

## Goal 7— Ensure environmental sustainability

### Global context

Achieving environmental sustainability is a crucial aspect of the MDGs, as both human health and development are profoundly linked to the condition of the environment. The actions of all countries influence environmental issues such as climate change and loss of biodiversity, and their impacts cut across both national and regional boundaries. As a result these issues must be addressed cooperatively. Globally, climate change linked to fossil fuel usage is believed to be affecting global climatic and weather patterns,<sup>1</sup> with a host of still emerging impacts (e.g. on rainfall, the frequency and severity of storms, and sea levels). Secondary negative impacts — for example, on disease incidence, water supplies, agricultural patterns, the health of coral reefs, and the viability of human settlements — are predicted and may have already begun. Loss of biological diversity, in both terrestrial and marine ecosystems, is increasing worldwide as a result of human activities such as land clearing and ocean harvesting.

### Pacific context

Ensuring environmental sustainability is of high importance for all countries and presents unique challenges for PICs. The combined land and marine areas<sup>2</sup> of PICs occupy some 30 million square kilometres (accounting for almost 6% of the earth's surface and 30% of the global EEZ). Many PICs have very small land areas and high population densities, resulting in intense pressure on land and associated resources. The extreme isolation of many islands has led to the evolution of a high percentage of unique (endemic) terrestrial plants and animals, many of which are highly susceptible to disturbance and competition from introduced species. Marine areas are very extensive and typically highly diverse biologically, but are vulnerable to overexploitation, pollution and environmental change. Marine and terrestrial resources remain important across the region for both subsistence use and economic development.

Although a number of regional environmental assessments have been made in recent years,<sup>3</sup> no systematic effort has been made to update these analyses or to develop a Pacific-based capacity to do so. Consequently, the ability to effectively monitor environmental changes occurring in the region remains weak; the reporting that does occur is generally not accessible to Pacific policymakers and resource managers. Data from which environmental change may be monitored and on which management decisions can be based is scarce, with time series information generally not available.<sup>4</sup>

Despite the absence of reliable data, a number of priority regional environmental issues have been identified and a broad consensus reached on their importance. These include:<sup>5</sup> loss of environmental biodiversity, threats to fresh water resources and marine water quality, degradation and overuse of coastal and marine resources, unsustainable forestry and land use practices, climate change and sea level rise, land and sea based pollution, degradation of critical habitats, and waste management.

Although economic growth is important for achieving development progress, investment and development initiatives that are accompanied by insufficient regulation and oversight can increase environmental degradation and worsen existing environmental problems.

<sup>1</sup> IPCC 2001.

<sup>2</sup> Marine areas include exclusive economic zones (EEZs).

<sup>3</sup> including UNEP 1999.

<sup>4</sup> ADB 2004a.

<sup>5</sup> UNEP 1999; ADB 2004a; SPREP 1998; SPREP 2004.

**Table 7.1 Goal 7 — Ensure environmental sustainability**

	Indicators	Year	Cook Is	Fiji	FSM	Kiribati	Marshall Is	Nauru	Niue	Palau	PNG	Samoa	Solomon Is	Tokelau	Tonga	Tuvalu	Vanuatu	
<b>Target 9</b>	25. Proportion of land area covered by forest	1990		48.9 (1989)								46.1						
		2000	60.8	44.6	50	12.5	6.0 (1999)	17	78.8	76.1	84.9	35.2	88.2		5.4	43	36.3	
	26. Ratio of area protected to maintain biological diversity to surface area	1990									3.49			0				
		2003	15.1	2.13	7.33	32.96	0	0	23.28	0	11.29	4.1 (2002)	1.31	0	9.01	0	0.27	
	28. CO <sub>2</sub> emissions (per capita) & consumption of ozone-depleting CFCs (ODP tons)	Emissions 1990	2.37	1.52		0.32		15.53	1.57	15	0.67	0.81	0.54		0.88		0.94	
		Emissions 2000	2.84	1.02		0.28		16.16	1.57	13	0.48	0.83	0.4		1.3		0.42	
		Consumption 1990		38		1 (1993)	1				2 (1995)	4	2		2 (1995)			
		Consumption 2000		9 (1999)		1 (1997)	1				1	1	6 (1999)		1 (1999)			
	29. Proportion of households using solid fuels	1990	19.0 (1991)		47 (1994)		13.8 (1988)	0.8 (1992)	49.5 (1991)		12.5		72.1 (1991)		18.2 (1991)		69.9 (1991)	81.8 (1989)
		2000	10.9 (2001)	48 (1996)	53.5		29.9 (1999)	0.5 (2002)	16.9 (2001)		1.0		62.9 (2001)	87.3 (1999)	14.5 (2001)	74.3 (1996)	31.5 (2002)	83.3 (1999)
<b>Target 10</b>	30. Proportion of households with sustainable access to an improved water source, urban and rural	Urban 1990		94.5 (1986)	93.5 (1994)	54.5	96.7 (1988)		99.4 (1991)	84.4 (1995)		98.7 (1991)			96.6 (1986)	92.6 (1991)	96.3 (1989)	
		Urban 2000		97.5 (1996)	94.4	60.4	83.3 (1999)		100 (2001)	78	93.1	91.6 (2001)	80.9 (1999)		96.8 (1996)	93.9 (2002)	90.5 (1999)	
		Rural 1990		55.4 (1986)	87.9 (1994)	24.7	84.8 (1988)		98.8 (1991)	97 (1995)		89 (1991)			90.2 (1986)	97.9 (1991)	70.9 (1989)	
		Rural 2000		65-82 (1996)	92.1	42.3	87.3 (1999)		100 (2001)	94.5	29.5	87.7 (2001)	21.8 (1999)			97.6 (2002)	70.8 (1999)	
		Total 1990		71.0 (1986)	79.1 (1994)	35.1	92.5 (1988)	71.7 (1992)	99 (1991)	88.7 (1995)		90.9 (1991)			82 (1991)	91.5 (1986)	90.3 (1991)	75.8 (1989)
		Total 2000		92.7 (1996)	87	49.1	84.7 (1999)	81.7 (2002)	100 (2001)	83.6	39.7	88.6 (2001)	29.8 (1999)	89.5 (2001)		92.5 (2002)	75.3 (1999)	

**Table 7.1 Goal 7 — Ensure environmental sustainability**

		Cook Is	Fiji	FSM	Kiribati	Marshall Is	Nauru	Niue	Palau	PNG	Samoa	Solomon Is	Tokelau	Tonga	Tuvalu	Vanuatu
31. Proportion of urban and rural households with access to improved sanitation	Urban 1990		99.1 (1986)		32.9	87.2 (1988)			98.5 (1995)		99.6 (1991)				83.8 (1991)	97 (1989)
	Urban 2000				54.4	92.1 (1999)		100 (2001)	99.1	58.3 (1996)	100 (2001)	85.3 (1999)		99.3 (1996)	91.9 (2002)	96.9 (1999)
	Rural 1990		97.5 (1986)		21.5	49.5 (1988)			97.4 (1995)		98.1 (1991)				73.6 (1991)	87.9 (1989)
	Rural 2000				22.2	56.7 (1999)		99.0 (2001)	98.1		100 (2001)	12.5 (1999)			82.8 (2002)	94.7 (1999)
	Total 1990		98.2 (1986)	34.4 (1994)	24.4	73.8 (1988)	65.3 (1992)		98.2 (1995)		98.4 (1991)		33 (1991)		76.9 (1991)	89.7 (1989)
	Total 2000		98.8 (1996)	44.0	31.1	80.2 (1999)	96.9 (2002)	99.7 (2001)	98.8		100 (2001)	22.4 (1999)	69.4 (2001)		86.5 (2002)	95.2 (1999)

Underlined figures report data that do not precisely correspond to the indicator as defined by the UN. See notes below (for additional details as well as definitions and sources see Goal 7 Technical and Source Notes).

**Indicator 25:** The definition of forested areas used for calculating the proportion of land area covered by forest does not correspond to the FAO (2000) definition; figures include all forest types including mangroves, dry and wet woodlands and coconut and broadleaf forest areas, but exclude forest plantations and any bare land. All data from from HoF meeting reports of 1991, 1992, 1993, 1994, 1995, 1996, 1998, 2000, 2003. Exceptions: Samoa data: Samoa Draft MDG Report 2004; Marshall Islands data: SPREP Strategy for Nature Conservation 1999-2003; Palau data: FAO.

