

# Technical note

## MDG progress classification

The same classification method is applied for both countries and regions or country groups. The four categories of MDG progress towards the targets are:

- *Early achiever*: Already achieved the 2015 target
- ▲ *On track*: Expected to meet the target by 2015
- *Off track–Slow*: Expected to meet the target, but after 2015
- ▼ *Off track–No progress/regressing*: Stagnating or slipping backwards

Two different procedures are used to determine the categories depending on whether or not an indicator has an explicit target value for 2015. For indicators without such a target value, such as HIV prevalence, TB prevalence, TB death rate, forest cover, protected area, CO2 emissions and CFC consumption, only three of the four categories are used: indicators trending in the ‘right’ direction since 1990 are categorized as *Early achiever*; indicators showing no change at all over the period are categorized as *On track*; and finally indicators trending in the ‘wrong’ direction are categorized as *Off track–No progress/regressing*.

For indicators with an explicit target value, such as \$1/day poverty, mortality rates, school enrolment and the gender parity indices, all four categories are used. To determine the category, the year  $t^*$  – by which a country would reach its MDG target if the trend since 1990 continued – is estimated (see below). Denote  $t_{Lst}$  as the year with the latest available value. If  $t^*$  is below  $t_{Lst}$ , the country is categorized as an *Early achiever*. If  $t^*$  lies between  $t_{Lst}$  and 2015, it is categorized as *On track*. If  $t^*$  is above 2015, the country is categorized as *Off track–Slow*. Naturally no  $t^*$  can be estimated if a country has a zero trend or trends in the ‘wrong’ direction, i.e. away from the target value.

In these cases, the country is categorized as *Off track–No progress/regressing*.

**Estimating the trend.** To estimate  $t^*$ , the trend since 1990 is estimated first based on at least two data points, which are at least three years apart. The only exception is HIV prevalence, for which country data are available only for 2003 and 2005 for almost all countries. Two different models are used depending on whether the trend for an indicator is decreasing or increasing. For decreasing time series, a geometric model with annual discrete compounding is applied:

$$Y_{Lst} = Y_{Fst} (1 + \bar{r})^{(t_{Lst} - t_{Fst})}$$

where  $Y_{Lst}$  and  $Y_{Fst}$  denote the latest and first available values since 1990 for the years  $t_{Lst}$  and  $t_{Fst}$ , respectively, and  $\bar{r}$  denotes the average growth rate between  $t_{Lst}$  and  $t_{Fst}$ . The average growth rate is calculated as the geometric mean

$$\bar{r} = \left[ \prod_{t=1}^{(t_{Lst} - t_{Fst})} (1 + r_t) \right]^{1/(t_{Lst} - t_{Fst})} - 1 = \left[ \frac{Y_{Lst}}{Y_{Fst}} \right]^{1/(t_{Lst} - t_{Fst})} - 1$$

This specification describes a slope, which decreases with a decreasing rate – a reasonable assumption for the indicators considered.

For increasing time series, an average geometric rate of change would yield a slope which increases at an increasing rate – an unreasonable assumption. Therefore, for increasing indicators, a linear model is applied instead,

$$Y_{Lst} = Y_{Fst} + \bar{q}(t_{Lst} - t_{Fst})$$

where  $\bar{q} = \frac{Y_{Lst} - Y_{Fst}}{t_{Lst} - t_{Fst}}$  denotes the average unit increase per period between  $t_{Fst}$  and  $t_{Lst}$ .

In all cases except for the CIS countries, the first and latest available values are used to estimate the average rate of change. This procedure implicitly takes the intermediate values into account and has the advantage over the widely used least-squares method in that it covers difference-station-

ary as well as trend-stationary time series (see e.g. Altinay, 2004). For CIS countries, the impact of the social changes in the early 1990s on many of the MDG indicators is taken into account. The rate of change for all the available data since 1990 is calculated first and then for all the available data except the first year. If the signs of the two estimated rates differ, the trend estimate excluding the observation for the first year is used.

**Estimating the year of MDG achievement.**

For indicators with a target value, the calculation of  $t^*$  is as follows. Let  $Y^*$  and  $Y_{Lst}$  denote the target value and latest available value, respectively. For decreasing indicators, re-arranging  $Y^* = Y_{Lst}(1+r)^t$  and adding  $t_{Lst}$  gives

$$t^* = t_{Lst} + \frac{\log(\frac{Y^*}{Y_{Lst}})}{\log(1+r)}$$

and for increasing indicators with the linear unit rate of change, it is

$$t^* = t_{Lst} + \frac{Y^* - Y_{Lst}}{q}$$

**Using cut-off values.** Many of the MDG targets require an indicator value to increase or decrease by a certain proportion. In this report, the target is also treated as achieved if a country has reached a certain absolute value. In the case of primary school enrolment, for example, this “cut-off” value is set at 95 per cent, and for \$1/day poverty at 5 per cent. The cut-off values for selected indicators are presented in Table 1 below.

