

ENVIRONMENTAL ECONOMICS SERIES

# Poverty Reduction Strategies and the Millennium Development Goal on Environmental Sustainability

*Opportunities for Alignment*

Jan Bojö  
Rama Chandra Reddy

September 2003





THE WORLD BANK ENVIRONMENT DEPARTMENT

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# Abbreviations

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AET	Actual evapotranspiration
CAS	Country Assistance Strategy
CIFOR	Center for International Forestry Research
DfID	Department for International Development, UK
ECD	Evaluation Capacity Development
DHS	Demographic and Health Survey
GEF	Global Environmental Facility
FAO	Food and Agricultural Organization
IDA	International Development Association
IEA	International Energy Agency
IMF	International Monetary Fund
IPRSP	Interim Poverty Reduction Strategy Paper
ITTO	International Tropical Timber Organization
IUCN	World Conservation Union
JSA	Joint Staff Assessment
LSMS	Living Standard Measurement Survey
MDG	Millennium Development Goal
MICS	Multiple Indicator Cluster Survey
MSY	Maximum Sustainable Yield
MT	Million Tonnes
NEAP	National Environmental Action Plan
ODA	Official Development Assistance
OED	Operations Evaluation Department
PRSP	Poverty Reduction Strategy Paper
PRSC	Poverty Reduction Strategy Credit
UIP	Urban Indicators Programme
UN	United Nations

UNHSP	United Nations Human Settlement Programme
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNICEF	United Nations Children's Fund
WCMC	World Conservation Monitoring Center
WEC	World Energy Council
WHO	World Health Organization
WSSD	World Summit on Sustainable Development
WWF	Worldwide Fund for Nature

# Executive Summary

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About 50 countries have prepared interim and full Poverty Reduction Strategy Papers (PRSPs). In this context, this paper examines *Millennium Development Goal (MDG)7: Ensuring Environmental Sustainability*, its targets and indicators, and responds to three questions:

- To what extent do PRSPs define and adopt targets and indicators that align with those of MDG7?
- To what extent do the available data allow tracking of progress with respect to MDG7?
- When data are available, what are the trends, and how can the data be effectively utilized to examine the status and trends of countries in relation to MDG7?

The assessment of interim and full Poverty Reduction Strategy Papers (PRSPs) shows that:

- Only 12 of the 28 full PRSPs present some information on the baselines and targets in line with the MDG7; and none of the 22 interim PRSPs present discussion on the long-term perspective;
- Within the PRSPs that present targets aligned with MDG7, attention is almost exclusively focused on water and sanitation;
- Available data can be used to document the status and trends of relevant MDG7 indicators.

Our analysis of the available data on targets and indicators of MDG7 shows that for the PRSP countries reviewed in this paper:

- The rate of deforestation has marginally declined, with marginal improvements in the forest cover of Central Asia, but a continuous loss in the forest cover of Africa
- Land area protected has grown significantly during the last decade with additional area brought under legal protection
- The proportion of people relying on traditional fuels remains high, particularly in rural Africa, and is likely to remain so within the MDG horizon
- Growth in access to safe water is still low in several countries of Africa, reflecting the challenges in meeting the target;
- Most countries will not be able to reach the sanitation target with the current pace of improvement in access
- Progress on secure tenure is modest considering the multiple challenges involved in achieving the target.

In summary, a major effort is needed to raise the level of attention to MDG7 in the PRSPs. While progress has been registered with respect to integration of immediate environmental concerns, focus on long-term environmental sustainability is still lacking in most PRSPs. However, the revisions from interim to full PRSPs show promise. First, coverage of

environmental issues has improved considerably from interim to full PRSPs. Second, our assessment shows that available data can be effectively utilized to enhance the alignment of PRSPs with MDG7, with particular attention to indicators that are directly linked to poverty. The

strength of such links vary across countries, but are most apparent with respect to safe water, improved sanitation, substitution of traditional with modern fuels, and secure tenure for urban poor.

# 1 Introduction

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The Poverty Reduction Strategies implemented by countries with the active support of multilateral and bilateral agencies represent medium-term commitments with a long-term perspective to reach poverty reduction targets. As key instruments of national and sub-national planning within a country, Poverty Reduction Strategy Papers (PRSPs)<sup>1</sup> can also be the major building blocks in achieving the Millennium Development Goals (MDGs).<sup>2</sup>

The MDGs, adopted by the UN General Assembly in 2000, articulate a long-term perspective and provide direction to PRSP implementation. Environment is inextricably linked to several MDGs.<sup>3</sup> In this context, this paper focuses on the MDG7: environmental sustainability,<sup>4</sup> and responds to three questions:

- *To what extent do PRSPs define and discuss targets and indicators that align with the targets and indicators of MDG7?*
- *To what extent do the available data allow enhanced tracking of progress with respect to MDG7?*
- *When data are available, what are the trends, and how can the data be effectively utilized to examine the status and trends of countries in relation to MDG7?*

In addition to the environmental targets of the MDG7, new targets were adopted at the World Summit on Sustainable Development (WSSD) in

Johannesburg during September 2002. These new targets are discussed separately in Appendix A.

Comments on the draft versions of this paper highlighted the need to clarify the ways in which this paper relates to existing literature and what this paper is *not* about. First, this paper is not an assessment of the MDGs. For example, IMF, OECD, UN, and World Bank (2000) *2000 A Better World for All* provides an overview of progress towards the International Development Goals. The *World Development Indicators* (World Bank 2002b) contains an introductory chapter on the MDGs along with regional data on access to water supply and changes in forest cover. Devarajan et al (2002) focus on the global costs of achieving the MDGs. Another contribution, *The Environment and the Millennium Development Goals* (World Bank 2002d) takes a broad look at how environment relates to the entire set of goals, poverty-environment links, and the cost of meeting the MDGs globally. We complement this literature by taking a more detailed look at MDG7, with specific reference to PRSPs. Second, this paper is not an evaluation of PRSPs and their associated processes.<sup>5</sup> There are already other processes to assess the qualities of PRSPs.<sup>6</sup> In this report, we focus exclusively on the relationship of PRSPs and MDGs in the context of environmental sustainability, which has received limited attention.

Third, we agree that the relevance of the MDG7 indicators varies across regions and countries. Beyond some brief comments on that, it has not been possible to review the indicators systematically from the perspective of the six regions that the World Bank recognizes in its organization.<sup>7</sup>

Fourth, we have taken the internationally agreed targets and indicators as a starting point. Additional indicators may provide more insights into the country progress on MDGs, and we discuss several complementary indicators in this context. However, this paper is not an open-ended search for suitable indicators on environmental sustainability but is focused on a set of indicators as relevant to improve the monitoring process related to MDG7.

Fifth, it is agreed that official data pertaining to MDG7 are often deficient. We examine the opportunities for using and improvising the existing data, however a comprehensive treatment of data quality goes much beyond what we aspire to cover in this report.

Finally, our paper is not an attempt to assess the environmental sustainability issues globally, or across the PRSP countries in a manner that gives weighted attention to countries according to their size or population. Several large developing countries have not presented a PRSP to the World Bank and IMF Boards, and are outside the scope of this paper.

The paper is organized into six chapters. Chapter 2 describes the MDG7 devoted to *environmental sustainability*, and discusses the poverty-relevance of the associated targets and indicators. Chapter 3 analyzes environmental baselines and targets in the PRSPs, their alignment with MDG7, and good practice examples. Chapter 4 presents data from non-PRSP sources to assess the extent to which available data are utilized. Chapter 5 examines the monitoring and evaluation systems of PRSPs to assess the progress on MDG7. Chapter 6 presents conclusions.



## 2 MDG7 — Ensuring Environmental Sustainability

Though environment as a crosscutting theme influences several MDGs, its significance in the MDG framework,<sup>8</sup> is prominently highlighted in MDG7: *Ensuring Environmental Sustainability*. MDG7 is divided into three targets—reversal of natural resource degradation and emphasis on sustainability principles; access to safe drinking water; and slum improvement (Table 1).

Additional targets adopted at the World Summit on Sustainable Development 2002 include: targets pertaining to fisheries; marine protection; biodiversity loss; access to renewable energy; and phase out of organic pollutants (Table A1, Appendix A). Since these targets are not officially part of the MDGs and the relevant indicators have not been determined, they are

examined separately in Appendix A. Access to adequate sanitation emphasized along with the water supply target at the WSSD was subsequently adopted as one of the MDG7 indicators (UN 2003).

### 2.1 Relevance of the MDG7 Indicators to Poverty Strategies

Before we set out to examine the MDG7 targets and indicators in the PRSPs, it is pertinent to ask: *which MDG7 indicators can reasonably be expected to be included in a poverty strategy?* The answer will vary across countries. This section reviews the poverty-relevance of the indicators defined in Table 1.

*Proportion of land area covered by forests:* The extent of forest area is to a large extent a

**Table 1. Targets and indicators of MDG7 — Ensuring environmental sustainability**

Targets	Indicators
Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources.	<ul style="list-style-type: none"> <li>• Proportion of land area covered by forests</li> <li>• Land area protected to maintain biological diversity</li> <li>• Energy use per unit of GDP</li> <li>• Per capita CO<sub>2</sub> emissions and consumption of ozone depleting substances</li> <li>• Proportion of population using solid fuels</li> </ul>
Halve by 2015 the proportion of people without sustainable access to safe drinking.	<ul style="list-style-type: none"> <li>• Proportion of population with sustainable access to improved water source and adequate sanitation*</li> </ul>
Achieve by 2020 a significant improvement in the lives of at least 100 million slum dwellers	<ul style="list-style-type: none"> <li>• Proportion of households with access to secure tenure</li> </ul>

Source: United Nations 2001.

Note: \* The sanitation indicator included as part of the targets adopted at the WSSD is discussed along with the MDG7 targets.

function of ecological conditions: areas such as the African Savanna and the Sahara desert have not been bequeathed with heavy vegetation. Hence, different countries have different natural starting points with respect to this indicator.

Forests are important sources of livelihood for large groups of poor in many low-income countries. As the World Bank's new Forest Strategy points out: "About 60 million indigenous people are almost wholly dependent of forests. Some 350 million people living within or adjacent to dense forests, depend on them for subsistence and income. In developing countries, about 1.2 billion people rely on agro-forestry to sustain agricultural productivity and generate income. Worldwide, forest industries provide employment for 60 million people." (World Bank 2002a, p. 20) However, clearance of forests for agriculture and pasture can also pave the way for higher incomes. Hence, it is difficult to attribute a direct causal relationship between poverty and proportion of area under forests.<sup>9</sup> Nevertheless, in countries where significant household incomes of poor are attributable to products and services from forests, attention to deforestation and management of forests would be relevant in their poverty reduction strategies. For other countries, the significance of this indicator may be low.

*Land area protected to maintain biological diversity:* Biodiversity conservation can be the basis of sustainable livelihoods. However, it may also exclude the poor from using biological resources that support basic needs, creating a dichotomy between the use and conservation objectives. Considering the high dependence on biological resources in several PRSP countries, we expect attention to biodiversity in the context of promoting sustainable livelihoods,

conservation of medicinal plants,<sup>10</sup> and as a source of revenue from eco-tourism. Considering the geographic nature of this indicator, its significance will vary across countries. Countries with low dependence on biodiversity among poor may find this indicator less significant to their poverty strategies.

*Energy per unit of GDP:* The major concern with this measure arises out of the climate change debate and the need to "de-link" economic growth from the emissions of greenhouse gases. High-income countries produce more GDP per unit of energy than poor countries: the energy per unit of GDP in OECD countries is three times that of the developing country average (WEC 2001). However, considering the large magnitude of energy use in the OECD countries, this indicator has major relevance to the industrialized countries. From this perspective, we expect limited attention to this indicator in the poverty strategies. There is, however, another public policy aspect that needs attention. Energy intensity is often strongly linked to large public subsidies for energy. This in turn reinforces a tendency for public deficits, inadequate investment in energy development, inefficient operation and maintenance of infrastructure, and a corresponding "tax" on household income, translating into an indirect link between energy intensity and poverty.

*Per capita CO<sub>2</sub> emissions:* CO<sub>2</sub> emissions are positively correlated with the income per capita and are influenced by the type and amount of energy used in the economy (World Bank, 2002b). With high levels of per capita income, energy intensity tends to level off with improvements in energy efficiency, stabilizing absolute emissions over time, as observed in the high income countries (World Bank 2002e). Since most PRSP countries are not globally

significant emitters of CO<sub>2</sub>, we do not expect explicit attention to this indicator in the PRSPs.

*Proportion of population with solid/traditional fuels:*

The proportion of traditional and modern fuel use is an important indicator of quality of life and poverty incidence in a country. In most low-income countries biomass is a major form of traditional energy; however it is not reported in the final energy consumption of national statistics under solid fuels.<sup>11</sup> The International Energy Agency (IEA) has initiated reporting on biomass energy since 1998. It is estimated that 2.5 million women and children die prematurely each year from carbon monoxide and other gaseous pollutants of the stoves using biomass (IEA 2002). In Sub-Saharan Africa, women carry 20 kg of fuelwood each day over 5 km causing a large share of their time and calorie intake to be used directly for fuel collection (IEA 2002). Since use of traditional energy is closely related to low income and poor health outcomes, it is appropriate that PRSPs explicitly highlight the issues relating to this indicator.

*Proportion of population with access to improved water source.*<sup>12</sup>

Water supply has strong relationships with poverty – poor health and loss of productive time. Time spent in fetching water has implications for child education and women employment. The quality of water has implications for water borne transmission of diseases such as cholera, typhoid, dysentery, and hepatitis A; water-washed transmission of skin and eye infections (trachoma) spread through insufficient water for hygiene; and water-borne and water-washed transmission of diseases such as diarrhea (WHO 2000a). Hence, one would expect PRSPs to pay attention to this indicator.