**Indicator 26:** Note that figures are not available for the “terrestrial area” — defined to include any territorial sea area (up to 12 nautical miles) — as intended by the definition for MDGI 26. Consequently, data are reported only for terrestrial protected areas, as a proportion of total land area. See text and Figure 7.2 for figures that include coastal and marine protected areas. All data from Pacific Protected Area Database, Conservation International, last revised July 2003, except Samoa (Samoa Draft MDG Report 2004) and PNG (MDG TWG 2004).

**Indicator 28:** Carbon dioxide emissions data: Carbon Dioxide Information Analysis Center (2003); CFC consumption data: UNEP Ozone Secretariat (UNEP 2004).

**Indicator 29:** Measures proportion of households rather than proportion of population. Data source is national population and housing censuses. Figure for Palau is the percentage of households with no cooking facilities. Figures for other countries are the percentage of households whose main source of fuel for cooking is wood, charcoal or “other” sources.

**Indicator 30:** Measures proportion of households rather than proportion of population. Inconsistencies between definitions and uncertainties over water quality mean these data should be used with caution when assessing access to “safe” water supplies. See text and Technical and Source Notes for details.

**Indicator 31:** Measures proportion of households rather than proportion of population. The inadequacy of information regarding suitability of waste disposal methods and of facility location, construction and maintenance means these data should be used with caution when assessing access to “improved” sanitation. See text for details.

**Indicators 30 and 31:** Figures may differ from rates calculated previously because of the definitions of improved and not improved. Unless stated otherwise information is from last two censuses. Note that Tokelau lacks a distinction between urban and rural.

No data are available for Indicators 27 and 32.

## Target 9: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources

The definition of forests suggested for use in conjunction with MDGI 25 is that found within the Food and Agricultural Organization's (FAO) Global Forest Resources Assessment (FRA) 2000.<sup>6</sup> FRA 2000 assigns land to one of three categories: forests (defined to include plantations); other wooded land; and other land with trees outside of forests. This definition considers forests to be primarily a timber resource, with forested areas identified both by the presence of trees and the absence of other land uses. Forests are defined to include land with an existing or expected tree canopy of more than 10% and an area of more than 0.5 hectare where trees should be able to reach a minimum height of 5 meters. Land from which forest has been cleared but that will be reforested in the foreseeable future is included. Excluded are stands of trees established primarily for agricultural production (including coconuts and agroforestry).

Use of this definition for the Pacific is not ideal, as the status of a number of forest types and land uses that are of significant importance to PICs (such as mangrove forests<sup>7</sup>, coconuts and agroforestry<sup>8</sup>) is not assessed. By not differentiating between plantations and natural forest the indicator gives no indication of the degree to which natural forest areas are being maintained, which is a critical issue in PICs, due to the very limited land areas in most PICs and high numbers of native species generally.<sup>9</sup>

**Table 7.2 Proportion of land area covered by forest (%)**

	1990	2000
Cook Is		<u>60.8</u>
Fiji	<u>48.9</u>	<u>44.6</u>
FSM		<u>50.0</u>
Kiribati		<u>12.5</u>
Marshall Is		<u>6.0</u>
Nauru		<u>17.0</u>
Niue		<u>78.8</u>
Palau		<u>76.1</u>
PNG		<u>84.9</u>
Samoa	46.1	<u>35.2</u>
Solomon Is		<u>88.2</u>
Tonga		<u>5.4</u>
Tuvalu		<u>43.0</u>
Vanuatu		<u>36.3</u>

Source: See Goal 7 Technical and Source Notes  
Underlined figures report data that do not precisely correspond to the indicator as defined by the UN. See text for details.

### Assessment

The forest area figures are primarily based on data from regional Heads of Forestry meeting reports from 1991-2003. Data presented here do not correspond to the definition proposed by the UN but instead include all forest types (e.g. mangroves, dry and wet woodlands and coconut and broadleaf forest areas); forest plantations and any bare land are excluded. In many instances these figures are necessarily estimates because forest inventories have never been carried out. In others, inventories are conducted only infrequently due to the costs involved (for example, Vanuatu has had one inventory, and Fiji two, the last in 1992). There are also differences between countries (and within countries over time) in reporting methods and definitions.

Figures from Papua New Guinea's MDG Technical Working Group<sup>10</sup> differ considerably from those reported above (see Table 7.3). The focus of the

Technical Working Group data is on primary forest (i.e. forest that has never been logged). These data

<sup>6</sup> FAO 2000.

<sup>7</sup> Non-timber products from mangrove ecosystems (e.g. crabs) are often more important than timber and other tree-derived products. In Kosrae (FSM) in the late 1990s, the annual island-wide economic value of fuelwood, crabs and fish from mangroves was estimated to total USD15,690/hectare (UNESCAP 2000).

<sup>8</sup> Agroforestry includes agricultural systems (involving crops and/or animals) that incorporate planted or protected trees in an effort to enhance the productivity, ecological integrity, and economic and cultural utility of the system (see Clarke and Thaman 1993). Agroforestry has been widely practiced in PICs for generations.

<sup>9</sup> Proper management of areas managed for timber production, including plantations, is also of concern (Solomon Islands 2002).

<sup>10</sup> MDG TWG 2004.

indicate that there has been very significant loss of primary forest over the past century, with the current forested area accounting for just 57% of the original.<sup>11</sup> The rate of loss of primary forest was especially rapid over the last decade, but has apparently slowed, with the current rate estimated at 120,000 to 200,000 ha/year (0.46% to 0.77% per year).

**Table 7.3 Forest Cover in PNG**

Forest Type	Year	Area	Rate of change (%)	Proportion of original primary forest remaining (%)	Ha/year reduction
Mangrove	1990	150,000 ha			
Primary Forest	1900	46,000,000 ha		100%	
	1975	32,000,000 ha	-0.5 (1900-1975)	70%	240,000
	1996	29,000,000 ha	-0.5 (1975-1996)	63%	142,850
	2004	26,000,000 ha	-1.5 (1996-2004)	57%	428,500

Source: MDG TWG 2004

The Technical Working Group does not consider these figures to be complete, and includes the following caveat:

In practical terms, the figures .... are only of limited use. **They should definitely not be interpreted as giving an accurate picture of the total loss of primary forest.** Natural forest does not only disappear because of logging but also, and probably even more so because of agricultural use (both commercial and for subsistence) as well as for a variety of other reasons.<sup>12</sup>

Reliable estimates of the effect of all land clearing activities (from logging, expansion of agriculture and pasture, settlement and urban development, etc.) on different forest types in PICs are not available, but anecdotal data suggest that forest loss is rapid. For example, analysis of aerial photography of Pohnpei (FSM) showed that undisturbed forest had declined from 42% of land area in 1975 to 15% in 1995.<sup>13</sup> In Tonga, only about 4,000 ha (5.3% of total land) of natural forest remained in 1985, mostly on inaccessible or steep sites on the island of Eua.<sup>14</sup>

Available data on logging suggest a number of PICs with extensive forest resources have been logging at rates exceeding sustainable levels, and that marketable natural or primary forest resources will soon be fully exploited. In Solomon Islands, analysis indicates that commercial forest resources will be exhausted in this decade,<sup>15</sup> with rates of harvest two or three times the sustainable level. In Papua New Guinea “the vast majority of accessible and high volume forest has already been logged”,<sup>16</sup> and most of the unallocated forest (some 14.8 million ha) is remote, inaccessible and economically marginal for logging. Although overall log output in Vanuatu in 2000 was within the estimated sustainable national yield, the harvest on six of ten islands exceeded sustainable limits.<sup>17</sup> In Samoa between 1977 and 1992, 47% of the merchantable forest and 27% of the non-merchantable forest were cleared, and by 1995/96, there were only 13,575 ha (4.8% of total land) of merchantable forests remaining in the country. Given the rate of forest clearance, it was predicted that the remaining indigenous forests might last only another five to six years.<sup>18</sup>

<sup>11</sup> The report ascribes the large loss of primary forest from 1996-2004 to intensive logging during the mid-1990s.

<sup>12</sup> MDG TWG 2004: 188; emphasis in original.

<sup>13</sup> UNEP 1999.

<sup>14</sup> PIFS 2000.

<sup>15</sup> UNEP 1999, Hunt 2001, Solomon Islands 2002.

<sup>16</sup> ADB 2004a: 25.

<sup>17</sup> Hunt 2001.

<sup>18</sup> PIFS 2000.