Table 1  
Cut-off values for selected MDG indicators

Indicators	MDG target	Cut-off
\$1/day poverty	Reduce by half	5%
Underweight children	Reduce by half	5%
Primary enrolment	100	95%
Reaching grade 5	100	95%
Primary completion rate	100	95%
Gender primary	100	95%
Gender secondary	100	95%
Gender tertiary	100	95%
Under-5 mortality	Reduce by 2/3	30 per 1,000 live births
Infant mortality	Reduce by 2/3	20 per 1,000 live births
Water urban	Reduce by half	5%
Water rural	Reduce by half	5%
Sanitation urban	Reduce by half	5%
Sanitation rural	Reduce by half	5%

## Regional and country group aggregates

Regions or country groups are categorized with respect to their progress towards the MDGs in the same way as countries. To determine the trend and classify each region or country group accordingly, the aggregate values for 1990 and the latest year, for example, 2004 for \$1/day poverty and 2005 for under-5 mortality, are estimated first.

For the regions Sub-Saharan Africa, Latin America and the Caribbean, South Asia, and South-East Asia, estimates produced by the responsible international data agencies are obtained from the global MDG report (United Nations, 2007) for the following indicators: underweight children, under-5 mortality, forest cover, primary enrolment and CO2 emissions. For \$1/day poverty, the estimates for all regions and country groups are estimated by the World Bank through PovCal Net for this report.

The remaining aggregates are estimated by the ESCAP Statistics Division, by using a weighted average of the actual country values, or imputed country values wherever data are missing for the year required. The reference population are obtained from the *World Population Prospects: The 2004 Revision* (United Nations, 2005) to be consistent with the agency estimates. The estimation of the adversely affected populations is based on population data from the *World Population Prospects: The 2006 revision* (United Nations, 2007).

To impute missing values for 1990 and the latest year for a country, all available data for other years since 1990 are used. If a country has one observation during the period, this value is used for both 1990 and the latest year, as it provides useful information for estimating the aggregate. If a country has two or more observations, the missing values for 1990 and the latest year are replaced with fitted values according to

$$\hat{y}_t = \exp(b_0 + b_1t)$$

where  $b_0$  and  $b_1$  are Ordinary Least Square (OLS) estimates from the model  $\log y_t = b_0 + b_1t + e_t$  with  $e_t \sim N(0, \sigma_e)$  for decreasing indicator series. For increasing indicators, the fitted values from

$$\hat{y}_t = a_0 + a_1t$$

based on  $y_t = a_0 + a_1t + e_t$  with  $e_t \sim N(0, \sigma_e)$  are used. This approach is discussed in more detail in Stoff and Lorenceau (2007), see also Holt (2003).

Regional and country group aggregates are reported only when the countries with more than two available data values between 1990 and the latest year account for more than 50 percent of the total reference population in a region or country group.

The estimated aggregates and affected population presented in Figures 1-1 to 1-11b in the report can be found in Table B on page 34 by region and country group.

## Within-country disparities

The \$1/day international poverty estimates for India, the Philippines and Viet Nam are based on calculations made by the Development Indicators and Policy Research Division of ADB using country-specific household surveys. For India, the data are from the National Sample Surveys 1993/1994 and 2004/2005; for the Philippines, the Family Income and Expenditures Surveys of 1994 and 2003; and for Viet Nam, the Living Standard Surveys of 1993 and 2002. The poverty line of \$32.74 per month in 1993 PPP consumption dollars is converted into current local currency units for all the relevant country-year combinations using the national consumer price indices. The resulting poverty lines are then applied to population-weighted data on monthly per capita expenditures obtained from unit-level data.

All the estimates in Part 2, except those for poverty, are based on the global MDG database and the Demographic and Health Surveys (DHS) made available by Macro International Inc. These surveys, which provide data on population, health, and nutrition indicators, are nationally representative and range in size from close to 9,000 households for Nepal 2001, to over 90,000 households for India 1999 ([www.measuredhs.com](http://www.measuredhs.com)). For the DHS surveys used in this analysis, see Table 2.

Under-five mortality and the proportion of underweight children under five are calculated using the methodology described in the DHS reports. Under-five mortality is based on a direct estimation method using a synthetic-cohort life approach (see Rutstein & Rojas, 2006). Under-

Table 2  
DHS used in analyses of Part 2

Country	DHS
Armenia	2000, 2005
Bangladesh	1996/97, 2004
Cambodia	2000, 2005
India	1998/99
Indonesia	1997, 2002/03
Kazakhstan	1999
Kyrgyzstan	1997
Nepal	1996, 2001
Philippines	1998, 2003
Turkey	1998
Turkmenistan	2000
Uzbekistan	1996
Viet Nam	1997, 2002

weight children estimates are based on the reference population which have a weight-for-age rate of two (moderately underweight) and three (severe underweight) standard deviations below those for the corresponding populations. These populations are defined by the U.S. National Centre for Health Statistics, as recommended by WHO.

Access to water and sanitation estimates are based on the country files provided by the WHO and UNICEF Joint Monitoring Programme (JMP) for water and sanitation (<http://childinfo.org/eddb/water.htm>). The values reported by the JMP in the global MDG database are based on a linear trend for all the data points (surveys) available for a specific country. This report presents the percentages of safe and protected sources reported for each year, for which percentages might differ slightly from those based on the linear trend.

The wealth index is a living-standards index composed of different variables which reflect households' assets. The index includes variables on ownership of consumer durables such as a radios, televisions, refrigerators, cars, etc., and variables on the household's dwelling such as the type of toilet facilities, the sources of drinking water and the building materials used for the house (Filmer & Pritchett, 1998). Weights are constructed using principal components analysis for each country. Comparison between countries should be made with caution because wealth quintiles thus defined may vary from country to country.