*Proportion of population with access to adequate sanitation:*

Epidemiological studies indicate that

sanitation is as effective in preventing diseases as improved water supply. Provision of adequate sanitation and hygiene reduces diarrhea incidence by 65% and morbidity by 26% (WHO 2000a). In most PRSP countries, more than 80% of rural population has no access to improved sanitation, and the differences in rural and urban coverage are significant. Therefore, explicit emphasis to this indicator in poverty strategies is highly relevant

*Proportion of people with secure tenure:*

The term “secure tenure” refers to protection from involuntary removal from property except through a due legal process. It refers to legal title that provides security to tenants for undertaking long-term improvements to their dwellings. Varied interpretations of “secure tenure” present difficulties in the estimation of this indicator. About 40 percent of the urban population in developing countries lives in slum environment, in comparison to the 4 percent of urban population in developed countries (UN 2002a). Therefore, this indicator is expected to have strong poverty-relevance.

To summarize, the following MDG7 indicators are expected to hold high priority for countries in the design and implementation of poverty reduction strategies. The degree of their significance differs across countries, with traditional fuels, water supply, sanitation, and secure tenure generally having the strongest relevance to poverty reduction strategies, particularly in the poorest countries.<sup>13</sup> This report examines the following six major MDG7 indicators in the context of PRSP countries that are in different stages of design and implementation.

- Area under forests and changes in forest cover
- Proportion of land area protected

- Traditional/solid energy use and access to modern energy sources
- Access to safe drinking water
- Access to adequate sanitation
- Urban poor with secure tenure.

# 3 How Do Poverty Strategies Align with MDG7?

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To examine how well the PRSPs align with MDG7, we reviewed all PRSPs submitted to the World Bank as of May 2003. The PRSP preparation involves interim and full stages. Currently 28 out of 50 countries included in our sample have prepared full PRSPs and are in the process of implementation, while 22 countries are in the interim stage of PRSP preparation.<sup>14</sup> Since none of the 22 interim PRSPs presents noteworthy discussion relating to MDG7, only full PRSPs are considered for assessing the coverage of MDG7. However, to assess the data availability on environmental targets and indicators and the progress of countries towards achieving the MDG7, both interim and full PRSPs is considered.

## 3.1 Environment as a Dimension of Non-income Poverty

In addition to income dimension,<sup>15</sup> poverty reflects in several non-income dimensions involving the interface of environment, health, vulnerability, and empowerment and manifested in the quality of natural resource base, ecosystem services, property rights, air and water quality, access to water and sanitation, typology of energy use, quality of housing, and existence of slums. While most PRSPs focus on a 3 to 5 year period, environment issues fall beyond such a horizon; therefore it is imperative for PRSPs to focus beyond medium-term expenditure framework

to align the medium- and long-term priorities to reflect their commitment to MDGs.

## 3.2 Environment Targets Coinciding with the MDG Horizon

The focus of this paper is to assess the emphasis of PRSPs on the MDG-related environmental targets,<sup>16</sup> and the extent to which they provide insights into ways of improving the treatment of MDG targets within available data and resource constraints.

Most full PRSPs do not provide baseline and target data on the environment indices. Among the PRSPs that present baseline data, attention to targets and supporting monitoring indices is often missing. Less than half of the full PRSPs that present baseline data on water supply and less than a third of the PRSPs that present baseline data on sanitation have targets that coincide with the 2015 MDG horizon. Table 2 presents an overview of the MDG environmental indicators covered in the PRSPs. Detailed country-wise assessment of the environmental baselines and targets of the PRSPs are presented in Appendix B.

Though baselines and targets on access to water and sanitation are presented in few PRSPs, lack of information on costs and resource allocation makes it difficult to assess the realism of the targets. In cases where targets are presented, rural and urban access distinctions and quality

of service issues often do not receive attention. For several countries, the targets also appear to be ambitious: Ethiopia sets a 100 percent target for access to safe water by 2015, while the baseline as late as 1999 was only 28 percent. Rwanda proposes to increase the sanitation coverage from 10 percent to 56 percent over the MDG horizon. Nicaragua proposes to enhance the sanitation coverage by 4 percent per year during the PRSP period, which appears to be unrealistic considering the resource commitments and the pace of past achievement.

The information on baselines and targets with respect to forests, protected area, traditional energy, and secure tenure is either very limited or non-existent. PRSPs that discuss forest area and deforestation (Albania;<sup>17</sup> Bolivia, Cambodia, Ghana, Honduras, Nicaragua, Sri Lanka, Vietnam, and Zambia); protected areas (Albania, Nicaragua, Sri Lanka); and traditional energy dependence (Ethiopia,<sup>18</sup> Honduras, Mauritania, Mali, Nicaragua, Niger, Rwanda, and Zambia), present baseline information that is often sketchy without reference to either targets or to a long-term perspective. The focus on slums is often cursory without supporting information on baselines and targets. The support programs and qualitative indices are often generic with respect to sector priorities and only provide an overview of a country's

commitment to sector issues. Linking support programs along with relevant indices that are amenable to cost-effective monitoring is a first step in improving the monitoring process.

What explains this paucity of attention to long-term issues of environment that most likely affect the immediate objectives of PRSPs? We consider that the following factors may contribute to the limited attention.

- First, we are still dealing with a large share of interim PRSPs in our sample. The treatment of MDG7 has improved with the revision from interim to full PRSPs. Hence, we expect attention to MDGs to grow as more interim PRSPs transform into full PRSPs.
- Second, the MDGs, although evolved during 1990s and officially adopted in 2000, have yet to make their full imprint on development planning in countries preparing their poverty strategies.
- Third, poverty relevance of indicators such as deforestation and biodiversity loss is limited or ambiguous in some countries.
- Fourth, low data quality, vaguely defined indicators, and weak monitoring capacity appear to be the major deterrents in assessing the progress on MDGs.

**Table 2. Coverage of the MDG environmental indicators in full PRSPs**

Variable	Area under forests	Land area protected	Solid fuels / traditional energy	Access to safe water	Access to adequate sanitation	Secure tenure
Baseline	10	3	7	24	18	
Targets for 2015 - MDG horizon	1			12	5	
Targets for 2004-06 - PRSP horizon	3	2	1	14	9	2
Qualitative indices/support programs highlighted in the PRSP	7	8	6	8	6	5

Note: See Appendix B for detailed country-wise assessment of the environmental baselines and targets of the PRSPs.

- Fifth, the emphasis of most PRSPs is on a 3-5 year perspective. In contrast, most environmental issues reflect a time horizon longer than a PRSP. Those countries that did not design forward-looking PRSPs often fail to present a good description of environment issues.

### 3.3 Coverage of MDG in the PRSPs

Given the limited attention to MDG7, one might ask: what about the long-term perspective of PRSPs? Countries that refer to the MDG horizon highlight legal, institutional, and sector specific interventions to be implemented as part of the PRSPs. The legal interventions highlighted include reform of laws pertaining to forestry, water, mining, biodiversity, and tenure. The institutional and capacity development proposals focus on national environment action plans, decentralization, and disaster preparedness. Sector programs often emphasize interventions relating to water and sanitation, and in certain cases to those relating to forestry.

The PRSPs that highlight the MDG time frame may be grouped into three categories: those with explicit targets in the MDG horizon; those with targets falling short of the MDG horizon; and those that indicate their general commitment to MDG framework without reference to targets.

*PRSPs with explicit targets in the MDG horizon:* include Guyana, Honduras, Mauritania, Nicaragua, Rwanda, Senegal, and Zambia, which present targets coinciding with 2015. In most of these countries, baselines and targets are often presented with reference to water and

sanitation. Only Honduras presents target relating to forest area.

*PRSPs with targets for the period falling short of MDG horizon:* Guinea and Vietnam present targets for 2010. Guinea proposes a target for water supply, and Vietnam presents a target relating to forest area. Vietnam's target of 5 million ha of afforestation and 43 percent area to be protected forests as against the baseline of 33 percent appears to be ambitious considering the resources allocated and time horizon of the target.

*PRSPs that indicate general commitment to MDG:* Countries such as Bolivia, Benin, Ghana, The Gambia, and Yemen indicate a general commitment to achieving the MDG targets, however, they do not present targets. The Gambia PRSP presents monitoring indices for 2005 and proposes to align future planning with the MDG horizon and in the interim proposes to use annual implementation progress reports to assess the progress on MDG.

### 3.4 Good Practice Examples of PRSPs with respect to MDG coverage

The revision of interim PRSPs into full PRSPs saw improvements in the coverage of MDG indicators and their targets. Honduras, Nicaragua, Rwanda, and Zambia present baselines and targets relating to MDG7 and serve as examples for several interim PRSPs that are under revision. Several countries have also prepared country progress reports on MDG, which can be effectively utilized in monitoring the PRSP implementation. Box 1 presents the attention given to MDGs in the PRSPs.



**Box 1.**

**Focus on Millennium Development Goals in the PRSPs**

**Bolivia:** establishes three levels of indicators; impact, outcome, and intermediate indicators. Impact indicators coincide with the MDG horizon of 2015 and summarize the changes in different dimensions of poverty. Outcome and intermediate indicators reflect the progress towards achieving impact indicators. Water, sanitation, and protected areas are discussed in the context of intermediate indicators coinciding the PRSP horizon of 2006.

**Ethiopia:** The PRSP discusses issues relating to traditional energy, water and sanitation. However, baselines and targets on water supply and sanitation presented in the PRSP appear to be ambitious considering the progress on access to water and sanitation during 1990-2000.

**Guinea** presents targets and indicators relating to water supply and electricity in terms of coverage, service delivery, and cost recovery for 2010. Indicators relating to renewable energy, infections from sanitary conditions, tenure, and access to affordable housing are also proposed.

**Honduras:** presents targets relating to forestry, water supply, and sanitation to coincide with the MDG horizon. In addition, targets on  $pm_{10}$  particulate air pollution concentrations and early warning systems for environmental risks are also presented.

**Mauritania:** presents targets and indicators relating to secure tenure, subsidized housing, and access to water and sanitation. Indicators relating to current and targeted amounts in terms of liters per capita and cost of  $m^3$  of drinking water are also considered for monitoring.

**Nicaragua:** In line with MDG7, the PRSP reports on the approval of laws relating to forestry, fishery, and biodiversity. The MDG targets are proposed with additional national-level targets and are proposed to be monitored with intermediate indicators.

**Rwanda:** The targets and performance indicators relating to health, education, gender, and access to water and sanitation proposed in the PRSP coincide with the MDG time frame of 2015. The PRSP proposes to collect information to develop outcome, access, process, and proxy indicators and refers to relevant surveys to be used to generate the information.

**Vietnam:** proposes targets and indicators relating to forest resources, safe water, solid waste, and slums to be achieved by 2010. The national strategies for rural hygiene, clean water, and environmental protection are presented for 2001-10, to strengthen health and environmental protection in vulnerable regions.

**Zambia:** Access targets on water supply and sanitation are presented for 2015, with indicators such as number of water points, distance to water facility, volume of water treated, and number of D-WASHE committees strengthened to support water supply and sanitation. Targets for electrification are presented for 2010, while targets for wood fuel, solar applications, deforestation, and air and water pollution are presented for 2004.



# 4 Data Availability and Progress of PRSP Countries Toward MDG7

A natural argument in explaining the lack of attention to long-term environmental perspective of the PRSPs is “lack of data.” Are data not available? To examine this question, we return to the selected indicators to verify what data are readily accessible. To the extent that data are available, it is also of interest to document any trends towards achieving the MDG7 targets.

## 4.1 Area Under Forest Cover

The indicator for land area under forests does not specify a quantitative target for 2015. However, since the MDG target calls for reversal of natural resource degradation, we assume that the area under forest cover should remain stable or increase. In other words, the rate of deforestation should decline during the MDG horizon.

### DATA

The Food and Agricultural Organization (FAO) of the United Nations is the nodal agency on the data relating to area under forest cover. It conducts periodic assessments of the area under forest cover, including deforestation and degradation. Combined satellite and ground inventory methods have improved estimates on

forest area. However, there is a need for improvements in the estimates relating to forest quality and density at the sub-national level. Area under forest cover and data on the rates of deforestation are the starting points to examine the progress on this indicator. Since the FAO *Forest Resource Assessment 2000* uses a common methodology across countries, it provides a comparable basis for assessing the progress on deforestation. National and sub-national studies can be utilized to supplement the FAO data for setting intermediate and long-term targets, and corresponding monitoring indices.

### STATUS AND TRENDS IN AREA UNDER FORESTS

FAO forest resource assessments use area under vegetal cover as a criterion for estimating the land area under forests. Analysis of the changes in forest area during 1990 and 2000 indicates a loss of 14.6 million ha of forests with almost all of this loss occurring in tropical regions. Table 3 presents changes in forest area during 1990-2000.

### STATUS AND TRENDS OF CHANGE IN FOREST COVER

Data and reports on forest cover change during 1980s and 1990s present the trends of

**Table 3. Trends in area under forests by forest type during 1990–2000 (million hectares)**

Type	Loss of forest area	Gain in forest area	Net change
Tropical	-14.2	+1.9	-12.3
Temperate	-0.4	+3.3	+2.9
Global	-14.6	+5.2	-9.4

Source: FAO 2001, Global Forest Resource Assessment 2000.