### Challenges and prospects relating to forests

From the limited quantitative data and qualitative evaluations that are currently available, the situation with respect to forests in the Pacific Islands cannot be said to differ significantly from that reported five years ago:

Forests and trees throughout the Pacific region are being removed and degraded at an unsustainable rate .... In most countries the rate of deforestation and forest degradation far outstrips the rate of reforestation.<sup>19</sup>

Increasing population and demand for development, often coupled with unsustainable forest and tree use and harvesting practices, have resulted in serious depletion and degradation of the forest and tree resources in the region. This has given rise to a situation of increasing demands being placed on a decreasing and degraded resource base.<sup>20</sup>

Efforts are being made to address forest degradation and deforestation. A regional "Code of Conduct for Logging of Indigenous Forests in Selected South Pacific Countries" was developed collaboratively and endorsed by the South Pacific Forum (now the Pacific Islands Forum) in September 1995. At that time, only Fiji had developed its own national code of logging practice (COLP), which was launched in 1990 and fully implemented by 1996. PNG, Solomon Islands, Vanuatu, and recently Samoa and Niue have also developed COLPs, which are now at various stages in the implementation process. In addition, these countries have recognised that in order to make further progress towards sustainable forest management, their COLPs will need to incorporate silvicultural prescriptions (including reduced impact logging technique) that serve to enhance the regenerative capacity of their forests. Regional training (addressing effective implementation of COLPs and reduced impact logging) has been carried out by SPC's Regional Forestry Programme, and work is currently underway in a number of countries to determine additional silvicultural practices, including the use of species-specific cutting-diameter limits.

Significant attention is also being given to improving the policy and legislative frameworks in PICs, as these create an environment within which relevant activities that contribute toward better forest management can be implemented. Important activities include more effective participation of forest owners in the management of their forests, identification and formalisation of permanent forest estates, better harvesting practices (through effective implementation of improved COLPs), and enhancement of the value of timber resources through the implementation of in-country value-added processing strategies.

#### Assessment of the relevance of MDGI 25 and the availability of data

The FAO definition used for this indicator does not allow an accurate assessment to be made of the status of forest resources. The indicator as defined also does not provide an effective measure of progress toward Target 9 (Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources) with respect to forest resources. Accurate, up-to-date data are not available for all PICs.

### Recommendations relating to forests

- Develop common regional definitions of various forest types that allow for accurate assessment of the status of various important forest resources, and allow for comparison of data between PICs.
- Undertake accurate inventories of forest types.

<sup>19</sup> UNEP 1999: 8.

<sup>20</sup> PIFS 2000.

- Undertake accurate inventories of rates of deforestation by type of land use (commercial logging, subsistence fuelwood harvest, for agriculture, etc.).

**MDGI 26. Ratio of area protected to maintain biological diversity to surface area**

Loss of habitat is a primary factor in loss of biodiversity, and habitat conservation is an important element in stemming the decline. The establishment of protected areas can help conserve habitat; many protected areas also serve other functions as well (e.g. supporting recreation and ecotourism, protecting watersheds; and providing a sustainable resource base for scientific research and education).

Pacific Island ecosystems are very susceptible to loss of biodiversity and over 80% of the flora and fauna on some Pacific Islands is endemic, greatly increasing the potential for species loss.<sup>21</sup> Worldwide, the largest number of documented extinctions has occurred in the Pacific Islands (including territories not covered in this report); the region has the highest number of threatened species per capita worldwide.<sup>22</sup>

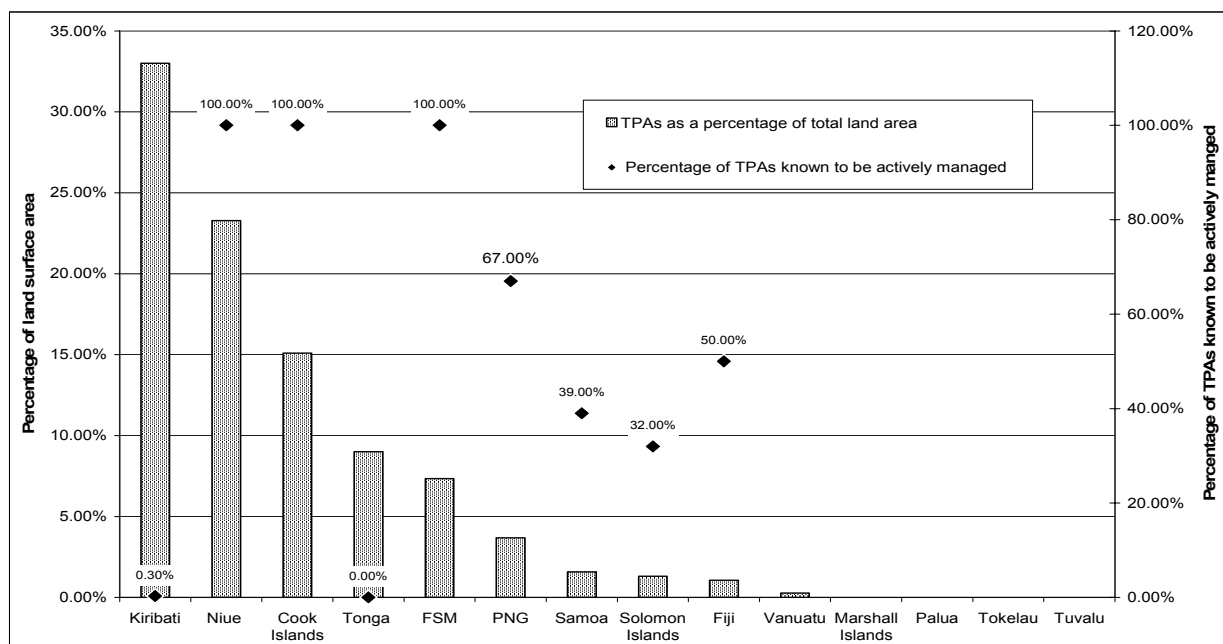


Figure 7.1 Terrestrial protected areas (TPAs) and active protected area management

**Assessment**

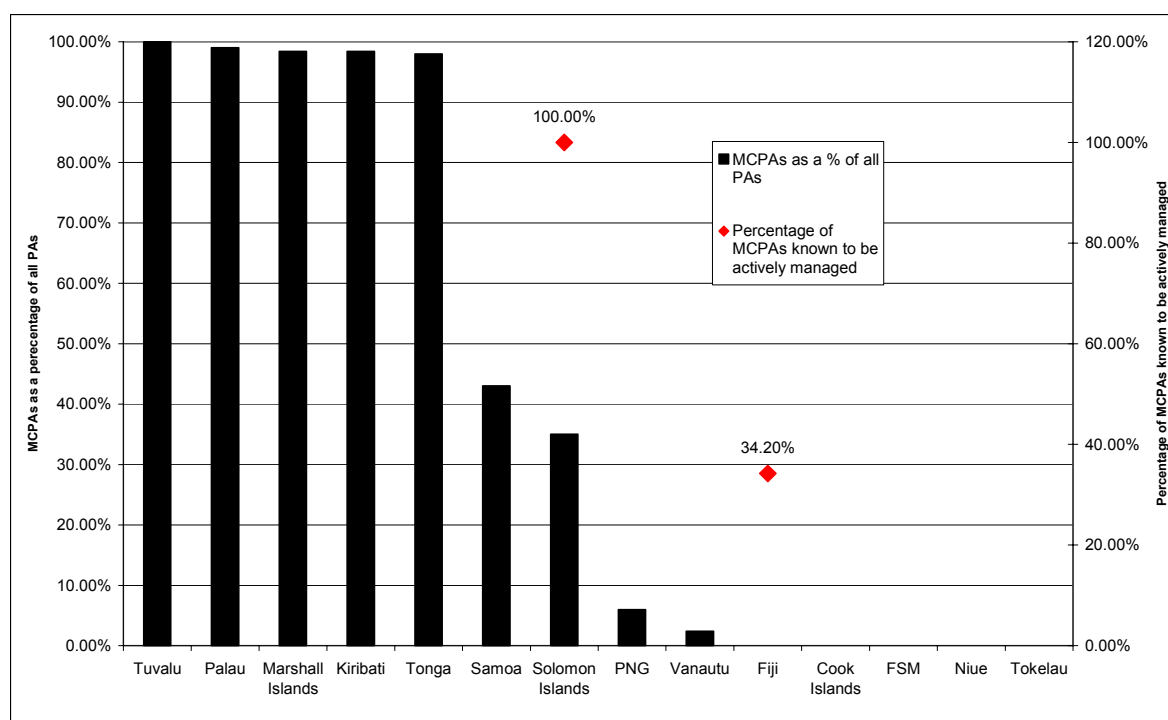
Globally, some 100,000 protected areas cover about 12.7% of the earth’s surface (including 11.5% of the land area, and about 0.5% of the ocean area).<sup>23</sup> Data for the Pacific region indicate that the percentage of land area under protection varies from a high of 33% (Kiribati) to a low of 0.27% in Vanuatu. The absence of terrestrial protected areas in Marshall Islands, Palau, Tokelau and Tuvalu reflects the fact that these PICs have designated coastal protected areas, which combine both marine and terrestrial elements (no breakdown of the terrestrial component of these protected areas is available). The percentage of total area under protection (as a percentage of land area)<sup>24</sup> in these four PICs is significant due to the marine component: Marshall Islands (387%), Palau (365%), Tokelau (83%) and Tuvalu (127%). Tonga also has a very large combined coastal and marine protected area; when this is included the area protected in Tonga amounts to 1,353% of land area.

