.5	2.4	34.2
India	620	5.4	6.9	7.9	0.1	17.9
Indonesia	1,140	3.7	5.1	8.5	0.0	56.5
Korea, Dem. Rep.	--	--	--	--	--	--
Nepal	250	1.4	3.5	0.0	6.4	50.2
Pakistan	600	3.9	6.4	-1.5	1.5	38.0
Philippines	1,170	4.2	6.1	14.1	0.5	66.8
Sri Lanka	1,010	4.5	5.4	7.8	2.7	56.6
Vietnam	540	6.6	7.7	27.9	4.1	40.1
Latin America and the Caribbean:						
Bolivia	960	1.6	3.6	16.1	9.1	72.7
Colombia	2,020	2.5	4.1	10.2	0.5	40.3
Dominican Republic	2,100	0.5	2.0	1.4	0.5	40.5
Ecuador	2,210	5.4	6.9	15.1	0.6	58.6
El Salvador	2,320	-0.2	1.5	6.6	1.4	47.2
Guatemala	2,190	0.2	2.7	12.4	0.8	20.4
Haiti	0	0.0	0.0	0.0	6.7	33.9
Honduras	1,040	2.3	4.6	0.0	9.1	89.5
Jamaica	3,300	0.4	0.9	0.0	0.9	76.1
Nicaragua	830	3.0	5.1	15.8	28.3	117.9
Peru	2,360	3.3	4.8	14.7	0.7	48.0
Commonwealth of Independent States:²						
Armenia	1,060	7.4	7.0	14.8	8.1	39.2
Azerbaijan	940	9.2	10.2	10.7	2.2	25.4
Georgia	1,060	7.3	6.2	4.6	6.0	39.3
Kazakhstan	2,250	8.8	9.4	10.5	0.7	85.1
Kyrgyzstan	400	5.9	7.1	14.8	12.2	99.3
Tajikistan	280	9.4	10.6	30.7	12.1	44.9
Turkmenistan	0	0.0	0.0	9.9	0.6	0.0
Uzbekistan	450	6.1	7.7	21.8	2.1	42.0

¹ Data start in 1993.² Data start in 1992.

-- = data unavailable or not applicable due to inconsistent data set.

Source: Population = FAOSTAT, Macroeconomic indicators = World Development Indicators, 2006, World Development Report 2006, World Bank.