**Table 4. Annual rate of deforestation in PRSP countries (in percent)**

Variable	1980–1990	1990–2000
Mean	0.80	0.79
Median	0.80	0.50
Standard deviation	1.45	1.32
Number of countries	43	47

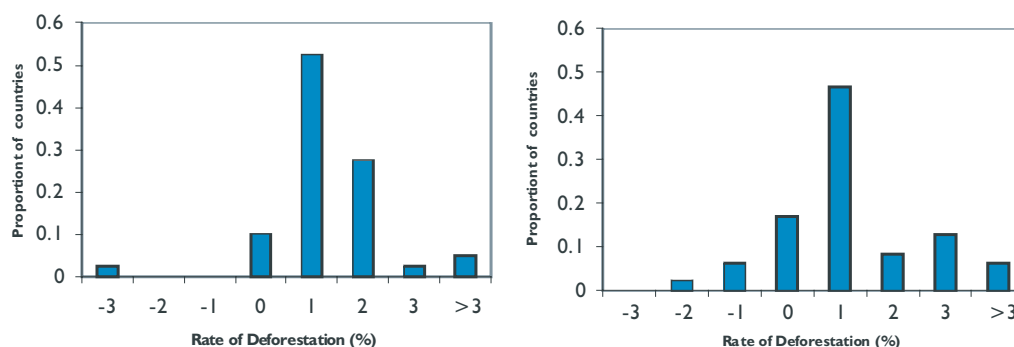
Source: World Bank 1996, and FAO 2001.

deforestation. Table 4 presents the average annual rate of deforestation in the PRSP countries included in our sample during 1980–90 and 1990–2000. Comparison of annual rates of deforestation for the two periods indicates a marginal decline in the rate of deforestation for PRSP countries. Considering the different estimation methods used during 1980–90 and 1990–2000 assessments, broad generalizations can only be made.

The 1990–2000 assessment indicates that area under forest cover has increased in countries such as Armenia, Azerbaijan, Kyrgyz Republic, Tajikistan, Mongolia, Vietnam, Lao PDR, and Pakistan in Asia; Bolivia and Honduras in Latin America; and The Gambia, Guinea, and Mozambique in Sub-Saharan Africa. However, deforestation rates show significant increase in countries such as Benin, Cote d'Ivoire, Ghana, Mauritania, Malawi, Nicaragua, Niger, Rwanda, Sierra Leone, and Zambia.

#### PROGRESS IN CONTROLLING DEFORESTATION

Considering 1990 as the baseline for MDG, a comparison of the deforestation rates of PRSP countries between 1980–90 and 1990–2000 indicates that the proportion of countries that increased their forest cover has grown, and the proportion of countries with deforestation rates greater than 1 percent has decreased since several countries have transitioned from a high deforestation rate in 1980–90 to a low rate in 1990–2000 (Figure 1).<sup>19</sup> Increase in forest cover is reflected in the transition economies of Central Asia and Europe, while high rates of deforestation are observed in the conflict and post-conflict countries. There is a strong need to strengthen national forest inventory systems, synchronize the variables and time period of the FAO and national forest resource assessments, and to undertake periodic analysis of forest management, forest health, and certification processes to improve monitoring and to ascertain the progress of countries on sustainable forest management.

**Figure 1. Rates of deforestation in PRSP countries during 1980–90 and 1990–2000**

Source: Authors' calculations based on FAO (2001).

### COMPLEMENTARY INDICATORS

Changes in forest cover may be a starting point to assess the progress in area under forests. However, statistics on forest area in most countries do not provide information on regeneration status, changes in density, species composition, and quality of vegetation. Improvements to monitoring should combine both geographic and management perspectives of forest resources.

From a geographic perspective, indicators relating to national and sub-national data on land use, per capita forest area, vegetation density and quality, and forest health provide insights into the dynamics of forest cover change. While, from a management perspective, indicators such as area under sustainable forest management, harvest intensity per hectare, proportion of value added forest products, certification of area and products in managed forests, and stakeholder participation in the management of forests provide additional insights into the evolution of forest resources. The divergence between the area under forest management plans and the area certified under sustainable management in Bolivia, Honduras, and Sri Lanka highlights the need to also consider the qualitative aspects of forest area indicator (Table 5).

A combination of geographic, management, and institutional indicators can provide holistic assessment of the progress on the MDG7 indicator relating to forests. Table 6 presents an

illustrative list of indicators that can complement the MDG indicator relating to forest resources. Country specific indicators relating to forest resources should provide additional information on the indicator.

### 4.2 Proportion of Land Area Protected

Proportion of land area protected to maintain biological diversity refers to the area protected under nature reserves, national parks, sanctuaries, heritage sites, and other conservation statutes. However, the MDG7 indicator corresponding to the land area under protection does not define a quantitative target. The *Plan of Implementation* of WSSD seeks to operationalize programs to achieve a “significant reduction” in the biodiversity loss by 2010 (United Nations 2002d). In the absence of measurable indices, *area under protection* and *species threatened* may serve as reference points.

### DATA

The World Conservation Monitoring Center (WCMC) of the United Nations Environment Programme (UNEP) is the nodal agency for global biodiversity information on protected areas, habitats, and species. The Biodiversity Conservation Information System of the WCMC provides searchable databases on protected areas, species diversity, and their management status.<sup>20</sup>

Status and trends in land area protected  
From Table 7, it is clear that land area protected in PRSP countries has grown significantly

**Table 5. Forest area under management plans and certified under sustainable management**

Country	Forest area under management plans (%)	Forest area certified under sustainable management (%)
Bolivia	15.0	0.4
Honduras	13.0	1.7
Sri Lanka	100.0	0.7

Source: FAO 2001.

**Table 6. Complementary indicators for monitoring the area under forest cover**

<i>Indicator</i>	<i>Significance of the indicator</i>	<i>Data sources</i>
Extent of illegal logging	Illegal logging and improper concessions are estimated to account for revenue losses of \$5-10 billion per annum. Improving policies and regulation can enhance the revenue to forest agencies and minimize damage to forest resources (World Bank 2002a)	Country, province
Area under sustainable management	Currently 9 million ha out of 600-800 million ha of forests in countries with World Bank lending are certified under sustainable management. The World Bank – WWF Alliance for Forest Conservation and Sustainable Use has set a target of bringing 200 million ha of production forests under certification by 2005	WWF, ITTO, FSC, country, province
Value addition from timber & non-timber sources	Significant value addition can be achieved through improving management practices, product mix; and developing markets for non-timber services such as eco-tourism and carbon storage	FAO, CIFOR, country, province
Governance gap and participation	Extent of decentralization, disputes relating to tenure and encroachments, and participation of civil society in the management of forest resources	FAO, Forest Trends, country, province

during the last decade.<sup>21</sup> The number of protected areas has also grown over the period. However, growth in area protected in the PRSP countries is slower than the growth in area protected globally,<sup>22</sup> with large variation in the area protected from 0 (Lao PDR) to 14.7 percent (Rwanda). The quality of protection and the nature of extractive dependence on protected areas also vary significantly across countries. With the growth of eco-tourism, focus on protected area management has also increased rapidly. Considering the expected population growth and increase in demand for land use, the rate of growth in area under protection observed during 1990-2000 may not be realizable in future.<sup>23</sup> Another implication is the increase in marginal cost of area brought under protection.

Figure 2 presents the frequency distribution of countries with percent land area protected in 1990 and 1999. The growth in the proportion of area protected during the period is primarily due to reservation of additional geographical area under legal statutes. Since this indicator highlights the government's commitment to conservation of biological resources, it does not provide adequate information on the status of biodiversity in a given region. Therefore, suitable complimentary indicators will need to be considered to accurately reflect the status of biodiversity.

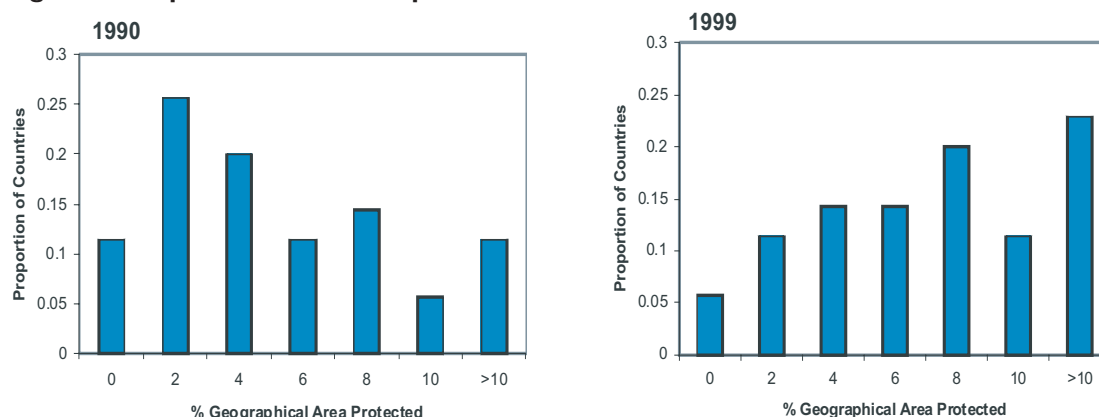
#### COMPLEMENTARY INDICATORS

Since some protected areas cover continuum of terrestrial and aquatic ecosystems, the proportion of protected area to geographic area

**Table 7. Percent land area protected in PRSP countries**

<i>Variable</i>	<i>1990</i>	<i>1999</i>
Mean	4.2	6.1
Median	3.6	5.5
Standard deviation	3.7	4.3
Number of countries	39	44

Source: UNEP-WCMC 2002, and WRI 1996.

**Figure 2. Proportion of land area protected in PRSP countries in 1990 and 1999**

Source: Authors' calculations based on UNEP-WCMC (2000) and WRI (1996).

may often get inflated for countries with large coastlines and for small islands states. Therefore classification of protected areas in terms of ecosystem diversity and species richness may improve the information on this indicator.

Since the definition of protected area and nature of protection afforded differ significantly across countries, areas designated as protected under

legal statutes may continue to lack active management. Indicators such as number of species threatened, area under active management, and number of species under *ex-situ* and *in-situ* conservation should improve the measurement of this indicator. Table 8 provides information on the complementary indicators that can provide additional insights into the MDG indicator relating to protected areas.

**Table 8. Complementary indicators for monitoring the area protected**

Indicator	Significance of the indicator	Data sources
Change in habitat & species	Information on habitat and species status	WCMC, country
Keystone or indicator species	Serves as early warning system on changes in the ecosystem.	WCMC, IUCN, country
Area and number of invasive species	Provides information on the disturbance and unsustainable use	WCMC, country studies
Area supporting alternative livelihoods	Significance of the ecosystem to local poor and potential for community management	Country studies
Staff and budget allocation per unit area protected	Informs the resource commitments and capacity development for protected area management	Country studies
Poaching and illegal trade in protected species	Informs the effectiveness of regulation & protection	Country studies

Source: World Bank 1998.

### 4.3 Traditional and Modern Fuels

The energy and poverty linkages are reflected in the types of energy used, their impact on indoor and outdoor air quality, and the resulting health outcomes. Considering the predominance of traditional fuels in the domestic energy of most low-income countries, it is useful to examine the PRSP countries in the context of solid or traditional fuels and their transition from traditional to modern fuels.

#### 4.3.1 Traditional fuels

Dependence on traditional fuels is an important indicator highlighting the significance of traditional energy to several MDGs such as income poverty - in terms of the time foregone in collecting biomass energy fuels (MDG1); non-income poverty - in terms of health outcomes such as acute and chronic respiratory infections (MDG 4&6); and degradation of natural resources—loss of forest cover and biodiversity (MDG7).

The focus of global and national energy statistics has been mostly on the industrial solid fuels such as coal. Biomass fuels comprising fuelwood, agricultural wastes, animal wastes, and other derived fuels are the major sources of traditional energy in developing countries, often accounting for more than 75 percent of the domestic energy consumption. Despite its importance to developing countries, the coverage on traditional biomass energy is often excluded from the national energy statistics, and the data on biomass energy are also either sparse or non-existent.

#### DATA

Most data on energy consumption at the national level are derived from energy balance studies, sector studies, and budget and

expenditure surveys, and therefore sub-national data are often missing. Since traditional fuels are not often traded, they are also not captured in the energy/GDP elasticities estimated from energy balance studies. The data also suffer from gaps and inconsistencies, and there are difficulties in extrapolating location-specific data from special surveys. Lack of a nodal agency, inadequate policy support, data scarcity, and lack of analytical studies on traditional energy issues are other impediments.

Traditional fuels have recently been included in the energy modeling and forecast framework of the International Energy Agency (IEA 1998, 2002) under combustible renewables and wastes.<sup>24</sup> The 19<sup>th</sup> Edition of the *Survey of Energy Resources* 2001 published by the World Energy Council also provides documentation of traditional energy sources of select countries (WEC 2001). FAO data on wood and other biomass energy sources is another major resource for country level data.

#### STATUS AND TRENDS OF TRADITIONAL ENERGY USE

Reduced availability of traditional fuels may not necessarily lead to growth in modern and conventional fuels, since the substitution between traditional biomass fuels such as fuelwood, crop residues, and dung is a more general phenomenon than substitution with conventional fuels.<sup>25</sup> From Table 9, it is clear that the proportion of biomass energy is expected to decline in regions other than Africa, while it is expected to grow in Africa because of population growth and sluggish economic outlook.