<sup>21</sup> SPREP 1998, 2002; UNEP 1999; ADB 2004a.

<sup>22</sup> ADB 2004a.

<sup>23</sup> see Chape et al. 2003.

<sup>24</sup> Note that figures are not available for the “terrestrial area” as defined to include any territorial sea area (up to 12 nautical miles), as intended by the definition for MDGI 26.



Source: Pacific Protected Areas Database, Conservation International (2003)

Figure 7.2 Marine and coastal protected areas (MCPAs) and active management

Unfortunately, data sources for protected areas in the Pacific are incomplete and inconsistent, with figures varying significantly.<sup>25</sup> In some instances protected areas may be “declared” but never officially designated. Even when designated, increases in the areal extent of protected areas do not necessarily lead to effective protection or management of resources and associated conservation of biodiversity. Problems include protected areas that are never legally established and protected areas that have no management capacity (i.e. “paper parks”). A number of challenges face even those protected areas that are established (including poaching, invasive species, and fire), with active management required in many cases.

Little information is available to indicate which protected areas are being actively managed. The figures reported here suggest that active management is more common in terrestrial protected areas with information for several PICs suggesting that 100% of terrestrial protected areas are actively managed (see Fig. 7.1); data regarding active management of marine and coastal protected areas are much more limited (Fig. 7.2).

There are a number of traditional cultural practises that serve to protect marine and land environments permanently or at certain times of the year, and these may not be captured in the protected area information. Examples include traditional “no take” practices in Niue, in which some villages implement a *fono* (a time or area closure on the reef) at different times of the year. A seasonal closure is enforced during the *kaloama* (goatfish) fishing season, where it is forbidden to swim, spearfish or dive in the area where these fish are caught. Pukapuka, in the northern Cook Islands, continue traditional closures, in which all harvest from both land and reef areas is banned.

In addition to the limitations of existing information regarding protected areas, many threats to biodiversity affect species or habitats generally (e.g. invasive species) and cannot be effectively addressed through protected area designation.

<sup>25</sup> See for example WCMC 2004, ADB 2004a, WRI 2004. Data presented here are drawn from the draft Pacific Protected Area Database, which was established by Conservation International in 2003.



### Challenges and prospects relating to conservation of biological diversity

All PICs are parties to the Convention on Biological Diversity (CBD). Drawing on support provided through the Global Environment Facility (GEF), PICs are implementing the CBD through the development of National Biodiversity Strategic Action Plans. The CBD also provides the basis for numerous components of the Action Plan for Managing the Environment in the Pacific region. Reviewed by Pacific Island countries every four years, the Action Plan is the overarching policy document managing the environment in the region, with the current Action Plan effective for the period 2005-2009.

The Action Strategy for Nature Conservation in the Pacific Islands Region 2003-2007,<sup>26</sup> based on the 7<sup>th</sup> Conference on Nature Conservation and Protected Areas,<sup>27</sup> provides a coordinating framework for the many actions that are needed to effectively conserve biodiversity in the region. These include placing areas under effective community-based conservation management, addressing alien and invasive species, and monitoring the state of the environment. The Pacific Islands Roundtable for Nature Conservation, established in 1998, also works to encourage more effective conservation action by providing a mechanism for enhanced regional coordination and collaboration. Three PICs are members of the Convention on International trade in Endangered Species of Wild Fauna and Flora (CITES).

#### Assessment of the relevance of MDGI 26 and availability of data

At present (using the recommended IUCN-World Conservation Union definition) the indicator does not measure a number of types of protected areas important within the region, including areas protected solely through traditional or customary means, via local or provincial laws, or via community management programmes. The data presently available on marine and coastal protected areas do not allow a breakdown to be made of various marine and coastal environments (e.g. actual terrestrial, inshore reef, lagoon, offshore reef, etc.). The indicator also provides no assessment of protected area management, which in many cases is crucial to the effectiveness of protected areas. Consequently, at present, the indicator does not support accurate assessment of progress toward the target (Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources) with respect to biodiversity.

Available data are not complete, and do not allow assessment of whether protection measures are actually in place or whether or not they are effective.

### Recommendations relating to conservation of biological diversity

- Develop common regional definitions relating to protected areas for use with MDGI 26 that take into account the variety of types of protected areas in place in the region.
- Develop additional biodiversity-related indicators based on regionally-agreed 30-year goals, 5-year objectives, and measurable 5-year targets incorporated in the Action Strategy for Nature Conservation in the Pacific Islands Region 2003-2007.<sup>28</sup>
- Establish a permanent regional database of protected area information that is regularly updated by PICs, NGOs, etc.
- Build capacity of Pacific Islands to conduct surveys of species and collect baseline data.

<sup>26</sup> SPREP 2004.

<sup>27</sup> Held in Rarotonga, Cook Islands July 2002.

<sup>28</sup> These include the five-year objective of increasing the number of areas under effective conservation management, with an associated target of placing at least 5% of coastal and terrestrial areas under effective community-based conservation management in all PICs.

**MDGI 27. Energy use (kg oil equivalent) per \$ 1 GDP (PPP)**

The indicator provides a measure of energy intensity (which is the inverse of energy efficiency). Differences in this ratio over time and across countries reflect structural changes in the economy, changes in the energy efficiency of particular sectors and differences in fuel mixes. In principle, the lower the ratio, the better the energy efficiency.

No data are available for this indicator due to the lack of accurate PPP conversion factors for the region (see discussion on PPP conversion under Goal 1).

**Challenges relating to increasing energy efficiency in the Pacific<sup>29</sup>**

Primary energy uses in the Pacific are for the production and distribution of electricity, transport, and to a lesser degree, industry and agriculture. Improving the efficiency of energy production, distribution and utilisation will lead to a reduction of energy consumption per unit product or activity. In the past the Pacific region has been relatively poor at adopting practices and designs that promote energy efficiency. This stems from a lack of policy, a lack of information and education, and reluctance among consumers and energy suppliers (i.e. power utilities) to make the necessary up-front investments. It has been well demonstrated and recognised that more efficient energy systems will contribute to cost reduction, reduce fossil fuel imports, reduce demand, improve local air quality and reduce greenhouse gas emissions.

The Pacific Islands Energy Policy and Plan (PIEPP 2002) contains a number of regionally-agreed statements, strategies, activities and indicators relating to energy efficiency. The PIEPP is currently being reviewed to incorporate the collection of data and indicators for reporting on progress toward the target with respect to energy use.

**Assessment of the relevance of MDGI 27 and availability of data**

The indicator measures commercial energy use compared to the output from that energy (in economic terms). However, in PICs a majority of energy is consumed for power generation (often publicly owned) and transport (much of it non-commercial). As a result, improvements in efficiency in these sectors would not be reflected by this indicator. In addition, changes in the structure of the economy have almost the same affect on the ratio over time as do changes in energy intensity in various sectors.<sup>30</sup> Consequently, the indicator is a relatively crude measure for PICs, and does not provide the best assessment of progress toward the target with respect to energy efficiency.

Data for the indicator are not available, due to the lack of accurate PPP conversion factors for the region.

**Recommendations relating to increasing energy efficiency**

- Develop a shortlist of regionally-agreed energy efficiency indicators based on activities and indicators contained within the PIEPP 2002.

<sup>29</sup> Based on information from the Pacific Regional Submission to the 9th Session of the Commission on Sustainable Development and the Pacific Islands Energy Policy and Plan. Both represent a regional consensus (see PIFS 2000 and PIEPP 2002).

<sup>30</sup> UN 2004b.

## **MDGI 28. Carbon dioxide emissions and consumption of ozone-depleting CFCs**

MDGI 28 signifies the commitment to reducing carbon dioxide emissions and progress in phasing out the consumption of CFCs by countries that have ratified the Montreal Protocol. Carbon dioxide emissions are largely a by-product of energy production and use, and account for the largest share of greenhouse gases associated with global warming.

**Table 7.4 CO<sub>2</sub> emissions (metric tonnes per capita)**

	1990	2000
Cook Islands	2.37	2.84
Fiji	1.52	1.02
Kiribati	0.32	0.28
Nauru	15.53	16.16
Niue	1.57	1.57
Palau	15.00	13.00
Papua New Guinea	0.67	0.48
Samoa	0.81	0.83
Solomon Islands	0.54	0.40
Tonga	0.88	1.30
Vanuatu	0.94	0.42
<b>PIC median</b>	<b>0.94</b>	<b>1.02</b>

Source: Carbon Dioxide Information Analysis Center

Figures for CFC consumption are from reports submitted by PICs in accordance with the Montreal Protocol. All PICs for which data are available have either reduced CFC consumption to zero (Kiribati and Fiji) or are maintaining their consumption below the “CFC freeze level”, set as an average of the consumption between 1995 and 1997.

Most PICs have committed to phasing out the use of ozone-depleting substances by the end of 2005. Eight PICs (FSM, Kiribati, Marshall Islands, Palau, Solomon Islands, Tonga, Tuvalu and Vanuatu) are participating in a regional strategy to implement the Montreal Protocol; Fiji, Samoa and PNG are receiving assistance directly from the Montreal Protocol’s Multilateral Fund. The new Parties to the Protocol (Cook Islands and Niue) and Nauru will participate once funding is received to implement activities outlined in their National Compliance Action Plans.

## **Challenges and prospects for reducing CO<sub>2</sub> emissions and CFC consumption**

As various studies have confirmed, PICs are particularly vulnerable to climate change. PIC leaders have consistently advocated internationally for immediate reductions and limits to greenhouse gas emissions.<sup>32</sup> Notwithstanding the insignificant emissions of greenhouse gas from small Pacific Island countries, actions that contribute to increased use of non-carbon energy sources will ensure a more sustainable

### Assessment

Information on carbon dioxide emissions includes emissions from consumption of solid, liquid and gas fuels; cement production; and gas flaring.<sup>31</sup> Figures are reported in metric tonnes (MT) of carbon dioxide per capita. Numbers show low, relatively stable rates in most PICs, typically well below the average for Asia and Oceania (2.14 MT/capita). A number of PICs have shown a decrease in per capita emissions between 1990 and 2002; significant increases are recorded in Tonga and Cook Islands. Emissions in Nauru (16.16 MT in 2000) and Palau (13 MT in 2000) far exceeded those in the rest of the region. Data for Nauru for 2002 (13.58 MT) indicate a significant drop in emissions from 2000.

**Table 7.5 Consumption of ozone-depleting CFCs (ODP tons)**

	1990	2000
Fiji	38	0
Samoa	4	1
Solomon Is	2	1
Kiribati	1	0
Marshall Is	1	1
Palau	2	1
Tonga	2	1

Source: UNEP Ozone Secretariat

<sup>31</sup> National reporting to the United Nations Framework Convention on Climate Change that follows the Intergovernmental Panel on Climate Change guidelines is based on national emission inventories and covers all sources of anthropogenic carbon dioxide emissions as well as carbon sinks (such as forests); figures reported under those guidelines will differ from figures reported here.

<sup>32</sup> PIFS 2003.

energy path for the future.<sup>33</sup> Most PICs have already embarked on projects and activities in the context of commitments under the United Nation Framework Convention on Climate Change (UNFCCC), and these have led to significant abatement in the levels of greenhouse gas emissions.

The Regional Framework on Climate Change, Climate Variability and Sea-Level Rise was endorsed by Forum Leaders in their 2000 Communiqué.<sup>34</sup> The framework serves as an agreed basis for effectively addressing climate change and variability through a cooperative process among all stakeholders. The Climate Round-Table provides a mechanism by which stakeholders can cooperate and collaborate on climate related issues. Through the Pacific Islands Climate Change Assistance Program most PICs have produced a variety of climate change related outputs, such as greenhouse gas inventories, national vulnerability assessments, and climate change implementation plans.

PICs are continuing to cooperate on climate change issues globally through the Alliance of Small Islands States and the Barbados Plan of Action + 10 Review process. Other ongoing projects include the Climate Change Adaptation Program in the Pacific, the Pacific Islands Climate Change Assistance Program and the Capacity Building for the Development of Adaptation Measures in Pacific Island countries.

In addition to developing strategies to better understand and adapt to climate change, PICs are also taking steps to reduce their greenhouse gas emissions (through increased reliance on alternative energy technologies, as discussed under MDGI 29, below), and to institute carbon sequestering activities, such as increasing forested areas.

#### **Assessment of the relevance of MDGI 28 and availability of data**

The indicator measures carbon dioxide emissions per capita and consumption of CFCs. Accurate data on emissions from solid fuels and other non-fuel energy sources are not available, and thus the data presented may not give an accurate picture of carbon dioxide emissions, particularly in PICs with large rural populations, most of which lack access to electricity. PICs that currently have very low carbon dioxide emissions per capita may see increases in per capita emissions as economic development takes place, despite efforts to ensure environmental sustainability with respect to energy use.

PICs have already made significant progress toward ensuring that (with respect to energy use) the principles of sustainable development are incorporated into country policies and programmes, and the loss of environmental resources is avoided. Consequently, future reporting on the standard MDG indicators (where data are available) may lack sufficient specificity to allow for assessment of further progress toward the target. Data on CFC consumption are not currently available for all PICs.

#### **Recommendations relating to CO<sub>2</sub> emissions and CFC consumption**

- Develop alternative indicators for measurement of CO<sub>2</sub> emissions by source.
- Report on progress in eliminating the use of other ozone depleting substances in those PICs that have phased out CFC use.

#### **MDGI 29. Proportion of population using solid fuels**

Incomplete and inefficient combustion of solid fuels results in the emission of hundreds of compounds, many of which are health-damaging pollutants or greenhouse gases that contribute to global climate change. There are also important linkages between household solid fuel use, indoor air pollution, deforestation and soil erosion, and greenhouse gas emissions. Exposure to indoor air pollution is a complex phenomenon and depends on interactions of pollution source (fuel and stove type), pollution

<sup>33</sup> CROP EWG 2000.

<sup>34</sup> PIFS 2000a

dispersion (housing and ventilation) and the time-activity budget of household members. The type of fuel and participation in cooking tasks have consistently been the most important predictors of exposure.<sup>35</sup>

### Assessment

Figures for this indicator (which use the proportion of households rather than population) vary widely in PICs, from a low of 0.5% and 1% in Nauru and Palau, respectively, to highs of 74% (Tonga), 83% (Vanuatu) and 87% (Solomon Islands). These data are derived from national censuses. Questions typically ask respondents to indicate the primary fuel used for cooking.

The proportion of respondents using wood as a primary cooking fuel increased in some PICs (Marshall Islands, FSM, and slightly in Vanuatu). In the Marshall Islands, the increase (from 14% to 30%) was accompanied by a simultaneous decrease in the actual number of households cooking with electricity (from 1,827 households to 1,702). Marshall Island households cooking with kerosene increased in number but decreased as a percentage (from 48% to 40%).

**Table 7.6 Proportion of households using solid fuels (%)**

	1990	2000
Cook Is	19	11
Fiji		48
FSM	47	54
Marshall Is	14	30
Nauru	1	1
Niue	50	17
Palau	13	1
Samoa	72	63
Solomon Is		87
Tokelau	18	15
Tonga		74
Tuvalu	70	32
Vanuatu	82	83

Source: See Goal 7 Technical and Source Notes

The high dependence on solid fuels must be considered in conjunction with the high cost of and limited access to other forms of energy in the region (e.g. kerosene, gas and electricity). Access to electricity is estimated at 30% regionally, but varies from 10% to 100% at the national level;<sup>36</sup> in Vanuatu in 1999 only 7% of rural and 25% of all households had access to electricity. Having access to electricity does not necessarily result in a decline in use of solid fuel for cooking, however. In Tonga in 1996, 80% of the population reported having access to electricity, but 74% used wood for cooking (1996 census data).