Biomass dependence is the highest in Sub-Saharan Africa, mostly consumed as domestic energy. The proportion of population dependent on biomass energy for cooking and

**Table 9. Regional trends in biomass energy dependence****(Mtoe)**

Source	1995			2020			Annual growth rate 1995-2020	
	Biomass	Total	%	Biomass	Total	%	Biomass	Total
East Asia	106	422	25	118	931	13	0.4	3.2
South Asia	235	423	56	276	799	35	0.6	2.6
Latin America	73	416	18	81	787	10	0.4	2.6
Africa	205	341	60	371	631	59	2.4	2.5
World	930	6643	14	1143	10558	11	1.0	1.9

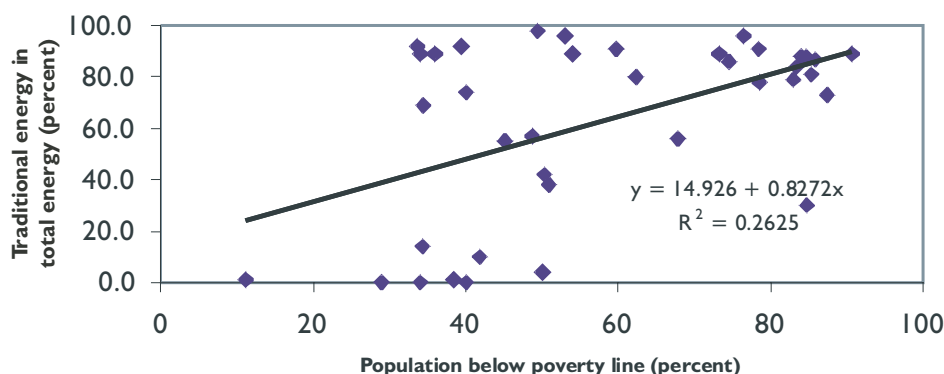
Source: D'Apote 2000.

heating is particularly high in Kenya, Tanzania, Mozambique, and Zambia, with nearly all households using fuelwood for cooking in rural areas and charcoal in over 90 percent of urban households. A positive trend in the relationship between poverty and traditional energy dependence is observed in most PRSP countries, however the extent of relationship varies significantly across countries (Figure 3). The dependence on biomass is very low in Eastern Europe, while it is significantly high in Africa; this explains the clear separation of countries into distinct groups. Countries with very high (more than 50 percent) poverty show high dependence on traditional energy, while countries with poverty levels less than 50 percent are distinctly clustered into two groups of low traditional energy dependence (Eastern Europe and Central Asia) and high traditional energy dependence (Sub-Saharan Africa). Since

the consumption of biomass fuels is dependent upon the biomass supplies from forests and agriculture, seasonal influences, food preferences, and access to modern energy sources, substantial national and local variations in biomass energy use are observed. For example, in East Africa, biomass use accounts for 55 percent in cooking, 20 percent in water heating, 15 percent in space heating, and 10 percent in other uses (WEC 2001).

#### PROGRESS ON TRADITIONAL ENERGY DEPENDENCE

IEA projections indicate that several PRSP countries will continue to be dependent on traditional energy even after the MDG horizon. Though the share of population relying on biomass for cooking and heating may decline in several PRSP countries, population growth may continue to drive the dependence on biomass fuels. Biomass consumption is expected to

**Figure 3. Poverty incidence and traditional energy dependence in PRSP countries**



**Table 10. Progress of traditional energy dependence in the PRSP countries of Asia**

Country	1990	2000	2005	2010
Cambodia	90	89	88	88
Lao PDR	90	89	88	87
Pakistan	21	19	18	17
Vietnam	48	48	50	51

Source: IEA 1998.

remain high in Africa. A similar scenario is projected for Asian countries that have high dependence on biomass energy (Table 10).

#### 4.3.2 Modern fuels

As countries move toward the MDG horizon, rural energy consumption may become diversified with a mix of traditional fuels and modern sources such as kerosene, LPG, and electricity. However the transition may get significantly delayed due to slow growth in income per capita. Considering the exclusive dependence of PRSP countries on traditional energy, there is an urgent need to explore the options relating to the efficiency of modern conventional fuels and renewables such as hydro, wind, solar, and geothermal energy. The WSSD declaration has also called for a significant increase in the proportion of renewable energy in the total energy use worldwide, specifically in African countries.

#### DATA

National energy statistics present data on conventional/modern energy with a breakdown into major fuel groups such as thermal, oil, gas, hydro, and on renewable sources. However, national statistics often do not report data pertaining to population with access to modern energy. Data from

secondary sources are available for few countries. The International Energy Agency, United Nations, and the World Energy Council publish data on conventional energy for select countries. Since our focus is on the pace of transition from traditional to modern and renewable sources in PRSP countries, we use *population with access to electricity* as proxy for examining the improvements in the access to modern energy sources.

#### STATUS AND TRENDS OF ELECTRICITY ACCESS

Though modern and renewable energy sources such as electricity directly contribute to human development by extending hours of work, preventing indoor air pollution, and supporting refrigeration and critical health care, the high cost in creating initial capacity, dispersed rural settlements, and limited affordability of households are major constraints to the growth of electricity access. Table 11 presents the expected regional progress in electrification of over the MDG horizon.

Rural electrification rate is still lower within each region, with significant rural and urban

**Table 11. Population with access to electricity across regions (percent)**

Region	1990	2000	2015
North Africa	61	90	98
Sub-Saharan Africa	16	23	33
South Asia	32	41	53
Latin America	70	87	94
East Asia	56	87	94
Middle East	64	91	97
All developing countries	46	64	72

Source: IEA 2002.



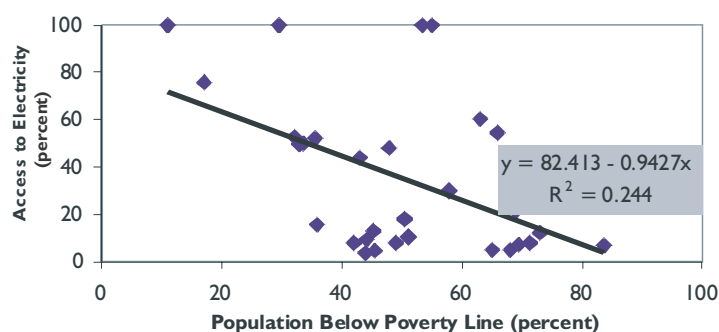
**Table 12. Rural access to electricity across regions in 2000 (percent)**

Region	1990	2000
North Africa	35.0	79.9
Sub-Saharan Africa	8.0	7.5
South Asia	25.0	30.1
Latin America	40.0	51.5
East Asia	45.0	81.0
Middle East	35.0	76.6

Source: IEA 2002.

differences as observed from the comparison of Table 11 with Table 12.

The cross-country analysis of electrification rates reflects a negative relationship between access to electricity and proportion of population below poverty, with countries of Eastern Europe and Central Asia (Albania, Armenia, Moldova, and Georgia) at one end with full access to electricity, while most countries of Sub Saharan Africa (Ethiopia, Lesotho, Malawi, Mozambique, and Uganda) at the other end with less than 10 percent of population with access to electricity (Figure 4). However, the relationship between poverty and access to electricity in the sample PRSP countries is less robust because electrification is influenced by several supply-side factors, lag effects of energy infrastructure, limited grid connectivity, poor distribution system, and unrecorded connections.

**Figure 4. Poverty incidence and access to electricity in PRSP countries**

## PROGRESS ON MODERN AND RENEWABLE ENERGY SOURCES

Most rural electrification interventions until now focus on grid. Decentralized renewable energy projects based on small-scale biomass, mini hydro, wind, and photovoltaic units are other options for remote areas. Small hydropower, although site-specific, can be a least-cost option, while photovoltaic systems can support lighting, refrigeration, water pumping, and telecommunication services of isolated loads in rural and remote areas. However, high capital expenditure, taxes, duties, and limited incentives for private sector participation limit the renewable energy penetration. Therefore, emphasis needs to be placed on market and policy incentives that promote wind, photovoltaic, and household biogas energy systems.<sup>26</sup>

## COMPLEMENTARY INDICATORS

Dependence on solid fuels is an important variable that reflects income and non-dimensions of poverty. Indicators relating to energy mix, relative proportions of household energy, extent of renewable energy use, and energy efficiency provide insights into the progress on this indicator. Complementary indicators from country studies and household surveys, such as living standard measurement survey (LSMS), demographic and health survey (DHS), multiple indicator cluster survey (MICS), and relevant national energy surveys, can help to improve the assessment of solid fuels dependence (Table 13).

## 4.4 Access to Safe Water

Access to water is a direct indicator of environment and health outcomes and

**Table 13. Complementary indicators for monitoring solid fuel dependence**

<i>Indicator</i>	<i>Significance of the indicator</i>	<i>Data source</i>
Diversity of household energy use	Provides information on energy alternatives	Country case studies, household surveys
Proportion of fuels collected and purchased	Indicates the relationship between income and environmental health	Country case studies, household surveys
Proportion of top income quintile using modern fuels	Informs about availability of modern fuels in the market	Country studies, household surveys
Per capita electricity consumption (Kwh)	Provides information on the shifts to modern energy sources	Country studies, household surveys
Number of households using purchased fuels	Informs about availability, alternatives, willingness to pay, and market price	Country studies, household surveys
No. of households with modern/improved cook stoves	Provides information on energy efficiency	Country studies, household surveys

an indirect indicator of income poverty. Access to safe water refers to the proportion of population dependent on piped water; public tap; borehole; protected well; protected spring; and rainwater, with the availability of at least 20 liters/capita/day.<sup>27</sup> Though access to water has gained attention during the last two decades in part due to increased urbanization, development of rural and urban infrastructure, and the programs of international water and sanitation, there is a significant gap between the current access and the MDG target. Since the issues of water quality, reliability, and service delivery are not adequately captured in the definition of access, these important elements cannot be assessed with the access definition alone and needs to be supplemented with suitable indices to capture essential aspects of the access, quality, reliability, and service delivery.

#### **Data**

*Global Water Supply and Sanitation Assessment 2000 Report* published by the Joint Monitoring Programme for Water Supply and Sanitation, a

collaboration of the World Health Organization (WHO) and UNICEF, provides the recent country level data on access to water. The report presents access rates for rural and urban water regimes in 1990 and 2000 for developing and developed countries.<sup>28</sup> Though improvements are needed to the WHO and UNICEF estimates on access to safe water and sanitation, in the absence of alternative data and assessments, they serve as starting points to examine the progress at the global level. Therefore, data from the Global Water Supply and Sanitation Assessment 2000 Report are used to examine the water supply and sanitation targets of PRSP countries.

#### **STATUS AND TRENDS OF WATER SUPPLY ACCESS**

The MDG target relating to safe water supply is to halve the proportion of population without sustainable access to safe drinking water from the 1990 baseline. Several African countries such as Burkina Faso, Chad, Democratic Republic of Congo, Eritrea, Ethiopia, Madagascar, Mauritania, Rwanda, and Sierra Leone have access rates lower than 50 percent. Table 14

**Table 14. Targets and outcomes on the access to safe water (percent)**

Region	Rural			Urban			National		
	1990	2000	2015	1990	2000	2015	1990	2000	2015
Africa	44	47	74	84	85	93	57	62	82
Asia	67	74	87	94	93	96	76	81	91
Latin America	56	62	81	92	93	96	82	85	93
Europe	100	87	94	100	100	100	100	96	100
Global	66	71	85	95	94	97	79	82	91

Source: WHO 2000.

presents the WHO estimates on regional baselines corresponding to 1990 and targets for 2015.

#### RURAL AND URBAN COVERAGE

There is significant regional variation in the access to water supply. Baselines and targets presented at the national level often mask regional variations. However, the gaps between rural and urban access rates are low in Sub-Saharan Africa (World Bank 2002e). Urban populations have relatively better access to improved water sources in most PRSP countries. The rural and urban water access outcomes in Rwanda illustrate the dichotomy of source-wise access. In Rwanda, private tap water supply is non-existent in rural areas, while it contributes to about 30 percent of urban water supply. Open and unprotected sources account for about one-third of rural water access, in comparison to less than 10 percent urban access (Table 15).

#### PROGRESS ON ACCESS TO SAFE WATER

During the last decade, significant improvements in access to safe water are

reported in Asia. Though the MDG target for water supply is likely to be achieved in several countries, for several countries in Sub-Saharan Africa, universal access still remains a distant goal, and Sub-Saharan Africa continues to hold 28 percent of the world population without access to water supply.

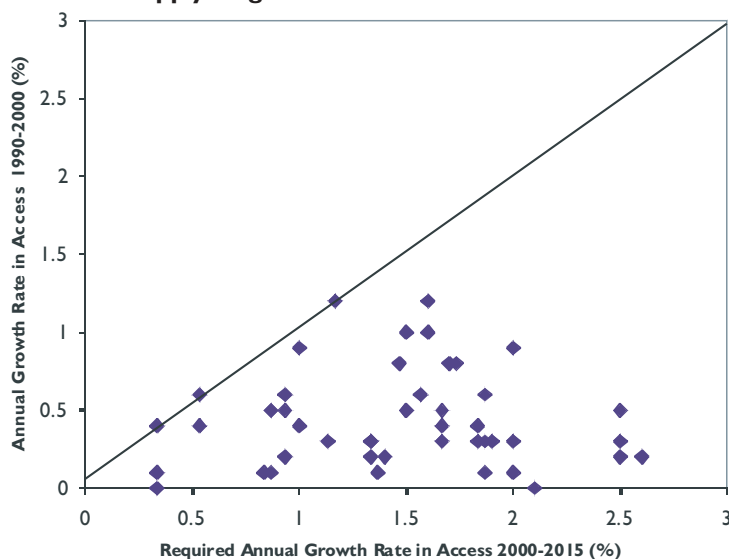
To assess the progress on water supply over its 1990 baseline, country specific targets for 2015 in terms of halving the proportion of population without access to safe water at 1990 level were constructed. Access rates between 1990 and 2000 were estimated and converted into annual growth rates of access to compare the progress with respect to targets. Similarly, the gap between the access rates of a country in 2000 and the country target for 2015 was estimated and converted into required annual growth in access for each country. **Figure 5** on the achieved annual access growth rates of PRSP countries during 1990-2000 and the required annual rates during 2000-2015 indicates slow progress, with current access regimes of very few countries in line with the required rates.

**Table 15. Rural and urban differences in the source-wise access to water in Rwanda**

Region	Tap in home	Public standpipe	Protected wells and springs	Unprotected wells and springs	Marsh, river, & lake	Other	Percent safe access
Rural	0.3	41.9	24.8	9.4	23.2	0.3	67.0
Urban	29.6	52.5	9.5	2.2	4.8	1.5	91.5
Total	2.0	42.5	23.9	9.0	22.1	0.3	68.5

Source: Rwanda PRSP.

**Figure 5. Achieved and required access rates in reaching the water supply target**



Source: Authors' calculations based on WHO (2000).

Considerable investment, policy support, and private sector interventions are required to enable countries to be on track and to proceed towards the targets.

With expected population growth and urbanization, closing the gap between the current access and the required access remains a challenge. However, opportunities to promote private sector investment, cost recovery, institutional capacity, and improvement in the operation and maintenance need to be explored. A major issue that needs attention is the close relationship between water supply and sanitation. Divergence between the water supply and sanitation access regimes can also affect the efficiency of their individual coverage.

#### COMPLEMENTARY INDICATORS

Water quality is an important aspect that is not generally reflected in the access to safe water target. A more complete picture would require a combination of indicators relating to source, per

capita availability, usage, reliability, cost recovery, and service delivery. In addition, information on bacterial and chemical contamination and the periodicity of disinfecting mechanisms that are under implementation needs to be considered (Table 16).

Access to water is generally assessed from the censuses conducted at national and sub-national levels using either data on population or service delivery. Evidence suggests that the census-based data are less reliable since they only provide information on aggregate coverage and not on the type of access, quality, reliability, and service delivery. Disaggregated data from the household surveys such as

LSMS, DHS, and relevant national level surveys are expected to provide additional insights into the access to safe water and its relationship to poverty and health outcomes.

#### 4.5 Access to Adequate Sanitation

Access to adequate sanitation refers to the proportion of population disposing human waste through facilities such as flush latrines, sewer, septic tank, and simple pit or improved pit latrines properly constructed, maintained and used (WHO 2000a).<sup>29</sup> Epidemiological evidence suggests that improved sanitation confers significant benefits. The benefits of improved water supply are also strongly observable, particularly when sanitation is improved (Esrey 1996). However, empirical observation and access data draws attention to low priority and often extreme neglect of sanitation in low income countries. In contrast to water supply, sanitation shows significant rural-urban divergence, with rural sanitation lagging far behind the urban sanitation. Lack of

**Table 16. Complementary indicators for monitoring the access to safe water**

<i>Indicator</i>	<i>Significance of the indicator</i>	<i>Data source</i>
Per capita consumption in liters/day	Indicates the relative abundance of safe water resources	Country, province, household surveys
Flow rating (actual discharge/design discharge)	Provides information on capacity and service	Country, province, municipal bodies
Time spent in water collection	Provides information on the distance to safe water source	Country, province, household surveys
Periodicity of water supply	Informs about the efficiency, abundance and service delivery	Country, province, household surveys
Diversity of water sources and corresponding uses	Indicates the source-wise dependence for drinking and non-drinking purposes.	Country, province, household surveys
Chemical (arsenic and fluoride) & biological contaminants ( <i>E.coli</i> )	Provide information on water quality	WHO, country case studies
Percent of under-5 children with diarrhea	Indicates quality of water sources	Country, province, household survey
Marginal cost of improvements to source, access, and quality	Informs about the additional costs to achieve and maintain access and quality	Country, province, household surveys
Periodicity and O&M costs of infrastructure and rehabilitation	Indicates the attention and investment on service delivery	Country, province, municipal bodies
Reliability, cost recovery, user satisfaction	Provides information on service delivery	Country, province, municipal bodies

Source: WHO 2000b, Billig and others 1999.

infrastructure, inadequate capacity of local governments, and low priority to hygiene contribute to low sanitation coverage in most PRSP countries. Additionally, inadequate water supply and improper design, maintenance, and operation of sanitation systems are the major causes of surface and ground water pollution.

## DATA

Data on sanitation are relatively scanty in comparison to data on water supply. Similar to the data on water supply access, data pertaining to sanitation are reported using census or provider sources. Even when the data are available, there exist significant gaps because of

the differences in the definitions of access across countries and also within a country. The World Health Organization continues to be the major source of data pertaining to sanitation. The *Global Water Supply and Sanitation Assessment 2000 Report published by the Joint Monitoring Programme for Water Supply and Sanitation*, a collaboration between WHO and UNICEF, presents the recent country-wise data on sanitation with 1990 baselines and 2015 targets.

## STATUS AND TRENDS OF SANITATION ACCESS

A striking observation is the lower baselines and targets for sanitation in comparison to those of water supply. The data also show a

**Table 17. Targets and outcomes on the access to sanitation (percent)**

Region	Rural			Urban			National		
	1990	2000	2015	1990	2000	2015	1990	2000	2015
Africa	49	45	73	85	84	92	61	60	82
Asia	23	31	65	67	78	89	37	48	76
Latin America	39	49	74	85	87	93	72	78	90
Europe	100	74	100	89	98	99	100	92	97
Global	35	38	69	82	86	92	55	60	81

Source: WHO 2000a.

strong urban bias in the sanitation coverage, infrastructure, and service delivery (Table 17).

### PROGRESS ON ACCESS TO SANITATION

Progress on sanitation is examined using the same approach as that followed in assessing the progress on water supply. In comparison to data on water supply, baseline data on sanitation in 1990 are sparse and are not available for several countries. Therefore, only countries that have base line data are considered. In comparison to water supply access rates, the average access rates of sanitation during 1990-2000 indicate significant divergence (Figure 6). Countries in Asia have

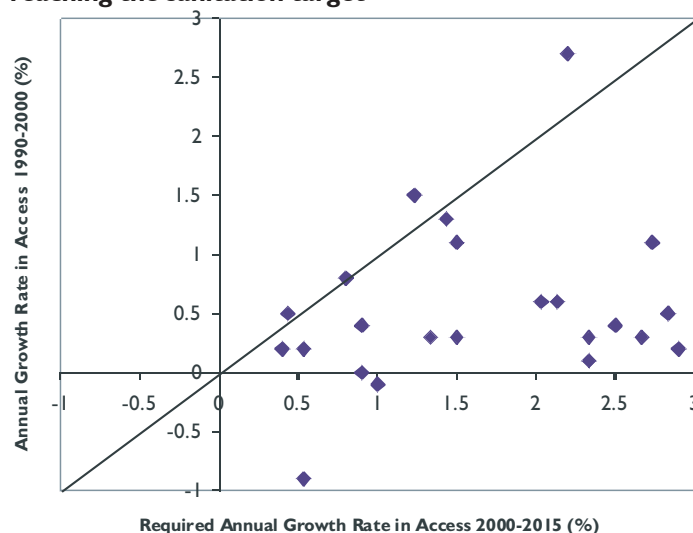
shown the least progress, while countries in Sub-Saharan Africa have stagnated. With the current access regimes, a significant portion of PRSP countries may not be able to meet their sanitation targets by 2015.

Unless the pace of sanitation coverage improves, the population without coverage is expected to increase sharply. WHO (2000a) estimates that to achieve the required access rate, annual average investment of the 1990s needs to be doubled.

Excessive dependence on provider-based data, use of multiple data sources, and inadequate definition of access regime and service delivery are the factors that inhibit accurate measurement of the progress. Most countries in Africa, Asia and Latin America also do not have a national body to oversee either rural or urban sanitation (WHO 2000a). Fragmented institutions, lack of regional planning, limited capacity, inadequate resources, and inefficient operation and maintenance are the major factors contributing to the slow progress.

### COMPLEMENTARY INDICATORS

The definitions of access, type, and quality of sanitation facilities vary among rural and urban areas within a country. Therefore, there is a need for adopting

**Figure 6. Achieved and required access rates in reaching the sanitation target**

Source: Authors' calculations based on WHO (2000).



objective criteria on sanitation access and service delivery. Additional data on the quality and reliability of sanitation services from provider and household surveys can help to improve the monitoring. In addition, information on infrastructure, investment, service delivery, operation and maintenance expenditure, and regulatory framework can strengthen the monitoring process.

#### 4.6 Slum Improvement

Slums are unplanned, informal, and often squatter settlements with minimal or non-existent basic services. The lack of secure tenure is reflected in quality of basic services, social infrastructure, and size and quality of housing, which manifest in squatter (illegal occupancy) and slum (uncertain tenure) settlements. The MDG target for improving the lives of 100 million people in slums is modest considering the estimated slum population of 837 million and its expected growth in the coming decades (United Nations 2002a).

#### DATA

The first major effort to undertake a comprehensive assessment of slums was under the Urban Indicators Program (UIP) of the United Nations Human Settlement Program,

through surveys conducted in 1993 and 1998 in 237 cities around the world. The 1993 survey used 46 indicators, and the 1998 survey used 23 indicators to document the status of slums. Inadequate information, response bias, differences in the definition of indicators, and dissimilar sample frames yielded results that were not comparable. Wide variation in the definition of tenure also resulted in the systematic underestimation of slum population in both surveys.<sup>30</sup>

The recent methodology of United Nations Human Settlement Program assesses slum population using secure tenure index based on five indicators: (i) percent households with access to improved water source within 200 meters; (ii) percent households with access to adequate sanitation; (iii) percent households with access to electricity; (iv) percent households living in permanent structures; and (v) percent houses complying with local regulations.

Secure tenure index assumes that improvement to permanent housing and investment in basic services is possible only in situations of non-alienable legal tenure to land or dwelling. Herr and Karl (2002) present methodology to

**Table 18. Complementary indicators for monitoring the access to sanitation**

<i>Indicator</i>	<i>Significance of the indicator</i>	<i>Data source</i>
Hygiene behavior	Indicates the awareness and attention to sanitation	Country, province, case studies, household surveys
Periodicity and O&M costs of infrastructure maintenance	Provides information on service delivery	Country, province, municipal bodies
Periodicity on the collection and disposal of solid waste	Informs the efficiency of sanitation services	Country, province, municipal bodies, household surveys
Reliability, cost recovery, and user satisfaction	Provides information on service delivery	Country, province, municipal bodies, household surveys

Source: WHO 2000b, Billig and others 1999.

**Table 19. Regional trends of slum population**

Region	Tenure index		Estimate of slum population	
	Secure	Insecure	1993	2001
Africa	44	56	126	148
Asia & Oceania	63	37	423	498
Europe	96	4	21	24
Latin America & Caribbean	74	26	87	103
Global	71	29	712	837

Source: UN-HABITAT estimates based on Global Urban Indicators 1993 and 1998. (See Herr and Karl (2002) on methods of estimation.)

estimate secure tenure index using the UIP 1993 and UIP 1998 survey data, and Herr (2002) proposes methods to combine data from UIP surveys and household surveys to estimate the proportion of slum population.

Status and trends in slum improvement  
Most initiatives for slum improvement are at the municipal and city levels and are often fragmented because of the legal and data constraints in defining the tenure status. More than half of the urban population in Africa and one-third of the urban population in Asia are estimated to be living in slum environment (Table 19). Slum growth in developing countries is expected to follow the annual population growth of 2.4 percent (UN 2002a), making it one of the most challenging targets to demonstrate progress. Therefore, the MDG target of improvement in the lives of 100 million slum dwellers, originally proposed under the *Cities Without Slums Initiative*, should serve as a

starting point to address a fast moving target that will require significant commitment of resources far beyond the 2020 horizon.

#### COMPLEMENTARY INDICATORS

United Nations Human Settlement Program is in the process of developing and refining methodologies to combine the census and demographic health survey data. Herr and Karl (2002) and Herr (2002) methodologies could be extended to estimate the proportion of urban population with and without secure tenure in the PRSP countries.

Since basic services such as access to safe water, sanitation, and electricity form important variables in estimating the tenure index, household surveys, such as LSMS, DHS, and MICS, and relevant municipal surveys could be utilized to assess the access to basic services and to the tenure status at municipal, city, and province levels. Table 20 provides the examples

**Table 20. Complementary indicators for monitoring the secure tenure indicator**

Indicator	Significance of the indicator	Data source
Size of dwelling in sq ft. and material used in construction	Provides insights into the tenure	Census, municipal records
Nature of roofing	Informs about the temporary and permanent nature of the structure	Census, municipal records
Owned, rented, squatted occupancy	Informs about the property rights	Household surveys
Number of persons per room	Indicates crowding	Census, household surveys

Source: UN-HABITAT 2001.



of complementary indicators that could improve the measurement and monitoring of this indicator.

Additionally, non-environmental indicators such as population growth, urban planning, rate

of urbanization, rural-urban migration, conflicts, regional development, land prices, cost of construction, and availability of housing finance also provide insights into the occurrence, growth, and proliferation of slums.



# 5 Monitoring and Evaluation of the Progress on MDG7

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We have shown that existing data and information can be a starting point of analysis to assess the progress on MDG7. While existing data can certainly be better utilized, there are gaps that need to be addressed, and the statistical capacity of countries needs to be strengthened to utilize the data efficiently.

Monitoring of annual and intermediate targets can also serve as early warning to identify the factors affecting the progress. The UN Secretary General is authorized to present an annual report to the General Assembly on the progress made towards achieving the MDGs (UN 2002b). Countries are expected to report their progress to enable the Secretary-General's global round up on Millennium Development Goals progress in 2005. Considering the long-term commitment of countries to MDGs, adequate capacity needs to be built to measure, monitor, and report on the progress made by countries. The UN agencies, the World Bank, the IMF, OECD, regional development banks, and bilateral agencies are expected to play a major role in monitoring the progress.