Households use some 60% of all biomass energy used in PICs, with small cottage industry uses (e.g. copra and crop drying) accounting for about 40%.<sup>37</sup>

Deforestation due to fuelwood harvesting is an issue in some PICs, particularly in periurban areas. Data reviewed under MDGI 25 suggests that many PICs are already placing significant pressure on forest resources, including mangrove forests. The issue of sustainability with respect to biomass fuels is well recognised in the region. A recent biomass resource assessment initiative undertaken in six PICs has led to the development of a technical report addressing the sustainable development of biomass resources.<sup>38</sup>

### Challenges and prospects relating to the use of solid fuels

Pacific Island countries and territories face a unique and challenging situation with respect to provision of energy for sustainable development:<sup>39</sup>

- Many PICs have small, isolated population centres;
- Energy markets are typically small, difficult to serve, and lack significant economies of scale;
- PIC ecosystems are predominantly influenced by marine systems that complicate infrastructure development and render environmental impacts significant;

<sup>35</sup> UN2004b.

<sup>36</sup> PIEPP 2002.

<sup>37</sup> ICEPT 2003.

<sup>38</sup> SOPAC 2004.

<sup>39</sup> PIEPP 2002.

- Most PICs lack domestic petroleum resources and few have hydropower potential;
- Environmental damage, habitat loss and pollution resulting from development and use of conventional energy sources have significant effects on fragile island ecosystems;
- Security of existing energy supplies is low, due to the limited storage for bulk petroleum fuels, which are sourced over a long supply chain at relatively high prices; and
- The development of renewable energy resources has been limited by the availability of appropriate technology, poor institutional mechanisms, and the challenges of developing systems for small remote markets at reasonable cost.

In combination these factors complicate the provision of affordable energy sources that could provide sustainable alternatives to the widespread use of biomass fuels.

PICs are committed,<sup>40</sup> however, to developing and improving access to affordable, reliable, and environmentally sound energy for sustainable development, as envisioned under Target 9. The Pacific Islands Energy Policy and Plan has been developed by Pacific regional organisations and endorsed by PICs, and serves as the common framework for implementing energy sector improvements. It recognises the fundamental importance of access to energy for economic and social development, but also the need to ensure that energy use and resource development is undertaken in a way that is compatible with the special needs and circumstances of PICs. A number of energy related projects are ongoing, including the Pacific Islands Renewable Energy Project, the Renewable Energy and Energy Efficiency Program, the Regional Power Side Management project, the Sustainable Utilisation of Renewable Energy (SURE) project, Copra Oil for Power Generation and for Transportation, and the Pacific Islands Energy Policy and Strategic Action Planning project. A number of related efforts are being undertaken at the national level.

### **Assessment of the relevance of MDGI 29 and availability of data**

In order to assess progress toward the target (Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources), household energy usage may need to be more broadly evaluated than is the case with the present indicator. For example, indicators could measure the proportion of households making use of electricity generated from non-fuel, waste-fuel or appropriate bio-fuel sources, the proportion of households using solar water heaters, etc. Although data on household biomass usage are generally available, by itself it does not allow for accurate assessment of progress toward the target.

### **Recommendation relating to the use of solid fuels**

- Develop appropriate regionally-agreed energy indicators, based on activities and indicators contained within the PIEPP 2002, that will more accurately measure progress in achieving energy development that successfully integrates the principles of sustainable development and delivers direct benefits to PIC populations.

## **Target 10: Halve the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015**

### **MDGI 30. Proportion of population with sustainable access to an improved water source, urban and rural**

The indicator monitors access to improved water sources based on the assumption that improved sources are likely to provide safe water; “unsafe” water is the direct cause of many diseases in developing countries. Access to safe water refers to the percentage of the population with reasonable access to an

<sup>40</sup> PICs have confirmed this in various fora and documents, including the Rarotonga Declaration (see PIEPP 2002).

adequate supply of safe water in their dwelling or within a convenient distance of their dwelling. The Global Water Supply and Assessment Report 2000<sup>41</sup> defines *reasonable access* as “the availability of 20 litres per capita per day at a distance no longer than 1,000 metres”. However, access and volume of drinking water are difficult to measure and so sources of drinking water that are thought to provide safe and reliable supply of water are used as a proxy.

## Assessment

Questions regarding “source of water supply” and “source of drinking water” are included in most PIC censuses. The data reported in Table 7.7 indicate relatively high proportions of households have sustainable access to improved water sources. Each country’s water source categories are different, however, and do not in themselves indicate whether they can be considered “improved” according to the definition used above. More importantly, the definitions (and hence the data) do not indicate whether a source consistently provides access to safe water. Table 7.9 includes water source definitions used by various PICs, and how these sources have been ranked (improved vs not improved) for the purposes of this analysis. In evaluating these definitions an attempt has been made to take into account what would be considered improved and not improved within each PIC. Inconsistency between definitions and uncertainty over the quality of the water *means these data must be used with great caution when*

*assessing access to water supplies.* As an example, if safe water in Samoa is defined to include only “treated” water, 52% of households would be assessed as having access to an improved water source. Water that is not treated may not be safe to drink: in Marshall Islands 70% of the catchments (tanks) tested in 1999 were contaminated.

MDGI 30 refers to “sustainable access”, but the available data measure neither the sustainability of water sources or the sustainability of access to those sources; no indication of

**Table 7.7 Proportion of households with sustainable access to an improved water source (%)**

	Urban		Rural		Total	
	1990	2000	1990	2000	1990	2000
Fiji	95	98	55	65-82	71	93
FSM	94	94	88	92	79	87
Kiribati	54	60	25	42	35	49
Marshall Is	97	83	85	87	93	85
Nauru					72	82
Niue	99	100	99	100	99	100
Palau	84	78	97	95	89	84
PNG		93		30		40
Samoa	99	92	89	88	91	89
Solomon Is		81		22		30
Tokelau					82	85
Tonga	97	97	90		92	
Tuvalu	93	94	98	98	90	93
Vanuatu	96	91	71	71	76	75

Source: see Goal 7 Technical and Source Notes

either quality or quantity of water is given by the census data. Other information sources indicate significant problems are being experienced across the region.

Atolls and other small islands that rely on either rainwater collection or pumping of groundwater in basal aquifers are especially vulnerable to problems with quantity and quality of water supplies. Climatic variability, as measured by El Nino/Southern Oscillation (ENSO) episodes, has been increasing in the region over the last two decades, and may be linked to climate change resulting from increasing concentration of greenhouse gases.<sup>42</sup> ENSO-associated drought in 1998 resulted in some of the worst water shortages on record across much of the region, including in the Marshall Islands, Nauru, PNG, Fiji,

<sup>41</sup> WHO/UNICEF 2000.

<sup>42</sup> Most climate models predict an increase in the frequency of ENSO episodes and in the intensity of cyclones (ADB 2002a). Large waves associated with tropical storms can cause contamination of groundwater supplies in atolls and small islands.

Tonga, and Samoa. A national emergency was declared in FSM in 1998 when 40 atolls ran out of water, while the Marshall Islands imposed severe water rationing, declared the country a disaster area and brought in desalinisation plants.<sup>43</sup> Although water shortages are typically most severe on atolls and small islands, large islands are also susceptible: the drought from August 1997 to March 1998 in the PNG highlands was so severe that emergency airlifts were made with food and water.<sup>44</sup>

Problems relating to intermittent access can be inferred from responses to a question in the Fiji census regarding whether the household water supply “ever dries up”. Nationally, 37% of households responded that their water supply does dry up (either “sometimes” or “every year”). In some remote areas the percentage was much higher (e.g. Kadavu 80%, Lau Islands 76%). Some 60% of villagers in Samoa surveyed by ADB in a participatory assessment indicated that their water supplies were intermittent and water had to be boiled due to the poor quality; in Kiribati water in South Tarawa is available only intermittently, and must be boiled.<sup>45</sup> Some of the problems with water supply can be attributed to leakage from old water systems (estimated at 45% in Fiji in 1995).<sup>46</sup>

The issue of impacts to human health due to contamination of water supplies has been recognised for many years; “the pollution of drinking water and the resulting health hazard may be one of the biggest watershed issues in island countries of the South Pacific”.<sup>47</sup> High incidence of diarrhoeal diseases and other infectious diseases (e.g. hepatitis, typhoid and cholera) on some small islands is often caused by poor quality groundwater used as a source of drinking water;<sup>48</sup> outbreaks of cholera in PICs have been linked to contaminated water (e.g. Tarawa in 1977, and FSM (e.g. Chuuk in 1982-83 and Pohnpei in 2000). The incidence of diarrhoeal diseases in PICs has been found to vary with water availability and climate,<sup>49</sup> with high disease incidence associated with low water availability, and higher temperatures.

Pollution of water supplies from sanitation systems is a priority issue as it can have severe health impacts on individuals and populations. Small islands with high population densities (e.g. main population centres on atolls) are particularly affected. Significant reduction in microbiological pollution of groundwater or surface water resources requires installation of appropriate, affordable sanitation systems in small island communities. Pollution problems are generally greater in urban and periurban areas with high population densities where the sanitation systems are principally pit toilets (either latrine or pour flush) and septic tanks, but many smaller villages also either exhibit high bacterial levels in groundwater or have the potential for such pollution. The problem is endemic in many small low-lying coral islands of the Pacific and other regions and is a major constraint to improvements in water quality.<sup>50</sup>

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<sup>43</sup> Burns 2002.

<sup>44</sup> UNESCAP 2000.

<sup>45</sup> Abbott and Pollard in press.

<sup>46</sup> UNESCAP 2000.

<sup>47</sup> Baisyet (1994) quoted in Falkland 2002: 22.

<sup>48</sup> Falkland 2002.

<sup>49</sup> Ibid.

<sup>50</sup> Ibid.



### Challenges and prospects for expanding access to safe water

The data quoted above are part of a significant body of evidence that indicates sustainability of water resources is a significant and increasing problem in much of the region as a consequence of drought, population growth, increasing water demand for tourism, agriculture and industry, and aging water systems. The problems are not new; many of these issues were identified as concerns over 20 years ago.<sup>51</sup> Nevertheless, comprehensive, comparable data to evaluate access to fresh water on a regional basis are scarce. In many PICs, knowledge about the type, extent and sustainable yields of surface and groundwater resources is very limited. This is true even on islands where water shortages occur as a result of demand exceeding supply during drought periods. Problems in the knowledge base include:<sup>52</sup>

- A lack of baseline water resources assessments,<sup>53</sup>
- Insufficient regular monitoring of water resources;
- Limited analysis and interpretation of water resources data for planning and design of water resources development projects, and for management of catchments.

PICs have committed<sup>54</sup> to taking action to address pressing water-related issues in the region and to meet Target 10 (halving the proportion of people without sustainable access to safe drinking water by 2015) through implementation of the Pacific Regional Action Plan on Sustainable Water Management. How the Regional Action Plan will be implemented varies across the region.

The Pacific Regional Action Plan on Sustainable Water has been incorporated into a Type II Initiative and was submitted by PICs to the UN Commission for Sustainable Development in Johannesburg during the World Summit on Sustainable Development held in August 2002. The objective of the initiative is to implement the Pacific Regional Action Plan on Sustainable Water Management and two related strategies (the Pacific Wastewater Policy Statement and the Pacific Wastewater Framework for Action) as effectively as possible.

### Assessment of the relevance of MDGI 30 and availability of data

Access to safe and adequate supplies of water are vital for human health and development, making this target and associated indicator very relevant for all PICs. Ongoing problems related to water quality and resource availability highlight the need for accurate information regarding access to safe water resources.

Although data (collected through censuses as reported above) are available, the definitions used hamper regional comparison and accurate analysis.

### Recommendation relating to access to safe water

- Adopt relevant regional definition(s) that are compatible with the Regional Action Plan on Sustainable Water Management and allow accurate assessment of access to safe water through household surveys. Process indicators could also be included that measure progress in implementing the Regional Action Plan.

<sup>51</sup> UNESCAP 2000.

<sup>52</sup> Falkland 2002; ADB 2003b.

<sup>53</sup> Although adequate baseline water resource assessments have been undertaken for some of the major urban centres on main islands, they have often not been carried out for smaller towns and villages on main islands and for outer islands. In addition, there is generally very little (or no) baseline water quality data. Water quality testing, particularly for pathogenic organisms, is also not commonly conducted, especially in outer islands. Testing is often conducted only after major health problems are detected (Falkland 2002).

<sup>54</sup> The Regional Action Plan was developed through the Pacific Regional Consultation On Water In Small Island Countries held 29 July – 3 August 2002, in Sigatoka, Fiji as part of the preparatory process for the Third World Water Forum. See ADB (2002a). The Pacific Regional Action Plan on Sustainable Water Management was endorsed by Pacific Island Leaders at the Thirty-Fourth Pacific Islands Forum, 14-16 August 2003 (PIFS 2003).

**MDGI 31. Proportion of urban population with access to improved sanitation**

<b>Table 7.8 Proportion of households with access to improved sanitation<sup>a</sup></b>		
	<b>1990</b>	<b>2000</b>
Fiji	98	99
FSM	34	44
Kiribati	24	31
Marshall Is	74	80
Nauru	65	97
Niue		100
Palau	98	99
Samoa	98	100
Solomon Is		23
Tokelau	33	69
Tuvalu	77	86
Vanuatu	90	95

Source: See Goal 7 Technical and Source Notes  
<sup>a</sup> Facilities ranked according to WHO/UNICEF sanitation

water sources), or properly maintained.

**Assessment**

Table 7.8 lists the proportion of households with access to improved sanitation, when facilities are classified in a manner that generally conforms to the WHO/UNICEF definitions<sup>55</sup> intended for use with MDGI 31, which assumes pit toilets and latrines to be adequate. (The sanitation definitions used by various PICs, and how these sources have been ranked (improved vs. not improved) for the purposes of this analysis are given in Table 7.10, in the Technical and Source Notes). Inconsistency between definitions and uncertainty over quality of construction and maintenance and location of pit, latrine and similar facilities, means the data in Table 7.8 must be used with great caution when assessing adequacy of sanitation facilities. Use of these classifications suggests that most of the inhabitants in the majority of PICs have access to improved sanitation facilities; significant exceptions include FSM (44% improved), Kiribati (31% improved), and Solomon Islands (23% improved). The low percentages recorded by FSM and Solomon Islands is due in part to the phrasing of their census questions, however, in which pit toilets are grouped under “other”, which is defined here as not improved.

The definitions adopted by WHO and UNICEF are necessarily generalisations that are not equally appropriate in all PICs, or in all parts of some PICs, due to differing environmental conditions. The intent behind MDGI 31 is reduction of health problems associated with improper disposal of human waste. While various types of pit toilets, septic systems and cesspools can serve this function in many environments, on atolls and small islands pit toilets can cause direct contamination of groundwater found in basal aquifers.<sup>56</sup> Contamination is less of a problem with septic tanks if they are well constructed and maintained, but this cannot be assumed. Raw sewage may leak from septic tanks due to poor construction or because of overflowing caused by not de-sludging the septic tank, which leads to blockages. Sanitation facilities are also often sited without concern for the direction of groundwater flow, and according to guidelines that are not applicable to island environments.

The normally accepted minimum distance between a sanitation facility and a freshwater well is about 15 m, but this distance is based on studies in environments quite different from those found on many small islands. Travel times through the groundwater between sanitation facilities and freshwater wells can be

<sup>55</sup> WHO/UNICEF 2000

<sup>56</sup> Falkland 2002

short in small island environments.<sup>57</sup> The proximity or density of household sanitation systems is also a problem, especially on small coral islands. Acceptable densities and separation distances suggested by studies relevant to tropical islands are exceeded in many PICs, especially in urban areas. The problem of extensive groundwater pollution is prevalent not only in Pacific coral islands, but has also been demonstrated on other small islands (e.g. coral islands in the Maldives). Health consequences can be serious, as reviewed above under MDGI 30. Consequently, the use of pit latrines and septic tanks is considered “definitely not appropriate in coral islands and many coastal areas of high islands”.<sup>58</sup>

If the available data on facilities used by PIC households is evaluated using altered definitions for improved and unimproved (considering various types of pit toilets as *not improved*), a rather different picture of sanitation emerges (see Fig. 7.3). Using the altered definition, significant declines in the proportion of improved facilities are evident in a number of PICs (notably Vanuatu, PNG, Tuvalu and Fiji); rates are then below 50% in seven PICs.

Neither approach taken here with regards to interpretation of the sanitation data is ideal, as the information is ultimately inadequate: many assumptions must necessarily be made regarding the suitability of waste disposal methods, and of facility location, construction and maintenance. As the WHO/UNICEF Global Water Supply and Sanitation Assessment Report<sup>59</sup> states:

One of the findings of the current assessment is that there is a lack of information on the safety of the water served to the population and on the adequacy of sanitation facilities. Population-based surveys do not provide specific information on the quality of the drinking-water or precise information on the adequacy of sanitation facilities.