## Country-level MDG Monitoring and Evaluation

With growing emphasis on the achievement of MDGs, focus on results based strategies has also increased.<sup>31</sup> Assessing the PRSP targets and their implementation is crucial to evaluate the progress on PRSP implementation and to support the monitoring and evaluation of the

MDG targets.<sup>32</sup> The ongoing Bank-supported program on *Evaluation Capacity Development* in 40 countries, which currently includes several PRSP countries such as Madagascar, Niger, Tanzania, Uganda, and Kyrgyz Republic, needs to be scaled up and extended to other countries.<sup>33</sup>

Several countries have taken the lead in reporting the status and progress on the MDGs. Of the 50 countries that have prepared PRSPs, 12 countries (Albania, Armenia, Bolivia, Cambodia, Cameroon, Chad, Guinea, Kyrgyz Republic, Mozambique, Senegal, Tanzania, and Vietnam) have taken the lead and submitted their country progress reports to the UNDP, the nodal organization monitoring the progress on MDGs. Countries that prepared full PRSPs have also been in the forefront, with 12 out of 28 full PRSP countries preparing progress reports on MDGs. However, the treatment of the MDGs in the full PRSPs is uneven.

Analysis of MDG progress reports indicates uneven and often poor coverage of MDG7 indicators (Table 21). Albania, Armenia, Bolivia, Kyrgyz Republic, Mozambique, and Vietnam provide an overview of indicators relating to forests, protected area, safe water, and the supporting policies proposed to address the relevant issues. While Cambodia, Cameroon, Chad, and Tanzania provide generic commitment to reverse the loss of environmental resources in the context of their

**Table 21. Country progress reports on MDG7**

<i>Country</i>	<i>Coverage of MDG7 indicators</i>	<i>Supporting policies</i>	<i>Data &amp; monitoring capability</i>	<i>PRSP status interim (I) / full (F)</i>
Albania	Area under forests, protected area, safe water	NEAP, sector strategies - water; waste, biodiversity, Env. health	Weak to fair	F
Armenia	Area under forests, safe water, other (air pollution)	NEAP, biodiversity, forestry, Ozone substances, water, Lake Sevan and Lake Gilly action plans		I
Bolivia	Protected area, safe water	Forests, mining code, hydrocarbon law, environmental law	Weak	F
Combodia	Reverse the loss of env. resources	NEAP (1999)	Weak	F
Cameroon	Reverse the loss of env. resources	Forests, desertification, pollution	Weak	I
Chad	Reverse the loss of env. resources	NEAP		I
Guinea	Safe water	NFAP, NEAP	Weak	F
Kyrgyz Republic	Area under forests, protected area, CO <sub>2</sub> emissions, energy use, access to water	Legislation, compliance, taxation, forest management, network of PAs, water, pollution standards, institutions and capacity	Fair	F
Mozambique	Forests, protected area	Environment framework, forests and wild life, water resources, and land law	Weak to fair	F
Senegal	Safe water	NEAP	Fair	F
Tanzania	Implement the national strategy for SD to reverse the loss of env. resources; safe water	NEAP, national env. policy, NSSD	Weak to fair	F
Vietnam	Forests, water, sanitation, secure tenure, other (air & water pollution)			F

Source: Country progress reports on Millennium Development Goals, UNDP.

national environmental action plans. With improved data and statistical capacity, it is hoped that future country progress reports will present a more holistic perspective of the progress on MDG7.

In addition to the assessment of country level progress, monitoring of the sub-national, provincial, and city level progress on the MDG indicators can help to improve the regional planning priorities of countries. Vietnam has

already initiated the sub-national system to monitor the progress on MDGs (Box 2).

### Box 2

#### Province level MDG Index: Vietnam

Building on the methodology of human development index, Vietnam has constructed a preliminary MDG index to assess the progress on MDGs at the province level. The MDG index indicates the relative progress of provinces on 17 MDG targets. The MDG index ranges from 0.794 (highest) to 0.171 (lowest). High proportion of ethnic minorities, rural population, geographic, social, linguistic, and cultural isolation are the factors that predominantly influence the lowest performing provinces on the MDG index.

*Source:* Bringing the MDGs Closer to People (United Nations 2002).

### Statistical Capacity Building

Gaps in the data and inadequate knowledge management are major factors affecting the assessment of progress on MDGs and are also reflected in the limited focus on the PRSP targets. In several countries, monitoring is done independently at the level of line ministries and departments, resulting in inconsistencies and poor data utilization. Therefore, statistical capacity envisaged as part of the PRSP capacity development should help to enhance the timeliness, data quality, monitoring, and reporting systems.

There is a strong need to enhance the network and efficiency of national statistical departments to support regular monitoring and reporting of the MDG outcomes. Monitoring systems should expand to improve the quality and coverage of data. The Nicaragua and Rwanda PRSPs emphasize the role of monitoring and evaluation systems to assess the annual progress on intermediate indicators. Rwanda PRSP presents a preliminary list of performance indicators categorized into outcome, access, process, and proxy indicators, and proposes surveys to generate additional information to assess the progress. Zambia PRSP proposes to utilize geographic information systems to monitor the progress. Ghana PRSP has set objectives for five thematic areas with detailed targets and proposes input, process, output, outcome, and impact indicators to monitor the progress.

Collaboration and shared responsibility among countries and multilateral agencies are crucial for making progress on MDG7 as several targets such as biodiversity, energy use, and CO<sub>2</sub> emissions have transboundary significance. Adequate emphasis also needs to be placed on developing integrated monitoring systems for linking the PRSP outcomes with the MDGs. The monitoring systems should be designed to correct for sector bias to promote uniform coverage of indicators.



## 6 Conclusions

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PRSP countries have committed to achieve the MDGs. This paper has assessed PRSPs in the context of MDG7—*ensuring environmental sustainability*—its targets and indicators. It is noted that environment cuts across sectors and is relevant to several other MDGs as well.

Our analysis of 50 interim and full PRSPs indicate that even for indicators with apparent poverty links such as traditional fuels, safe water, sanitation, and slums, attention is often not given to how the poverty strategies relate to the commitment as embodied in the MDG7. This is clearly a disappointing result. We attribute the limited attention to MDG7 in the PRSPs to:

- The high proportion of PRSPs still in interim stage
- Recent adoption of the MDGs (September 2000)
- The more or less weak poverty-relevance of the indicators in some countries
- Lack of good quality data and capacity to monitor them
- Emphasis on a medium-term perspective in PRSPs
- Limited influence of the environmental constituency on the PRS process.

In the few cases where targets coinciding the MDG horizon are reported in the PRSPs, they usually pertain to water and sanitation and often in terms of country-specific definitions of

access, thereby precluding cross-country comparisons based on common definitions. Since the information on rural and urban separation of access, quality, and reliability of water supply and sanitation is not often provided, assessments may also be influenced by measurement bias. The targets are also often ambitious in comparison to past achievements and proposed resource commitments. Therefore, the realism of targets needs to be evaluated through annual implementation reports.

*However, there is also good news: the focus on MDG7 has improved significantly from the interim to the full PRSP stages. This is an encouraging trend and needs to be supported in countries that are in the process of revising their PRSPs from interim to full stages. In countries that already have full PRSPs, refinement of indicators and their monitoring through the annual implementation progress reports provide opportunities to enhance the alignment with MDG7.*

It is also encouraging that available data can be effectively utilized to analyze the status and trends of environmental targets with particular attention to those with strong links to poverty. While this will vary across countries, we believe that access to safe water, improved sanitation, modern fuels, and slum improvement has significance in this respect. The existing data sources can be effectively utilized, and relevant complimentary databases can be developed and

monitored without significant cost and capacity constraints.

The principle of country-ownership of the PRSP process is paramount. However, in the dialog with stakeholders, country teams preparing and revising PRSPs should be encouraged to make full use of available data for baseline definition and target setting. In the short run, more focus

in JSAs needs to be placed on the achievement of MDGs, and improvements in the use of existing data and monitoring systems could improve the integration of MDG7 into PRSPs. In the long run, further work is needed to improve data quality, statistical capacity, and methods to track the progress on the alignment of PRSP and MDG7 targets.



# Appendix A —

## Environmental Targets Adopted at the World Summit on Sustainable Development 2002

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The country specific environmental targets and the newly adopted environmental targets at the World Summit on Sustainable Development are often referred to as part of “MDG Plus.” Of the WSSD targets, access to sanitation has been covered in the previous section as the complement of the MDG7 target relating to safe water. The new targets relating to fisheries, marine protected areas, renewable energy, and harmful chemical substances emphasize environmental aspects that are not formally covered under the MDG7 (Table A1). Indicators for these targets have also not been adopted.

Since the WSSD targets are of recent origin and were adopted after the initiation of PRSP preparation, we do not expect reference to them in the PRSPs, although a discussion on the issues relevant to specific country context can be expected. Since the issues relating to biodiversity are discussed as part of the MDG7 indicator relating to protected areas, and issues pertaining to renewable energy are examined in

the MDG7 indicator relating to sold fuels, they are not revisited here.

### Restoring Fisheries

A major WSSD target that has significance to PRSP countries relates to fisheries. Since fisheries contribute to more than 10% of food consumption and employment in several countries of Asia and Africa (FAO 2000), one would expect attention to fisheries in the PRSPs.

### Data

FAO is the nodal organization overseeing the data on fish production, trade, and stock assessments. The *FAO Code of Conduct on Responsible Fisheries* adopted in 1993 provides guidelines for sustainable management of fisheries. Global production of fish and aquaculture during 1999 was 126 MT, valued at US\$ 125 billion, and provided livelihood to 200 million people (FAO 2000). More than two-thirds of production is from marine and inland waters, and one-third from aquaculture.

**Table A1. Environmental targets adopted at the WSSD, 2002**

<i>Targets</i>	<i>Indicators</i>
Maintain or restore depleted fish stocks to levels that can produce the maximum sustainable yield by 2015	To be determined
Reverse the loss of biodiversity by 2010	- ” -
Establish a representative network of marine protected areas by 2012	- ” -
Increase the share of renewable energy in the total energy supply, and provide 35% of African households with modern energy within 20 years	- ” -
Phase out by 2020, production and use of chemicals that harm health and environment	- ” -

Source: United Nations 2002d.

National fishery agencies report annual catch and composition data under three major categories: marine fishery, inland fishery, and aquaculture. Inland fishery statistics are vastly under reported with actual catch at least twice as high as reported figures.

#### *Status and trends of fisheries*

Fish consumption shows marked regional and national differences. Though Africa accounts for only 4% of the world fish consumption, fish accounts for 50 percent of total protein intake in Ghana, Guinea, Senegal, and Benin (FAO 1996). In several African countries such as Mauritania, Senegal, Madagascar, Mali, Ghana, Seychelles, and Mozambique, fishery makes significant contribution to GDP and export revenue. Periodic assessment of stock, fishing effort, discards, and composition provide useful insights into the state of fish resources of a country. The fish production trends show high potential for aquaculture (Table A2).

Widely accepted reference points in assessing the fishery productivity are the maximum sustained yield (MSY) and spawning biomass per recruit (SSB/R). Other criteria such as fishing effort, profitability, employment, and per capita consumption also provide information on the status and trends of fish production. Maximum sustainable yield (MSY)<sup>34</sup> is a reference point adopted under the 1982 United Nations Law on Seas (UNLOS) for

building the fish stocks. However, there exist several empirical difficulties in assessing the MSY and the fishing effort required to reach it. In most marine and inland ecosystems, catch often exceeds the stock growth. Measures such as *abundance* and *fishing pressure* are quick reference points to assess the state of fish resources across regions and over time period.<sup>35</sup> Since MSY is estimated with reference to target species, sole reliance on MSY may not ensure sustainable harvest, since it does not fully reflect the dynamics of non-target species. Therefore, a range of criteria such as spawning and virgin biomass has been suggested.<sup>36</sup> For example, a 30% deficit in virgin biomass impairs the reproductive capacity of stock (FAO 1999b).

#### *Marine fishery*

Global marine fishery production is estimated at 82 MT, a value close to the landings of 1990-94 of about 83 MT. Accounting for 27 MT of unwanted catch comprising juveniles and species of low value leads to an estimated catch of 110 MT, higher than the estimated production potential of 80 MT to 100 MT. As observed from **Table A3**, most marine ecosystems are over fished. The East Central Atlantic, West Central Atlantic, Western Indian Ocean, and West Central Pacific marine regions that adjoin the PRSP countries are overexploited. The marine protected areas are expected to have positive influence in conserving the fish stocks of these regions.

**Table A2. State of global fisheries production (million tons)**

Source	1990	2000	2010
Marine	82.0	86.0	
Inland water	7.0	8.8	
Aquaculture	16.0	40.0	47.0 <sup>a</sup>
Total	105.0	122.8	

Note: a. Estimate for 2010.

Source: FAO 2000.

**Table A3. Status of marine fisheries during 1990s (million tons)**

Region	PRSP countries of the region	Estimated potential (A)	Year potential reached	Degree of reliability	Landings 1990-94 (B)	Difference (A-B)	Status
E.C. Atlantic	Chad, Ghana, Guinea, Gambia, Senegal, Mauritania, Guinea Bissau, Cameroon, Cote d'Ivoire	4	1984	**	3	1	O
N.E. Atlantic		12	1983	*	10	2	O
N.W. Atlantic		4	1971	**	3	1	O
S.E. Atlantic		3	1978	**	1	2	O
W.C. Atlantic	Guyana, Honduras, Nicaragua	2	1987	*	2	0	O
E. Indian		10	2037	Unreliable	3	7	I
W. Indian	Djibouti, Kenya, Ethiopia, Tanzania, Madagascar, Mozambique, Pakistan	13	2051	Unreliable	4	9	I
E.C. Pacific		3	1988	**	1	1	O
N.E. Pacific		4	1990	*	3	1	O
N.W. Pacific		26	1998	**	24	2	I
S.E. Pacific		29	2001	*	15	14	I
S.W. Pacific		1	1991	**	1	0	O
W.C. Pacific	Vietnam, Cambodia	11	2003	**	8	3	I
Antarctica		0.2	1980	**	0.3	-0.1	O
<b>All Oceans</b>		<b>100</b>			<b>83</b>	<b>17</b>	

Notes: \*Less reliable regression, unreliable regression, \*\*reasonably reliable regression; **Status:** O = Overfished, F = Fully fished (rate of stock increase is zero), and I = Increasing,

Source: FAO 1997.

### *Inland fishery*

Inland waters occupy less than 1 percent of the global surface area but contribute to 8 percent of the global fish production, with actual capture estimated to be twice that of 8.8 MT produced at the cost of aquatic ecosystem degradation. Asia, with 20 percent of the continental area, contributes to 64 percent of the inland capture. Since 1990s, Asia and Africa, with an annual growth rate of 7 percent and 2 percent, respectively, contributed to the rapid growth of inland fisheries (FAO 1999a). Tanzania and Uganda are the major African countries in inland fishery production.

### *Aquaculture*

Aquaculture production is expected to play a major role in the future fish production and reach 47 MT by 2010 (FAO 2000).<sup>37</sup> Because of the high initial investment, aquaculture may continue to be a costly option for several African countries. It also has strong adverse impacts on land use, inland waters, and input intensity of the production system. Accurate assessment of the environmental impacts, relevant ameliorative measures, and regulation should receive attention in countries such as Vietnam that have large aquaculture production.

*Integrating the WSSD targets into PRSPs*

The WSSD targets relating to fisheries, renewable energy, and harmful chemical substances may be incorporated into environmental sector priorities of poverty

strategies. Where feasible they should be linked to MDG7 monitoring so that holistic treatment of environment issues receives attention in the PRSP implementation.

# Appendix B —

## Coverage of MDG7 Environmental Baselines and Targets in the Full PRSPs

Country	Area under forest cover (a) /Annual deforestation (b) (%)		Protected area (%)		Proportion of population using solid fuels/switch to modern fuels (access to electricity) (%)		Complementary environment policy/regulation indicators presented in the PRSP	
	Base line	Target	Base line	Target	Base line	Target	Complementary PRSP programs / indicators	Complementary PRSP programs / indicators
Albania	36.0		6.0				Reduction in the electric power supply disruptions and losses; collection of bills; demand management and alternatives sources for cooking and heating	National plan for environment; law on carbon tax; norms for land, water & air quality; legal and regulatory framework to promote land market; monitoring of fish resources; watershed management
Azerbaijan								Implementing national program of soil conservation; regulation and management of pastures; environmental education in secondary schools
Benin					Electricity R-10.7 U-21.9		R-20.0; U-55.8 by 2005; Rural electrification and energy control agency; solar and hydropower development	Rural land code to improve women access to land; drafting fishing code; environmental information system and capacity; village development plans for poor areas
Bolivia	48.0				Electricity R-23.0		Rural electrification to reach 40.0% by 2006	Implementation of laws on agrarian reform, environment, and water; biodiversity strategy development; flood control plan
Burkina Faso					Electricity R-1.0 U-34.0			Implementation of environment code, forestry code, water code, and mining code

# Poverty Reduction Strategies and the Millennium Development Goal on Environmental Sustainability

Country	Area under forest cover (a) /Annual deforestation (b) (%)		Protected area (%)		Proportion of population using solid fuels/switch to modern fuels (access to electricity) (%)		Complementary environment policy/regulation indicators presented in the PRSP
	Base line	Target	Base line	Target	Base line	Target	
Ethiopia					Biomass R-76.0 U-41.0 Kerosene U-22.0 Electricity 13.0		
Ghana	11.0						Households using LPG; woodlots and tree planting; Implementation of national environmental action plan; consolidation of laws relating to land, forest, wildlife, and mining; land tenure reform; environmental resource degradation from mining and manufacturing reduced by 20%
Guinea					Electricity 16.4	65.0	Increase bill collection rate to more than 85%; share of rural population with access to renewable energy; ensuring reliable power supply; access to renewable energy
Honduras	50.7	56.0			Biomass 75.0		Support to solar energy; energy plantations
Kyrgyz Rep.	4.2						Setting up energy passports to set financial and consumption limits of thermal energy; funding for utility services; hidden energy subsidies; conversion of vehicles to LPG and network of LPG refueling stations

Appendix B — Coverage of MDG7 Environmental Baselines and Targets in the Full PRSPs

Country	Area under forest cover (a) /Annual deforestation (b) (%)		Protected area (%)		Proportion of population using solid fuels/switch to modern fuels (access to electricity) (%)		Complementary environment policy/regulation indicators presented in the PRSP
	Base line	Target	Base line	Target	Base line	Target	
Mauritania					Biomass 80.0 Electricity 18.0	Implementation of butane fuel program in rural areas.	Implementation of national environmental action plan; farming code; mining code; land ownership law
Malawi	21.0	Control of forest fires to limit erosion & Lake Malawi pollution; forest licensing, inventory, education, extension; and tree planting		Co-management & private sector management of PAs, wildlife farming, tax on park users; eco-tourism	Electricity 4.0	Extension of grid; Promotion of mini-hydro, solar, and wind energy	New land policy, Community based NRM; disaster preparedness; vulnerability assessment and mapping; prevention of over fishing; mining regulation
Mali		Number of ha. reforested; number of rural wood markets			Biomass 91.0 Modern fuels 8.0	Increase in population with electricity	Adoption of water code
Mozambique		Control of bush fires and deforestation		Restocking of wildlife with community support			Laws on fisheries, water and mining; land tenure reform; Compliance of environmental regulation; strategy on waste management; early warning systems and capacity to respond to natural disasters
Nicaragua		The deforestation estimated at 2.5% per annum	7.4		Biomass 94.0 Electricity 47.0		Implementation of environmental policy and action plan; forest, fishery, and biodiversity law
Niger		Reforestation of 3000 ha for agriculture; planting 50 million seedlings; agro-forestry; 300% increase in gum Arabic production; rules for natural resource management		Protected area to be increased from 84,000km <sup>2</sup> to 140,000km <sup>2</sup> by 2005.	Biomass 95.0	10,000 ha of energy plantations; households using non-wood fuel; implementation of national strategy for renewable energy and integrated village solar energy	1500 km of wind breaks and 1000 ha of sand dunes to be stabilized by 2005
Rwanda					Biomass 90.2 Electricity 1.0		Implementation of mining code

# Poverty Reduction Strategies and the Millennium Development Goal on Environmental Sustainability

Country	Area under forest cover (a) / Annual deforestation (b) (%)		Protected area (%)		Proportion of population using solid fuels/switch to modern fuels (access to electricity) (%)		Complementary environment policy/regulation indicators presented in the PRSP
	Base line	Target	Base line	Target	Base line	Target	
Senegal					Electricity 25.0		Access to land and natural resources; environmental management; mining policy; land development and occupation plans
Sri Lanka	28.0		13.0		Modern fuels R-14; U-51 Electricity R-57; U-84		Rate of coastal erosion to be reduced from current 10 ha per annum
Uganda						R-12.0% rural electrification by 2010	land act to improve access to land for poor; compliance with environmental standards
Vietnam	33.0	43.0*					
Yemen					Electricity R-17.0; U-65.7	R-22.2% and U-98.2% by 2005; reduce losses to 25%;	Environmental action plan for water land, sanctuaries and waste management; plan to combat desertification; regulation on fishing and exports; fish cooperatives; integrated water management with user groups



Appendix B — Coverage of MDG7 Environmental Baselines and Targets in the Full PRSPs

Country	Area under forest cover (a) /Annual deforestation (b) (%)			Protected area (%)			Proportion of population using solid fuels/switch to modern fuels (access to electricity) (%)			Complementary environment policy/regulation indicators presented in the PRSP
	Base line	Target	Complementary PRSP programs/ indicators	Base line	Target	Complementary PRSP programs / indicators	Base line	Target	Complementary PRSP programs / indicators	
Zambia	42.0		Plans for forest inventory; agro-forestry, joint forest management; national and provincial forestry action programs; improved revenue collection;			Upgrading national parks; community participation in wild life conservation; increase in game management areas from 36 to 40 by 2004; increase in wildlife population; revenue sharing with local communities	Biomass 73.0		R-22.2% and U-60.0% by 2005; households using biomass fuels to be reduced to 63% in 2004; Promoting efficient wood fuel production and use to achieve 10% wood savings; substitution of charcoal with millennium gel fuel and LPG; solar energy projects in schools, health centers, and homes	Implementation of national environmental action plan, environmental investment plan; industrial pollution prevention program; environmental management plans; land rights to women

**Table A2. Coverage of MDG7 environmental baselines and targets in the full PRSPs**

Country	Access to safe water (%)			Access to adequate sanitation (%)			Tenure (%)			Complementary programmatic / operational indicators presented in the PRSP
	Base line	Target	Complementary PRSP indicators	Base line	Target	Complementary PRSP indicators	Base line	Target	Complementary PRSP indicators	
Albania	R-45.0 U-90.0					Construction of two sewage treatment facilities			Land market and changes in legal, regulatory, zoning, and construction codes; low cost dwellings	Reduction in air pollution; neutralization of toxic substances
Azerbaijan	50.0		Rehabilitation of Baku water supply system			Completion of sewerage system for Ganja city, Sumgait and Shabuz district				Definition of air pollution standards and their monitoring; reduction of oil and mercury contamination in soil; treatment of Caspian pollution; waste management; treatment of radioactive pollution
Benin	R-49.0 U-66.4	100.0	R-64.7 by 2005; decentralization of supply; tariff policy, cost sharing; community management	32.2		67.0 by 2005			Housing policy; improved housing for rural and urban poor	Reduce malarial deaths from 10.7 in 1998 to 6.2 in 2005; access to mosquito nets to 50.0% by 2005; improvements in air quality
Bolivia						Construction of wastewater & solid waste treatment plants			Low-cost housing; regulation of property rights, rental housing, and tenant law	
Burkina Faso			Establishment of new water points; reduction in hand pump breakdown							Vulnerability mapping
Cambodia	R-29.0 U-69.5		R-40% and U-87% by 2005; 50 percent women members in water users associations	R-8.6 U-49.0		R-20% and U-90% by 2005; rehabilitation of old facilities; sanitation master plan for towns				Disaster management; area and population affected by flood and drought; floodplain zoning; land reclamation in Svay Rieng province; management of Stung Mean Chey landfill
Ethiopia	30.0	100.0	R-31.4%, U-82.5% by 2005	29.0		35% by 2005				
Gambia	R-75.0 U-95.0			R-20.0 U-60.0					Number of urban poor with ownership rights to water, electricity, and sanitation at relocated sites	Adoption of agricultural and natural resource strategy

Appendix B — Coverage of MDG7 Environmental Baselines and Targets in the Full PRSPs

Country	Area under forest cover (a) /Annual deforestation (b) (%)		Complementary PRSP programs/ indicators	Protected area (%)		Complementary PRSP programs / indicators	Proportion of population using solid fuels/switch to modern fuels (access to electricity) (%)		Complementary PRSP programs / indicators	Complementary environment policy/regulation indicators presented in the PRSP
	Base line	Target		Base line	Target		Base line	Target		
Guinea	49.0	90.0	R-55% by 2005; Increase rate of access to safe water to 90% by 2010; Reduce deficit levels; For Conarky, increase per capita supply from 47litres to 63 liters per day; 5400 more water points by 2005			% population benefiting reduction in infections related to sanitary conditions			Land tenure and occupation security guaranteed; access to appropriate housing; land and property code and urban planning code	
Guyana	92.0	100.0	97.5% safe water access and 62.3% treated water access by 2005; Improvements in quality and delivery services	88.4		93.5% by 2005; Rehabilitation of sewer system, construction of sludge pre-treatment facility			6200 house lots and 15,500 land titles to be distributed by 2005; legislation for autonomous land agency; targets for reducing squatter holdings; accelerating titles to freehold	Enforce the provisions of environmental protection act focusing on air pollution, effluent discharge, land tenure reform; revenue from environmental services; environmental fund
Honduras	81.0	95.0	Water and sanitation sector law	70.2	95.0				Law for modernizing housing sector; no. of owner titles issues; no. of settlements with adequate norms; self-help housing program; title regulation	Early warning on environmental risks; preparedness and management of natural hazards; reduce pm <sub>10</sub> particulate air pollution from 1100 ug/m <sup>3</sup> in 2000 to 200ug/m <sup>3</sup> in 2015
Kyrgyz Rep.	R-15.0* U-90.2*		* Refers to tap water connections; volume of nitrite, chloride, chromium, and sulfate contaminants			40% by 2005; 1 million tons of solid waste treatment per year				National water resources strategy and cadastre of land and water resources
Malawi	65.6		84% by 2005; rehabilitation of rural gravity fed piped water schemes & multi-purpose earth dams	81.4						Fiscal incentives for deep water fisheries and forest plantations
Mali	57.0		Rate of villages benefiting from at least 1 water point; % increase in population with drinking water	8.0		Collections and processing of urban solid waste; % household with sewage disposal system			% of households with rented housing and own housing	Reduction of CO <sub>2</sub> and lead emissions from transportation

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Appendix B — Coverage of MDG7 Environmental Baselines and Targets in the Full PRSPs

Country	Area under forest cover (a) /Annual deforestation (b) (%)			Protected area (%)		Proportion of population using solid fuels/switch to modern fuels (access to electricity) (%)			Complementary environment policy/regulation indicators presented in the PRSP
	Base line	Target	Complementary PRSP programs/ indicators	Base line	Target	Complementary PRSP programs / indicators	Complementary PRSP programs / indicators		
Uganda			Boreholes drilled, springs and shallow wells protected; quality of water sources			Sanitary facilities in schools and markets			
Vietnam		85.0	Water and air quality			% towns and cities with 100 percent waste water treated and 100 percent solid waste disposal; rate of households with hygiene latrines	100.0	% households living in slums; % towns and cities with more than 5 percent land area covered under slums; % towns and cities with more than 10 percent under temporary houses by 2010	Rate of poor falling back into poverty due to natural disasters
Yemen	R-55.0 U-64.0		R-65% and U-69% by 2005; cost recovery; restructuring water sector	R-6.2 U-33.0		R-8.0% and U-44.0% by 2005; waste water sanitation in rural and urban areas			Fishery management and fishery promotion fund; coral reef protection; water database
Zambia	R-37.0 U-89.0	R-75.0 U-100.0	No. of water points; distance to water supply; volume of water treated; no. of people trained; D-WASHE committees	R-68.0 U-73.0	R-80.0 U-100.0	Volume of water treated			Air pollution - 500 µg/m <sup>3</sup> Water pollution (NO <sub>3</sub> , DO & PH) 6.36 mg



# Appendix C —

## Countries in the Interim PRSP/PRSP Preparation and Implementation Stages

S. No	Country	Region	IPRSP	PRSP	Implementation progress report
1	Albania	Europe & Central Asia	Dec 4, 2001	April 2002	
2	Armenia	Europe & Central Asia	Jan 11, 2001		
3	Azerbaijan	Europe & Central Asia	May 22, 2001	May 14, 2003	
4	Benin	Sub Saharan Africa	July 13, 2000	Feb 23 2002	
5	Bolivia	L. America & Caribbean	Jan 27, 2000	June 5, 2001	
6	Bosnia & Herzegovina	Eastern Europe	Oct. 2, 2002		
7	Burkina Faso	Sub Saharan Africa		June 30, 2000	Dec 6, 2001, Sept 2002
8	Chad	Sub Saharan Africa	July 25, 2000		
9	Cameroon	Sub Saharan Africa	Oct 10, 2000		
10	Cambodia	East Asia	Jan 18, 2001	Feb 2003	
11	Cape Verde	Sub Saharan Africa	April 8, 2002		
12	Central African Rep.	Sub Saharan Africa	Jan 18, 2001.		
13	Congo, DR	Sub Saharan Africa	June 11, 2002		
14	Cote D'Ivoire	Sub Saharan Africa	March 28, 2002		
15	Djibouti	Middle East & N. Africa	Feb 27, 2001		
16	Ethiopia	Sub Saharan Africa	Mar 20, 2001	Sept 17, 2002	
17	Gambia	Sub Saharan Africa	Dec 14, 2000	July 16, 2002	
18	Georgia	Europe & Central Asia	Dec 19, 2000		
19	Ghana	Sub Saharan Africa	Aug. 24, 2000	March 4, 2003	
20	Guinea	Sub Saharan Africa	Dec. 22, 2000	July 25, 2002	
21	Guinea Bissau	Sub Saharan Africa	Dec. 14, 2000		
22	Guyana	L. America & Caribbean	Nov 14, 2000	Sept 17, 2002	
23	Honduras	L. America & Caribbean	July 6, 2000	Oct 11, 2001	
24	Indonesia	East Asia	May, 2003		
25	Kenya	Sub Saharan Africa	Aug 1, 2000		
26	Kyrgyz Rep.	Europe & Central Asia	July 5, 2001	Jan 23, 2003	
27	Lao PDR	East Asia	April 24, 2001		
28	Lesotho	Sub Saharan Africa	March 6, 2001		
29	Mali	Sub Saharan Africa	Sept 7, 2000	Feb 27, 2003	
30	Malawi	Sub Saharan Africa	Dec 21, 2000	Aug 29, 2002	
31	Madagascar	Sub Saharan Africa	Dec 19, 2000		
32	Mauritania	Sub Saharan Africa	Feb 6, 2001	Sept 25, 2001	June 18, 2002
33	Moldova	Europe & Central Asia	Dec 14, 2000		
34	Mongolia	East Asia	Sept 27, 2001		
35	Mozambique	Sub Saharan Africa	April 6, 2000	Oct 1, 2001	April 2003
36	Nicaragua	L. America & Caribbean	Dec 21, 2000	Sept 25, 2001	
37	Niger	Sub Saharan Africa	Dec 20, 2000	Feb 7, 2002	
38	Pakistan	South Asia	Dec 4, 2001		

<i>S. No</i>	<i>Country</i>	<i>Region</i>	<i>IPRSP</i>	<i>PRSP</i>	<i>Implementation progress report</i>
39	Rwanda	Sub Saharan Africa	Dec 21 , 2000	Aug 6, 2002	
40	Sao Tome & Prin.	Sub Saharan Africa	April 27, 2000		
41	Senegal	Sub Saharan Africa	June 20, 2000	Nov 20, 2002	
42	Sierra Leone	Sub Saharan Africa	Sept 25, 2001		
43	Sri Lanka	South Asia		March 7, 2003	
44	Tajikistan	Europe & Central Asia	June 8, 2000.	Oct 10, 2002	
45	Tanzania	Sub Saharan Africa	April 4, 2000	Nov. 30, 2000	Nov 27, 2001, March 2003
46	Uganda	Sub Saharan Africa		Nov. 30, 2000	March 2001, 2002
47	Vietnam	East Asia	April 12, 2001	July 2, 2002	
48	Yemen	Middle East & N. Africa	Nov 27, 2001	Aug 2002	
49	Yugoslavia, FR	Europe & Central Asia	June 20, 2002		
50	Zambia	Sub Saharan Africa	August 4, 2000	May 22, 2002	



# Notes

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1. We use “PRSPs” as shorthand for both interim and full PRSPs when the distinction is not important.
2. The targets of the MDG were first set out by international conferences held in the 1990s, and later compiled as a joint UN, World Bank, and IMF publication, *A Better World for All: Progress Towards International Development Goals* in June 2000. The UN General Assembly adopted these goals in September 2000, as part of the *Millennium Development Declaration*. In 2001, The UN General Assembly recognized the Millennium Development Goals as part of the *Road Map Towards Implementation of the United Nations Millennium Declaration* for implementing the 8 goals supported by 18 targets and 48 indicators. See [worldbank.org/mdg](http://worldbank.org/mdg) for details.
3. See DFID, EC, UNDP, and World Bank (2002): *Linking the Poverty Reduction and Environmental Management* for a discussion.
4. In a broader context, the World Bank systematically monitors all the MDGs (formerly known as International Development Goals, IDGs) and presents overviews on a special website: <http://sima/mdg/> (internally) and <http://www.developmentgoals.org> (externally). This monitoring is not directly linked to the PRS-process.
5. A comprehensive introduction to PRSPs is contained in Klugman (2002)
6. See World Bank and IMF (2002h): *Review of the Poverty Reduction Strategy Paper Approach: Early Experience with interim PRSPs and Full PRSPs*, and World Bank and IMF (2002g): *An Issues Paper for the January 2002 Conference*.
7. However, see Markandya et al (forthcoming) for a regional perspective (Eastern Europe and Central Asia) on MDG7.
8. The eight pre-WSSD Millennium Development Goals form a framework that comprises 18 targets and 48 indicators. Additional targets and indicators are expected to evolve as exemplified by the WSSD *Plan of Implementation*.
9. The World Development Report 2003 (World Bank 2002f, p. 166) shows how the forces of deforestation vary considerably across regions. Smallholders in Africa now use most of the closed canopy forest cleared 1990-2000, while large-scale agriculture is practiced in most cleared forest areas of Latin America.
10. Some 1 billion people worldwide depend on drugs derived from forest plants for their medicinal needs.
11. In most national level energy statistics, solid fuels are described in the context of coal, lignite, and other raw materials. Though biomass fuels form part of solid fuel usage, data on biomass energy is not reported in the national energy statistics due to lack of time series data on biomass production and consumption. In this study, we consider biomass fuels under solid and traditional fuel sources.
12. The indicator is interpreted here as *reasonable access*, i.e. per capita water availability of at least 20 liters/day from a source within one kilometer (World Bank 2002b). *Improved water*

- source* refers to household connection, public standpipe, borehole, protected well or spring, or rainwater collection, while unimproved sources include vendors, tanker trucks, and unprotected wells and springs (WHO 2000a).
13. The targets adopted at the WSSD 2002 and their relevance to PRSPs are discussed in Appendix A.
  14. Though demands on interim PRSPs are lower than those for full PRSPs, commitment to MDGs is explicitly suggested in the IMF and World Bank *Guidelines* for the Joint Staff Assessment of interim PRSPs: "It would be desirable if the government could indicate its commitment to progress towards the International Development Goals." (World Bank and IMF 2000, p. 3)
  15. The national definitions of income poverty differ. International estimates define poverty incidence as per capita income of less than \$1/day in constant 1985 purchasing power parity (PPP), updated to \$1.08 in constant 1993 PPP dollars, and is conventionally referred to as \$1/day per capita (Chen and Ravallion 2000). For a discussion on the role of poverty indices in policy analysis, see Myles and Picot (2000).
  16. The coverage and treatment of environment issues in PRSPs is examined separately, see Bojö and Reddy (2002)
  17. Albania PRSP notes that forests occupy 36% of land area and over the last 20 years, and the sector has been plagued with uncontrolled deforestation.
  18. The PRSP of Ethiopia notes that biomass is a major source of energy for 76 percent rural households that collect fuelwood and for 41 percent of urban households that use purchase fuelwood. About 22 percent and 1 percent of the urban households, respectively, use kerosene and electricity for cooking.
  19. The negative deforestation rates in Figure 1 indicate net increase in the forest area of PRSP countries over two decades, 1980-90 and 1990-2000.
  20. Protected areas are classified on the basis of IUCN management categories I (strict protection) to VI (sustainable use) to distinguish according to the degree of protection. Category IV (protected area established to maintain the habitat of species of interest) is significant in terms of the number, and accounts for about half the total number of protected areas, while Category II (national park) is significant in terms of the area, and accounts for about one-third of area under protection.
  21. Protected areas of at least 1,000 ha as per legal statutes in a country.
  22. According to WCMC estimates, proportion of land area protected globally has increased from 7.5% of (about 1 billion ha) in 1990 to 9.5% (1.28 billion ha) in 2000.
  23. Though current area under protection (9.5% of the geographical area) is close to the informal target of 10 percent land area under protection, it is not uniformly distributed in each major ecological region as envisaged.
  24. See IEA/OECD (1998) *World Energy Outlook* 1998.
  25. The traditional energy dependence reflects three major trends: *volume* – constant per capita consumption linked to population growth, *efficiency* – transformational processes decrease the demand through improved efficiency, and *substitution* – of traditional fuels with modern fuels due to changes in income and pricing. Most energy assessments of countries focus only on volume trend.
  26. Good practice examples of private initiatives in renewable energy are beginning to emerge in several African countries. In Kenya, decentralized off-grid systems developed by eight private sector companies provide electricity to more rural households than those from the grid. About 20,000 rural households

- have purchased solar systems totaling more than 1 MW of installed capacity. In Senegal, adoption of 2000 rural solar home systems and additional demand encouraged private and public sector collaboration for building a photovoltaic solar panel factory.
27. Sources of water received from vendors, tankers, unprotected wells, and springs are not included in the definition on safe water, and are therefore considered unimproved.
  28. Data presented in the *World Development Indicators 2002* is also based on the Joint Monitoring Program database.
  29. Unimproved sanitation refers to public latrines, bucket latrines, and open pit disposal systems.
  30. The systematic differences in the estimates of UIP surveys may be observed from the *World Development Indicators 2002*, p 174-77
  31. Plan of Implementation of the WSSD Agenda (UN 2002), and Better Measuring, Managing, and Monitoring for Development Results World Bank (2002).
  32. Annual PRSP Implementation Progress Reports are expected to play an important role in the MDG monitoring and evaluation.
  33. See Evaluation Capacity Development in Africa, World Bank (1998).
  34. MSY is the maximum yield that can be obtained perpetually.
  35. *Abundance* is the ratio of spawning biomass (B) to virgin biomass ( $B_v$ ). It is used to measure the state of marine resources and is estimated using trawl and acoustical surveys. Under logistical model, MSY conditions occur when the stock size is 50 percent of virgin stock. An abundance ratio of 0.5 to 1.0 is rated good; 0.3 to 0.5 fairly good; 0.2 to 0.3 average; and 0.1 to 0.2 as poor. *Fishing pressure* is the ratio of fishing mortality (F) to fishing mortality at MSY ( $F_{MSY}$ ). It may be decomposed into catch structure reflecting the size, composition, and quantity of production. Downward shift in fishing pressure indicates fishing down the food chain. Assuming a target reference point of F to be 60 to 80% of ( $F_{MSY}$ ), a fishing pressure ratio of 0.6 to 0.8 is rated good; 0.8 to 1.0 fairly good; 1.0 to 1.3 average; and 1.0 to 2.0 as poor.
  36. Virgin fish biomass is the biomass in an unexploited ecosystem.
  37. Aquaculture is the farming of aquatic organisms including fish, mollusks, and crustaceans.



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