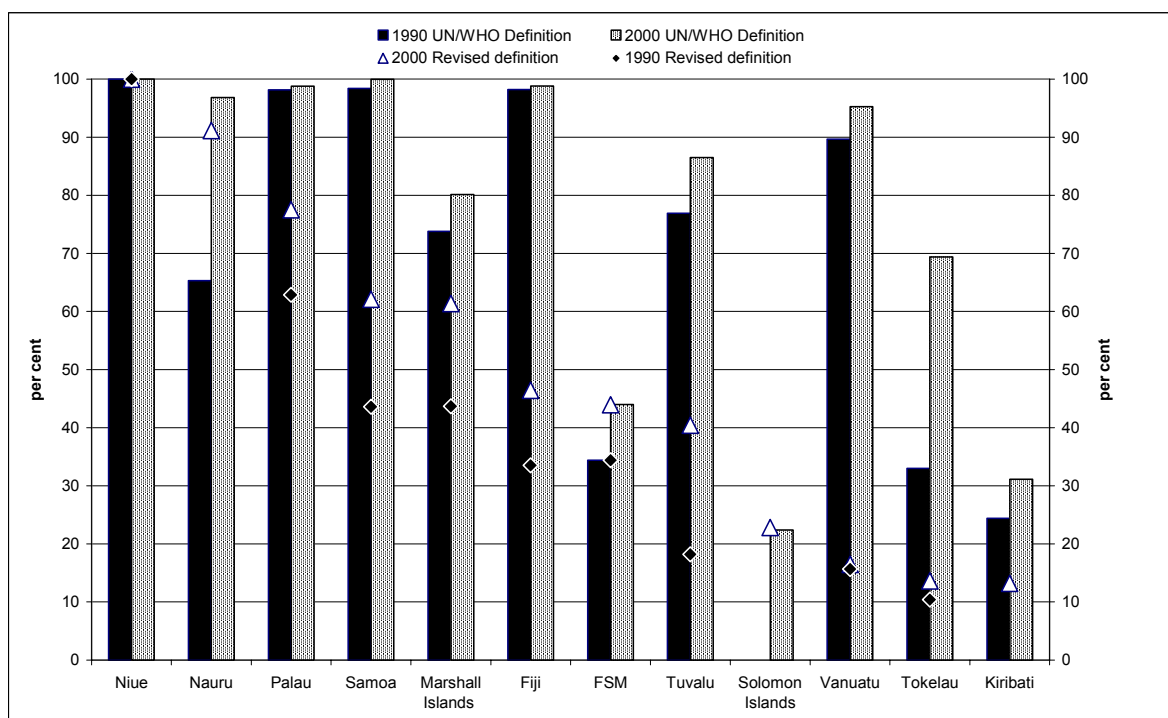


Figure 7.3 Proportion of households with access to improved sanitation, using differing definitions

<sup>57</sup> Ibid.

<sup>58</sup> Ibid.

<sup>59</sup> WHO/UNICEF 2000.

### **Challenges and prospects for expanding access to improved sanitation**

Through the Pacific Wastewater Statement and the associated Pacific Wastewater Framework for Action PICs, and the Pacific Regional Action Plan on Sustainable Water Management (see MDGI 30), PICs have committed to taking action to address pressing sanitation-related issues in the region and to meet Target 10 (halving the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015.). How the Regional Action Plan will be implemented varies across the region.

#### **Assessment of the relevance of MDGI 31 and availability of data**

Access to basic sanitation that serves to protect human health and environmental quality (including water resource quality) is of vital importance for both human health and development, making this target and associated indicator very relevant for all PICs. Inadequate sanitation systems currently have a significant impact on water quality and human health in many PICs, making collection and analysis of relevant sanitation related data a high priority

Although census data are readily available, the definitions used and the many assumptions that must be made when interpreting the data greatly hamper accurate analysis and regional comparison.

As noted under MDGI 30, the Pacific Regional Action Plan on Sustainable Water has been incorporated into a Type II Initiative. The objective of the initiative is to implement the Pacific Regional Action Plan on Sustainable Water Management and two related strategies (the Pacific Wastewater Policy Statement and the Pacific Wastewater Framework for Action) as effectively as possible.

### **Recommendations relating to improved sanitation**

- Adopt relevant regional definition(s) that are compatible with the Regional Action Plan on Sustainable Water Management and allow accurate household survey-based assessment of access to basic sanitation that serves to protect human health, possibly with differing assessments of facility suitability according to the environment in which the facility is located.
- Develop process indicators that measure progress in implementing the Pacific Wastewater Framework for Action and the Regional Action Plan on Sustainable Water Management.

#### **Summary and prospects for ensuring environmental sustainability**

It is difficult to make an accurate assessment of progress toward the Goal 7 targets from existing quantitative data. Data addressing the standard MDG indicators for Goal 7 are not uniformly available, and not of consistent quality. In a number of cases modifications are needed to the standard indicator definitions (and/or changes needed to the indicators themselves), if a meaningful assessment of regional progress is to be made.

There is strong political commitment within the region to the principle of environmental sustainability, and good regional cooperation in all areas covered under this goal, as evidenced by the various regional frameworks and action plans adopted in relation to environmental and resource issues. A summary of ongoing external assistance to PICs in areas of relevant to Goal 7 indicates over USD 200 million is allocated at the regional and national levels.<sup>60</sup>

There are significant ongoing efforts to harmonise environmental indicators and develop relevant goals against the environmental priorities of the region (e.g. State of the Environment Reporting (SOE), the Environmental Vulnerability Index (EVI), PRISM and the development of indicators for regional environmental and resource policies). Some environmental priorities (such as solid waste management) are not reflected in the MDGs or their indicators, and should be addressed in the context of future Pacific MDG reporting. Qualitative information should also continue to be collected and evaluated, due to the lack of reliable quantitative data relating to Goal 7 indicators.

<sup>60</sup> ADB 2004.

**Goal 7 Technical and Source Notes**

**MDGI 25:** *The proportion of land area covered by forest* is forest areas as a share of total land area, where land area is the total surface area of the country, less the area covered by inland waters, such as major rivers and lakes. Assessment of the proportion of forest area is intended to provide an indication of the relative importance of forests in a country, with the change in forest area over time reflecting the “unregulated demand” for land and forest products.<sup>61</sup> Accurate measurement of *proportion of land covered by forest* is complicated by the varying definitions for forested land used internationally. These definitions reflect the various values that forests can potentially have.<sup>62</sup> As well as being a source of timber and non-timber resources (for subsistence and local use as well as export), forests can provide people with a number of very important ecological services (e.g. watershed protection, coastal protection, reservoirs of biological diversity, soil conservation, etc.). The degree to which forests provide some or all of these functions depends on the particular forest type and its location (i.e. monoculture plantations may provide timber and some protection services but not serve as reserves of biological diversity).

The forested areas definition used in this report for calculating the proportion of land area covered by forest does not correspond to the definition called for above. Figures presented here include all forest types (including mangroves, dry and wet woodlands and coconut and broadleaf forest areas), but exclude forest plantations and any bare land.

**Sources:** Figure for Samoa: Samoa Draft MDG Report 2004; Marshall Islands: SPREP Strategy for Nature Conservation 1999-2003; Palau: FAO. All other information from Heads of Forestry meeting reports (variously from 1991, 1992, 1993, 1994, 1995, 1996, 1998, 2000, 2003).

**MDGI 26:** *The ratio of area protected to maintain biological diversity to surface area* is defined as nationally protected area as a percentage of total surface area of a country. The generally accepted IUCN–World Conservation Union definition of a protected area is an area of land or sea dedicated to the protection and maintenance of biological diversity and of natural and associated cultural resources, and managed through legal or other effective means. To calculate the ratio, protected areas (including both terrestrial and marine) are totalled and expressed as a percentage of the total surface area of the country. The total surface area of the country is intended to include terrestrial area plus any territorial sea area (up to 12 nautical miles). Note that for the Pacific region, terrestrial area figures that include territorial seas are not available. Consequently, data are reported only for terrestrial protected areas, as a proportion of total land area. See text and Fig. 7.2 for figures that include coastal and marine protected areas.

**Sources:** All data from Pacific Protected Area Database, established and maintained by Conservation International (last revision July 2003). Exceptions: Samoa data from: Samoa Draft MDG Report 2004; PNG data: MDG TWG 2004.

**MDGI 27:** *Energy use (kilogram oil equivalent) per \$1,000 GDP (PPP)* is commercial energy use measured in units of oil equivalent per USD 1,000 of GDP, converted from national currencies using purchasing power parity (PPP) conversion factors.

No data are presented as accurate PPP conversion factors for PICs are not available.

**MDGI 28:** *Carbon dioxide emissions per capita* is the total amount of carbon dioxide emitted by a country as a consequence of human (production and consumption) activities, divided by the population of the country. In the global carbon dioxide emission estimates of the Carbon Dioxide Information Analysis Center of Oak Ridge National Laboratory in the United States, the calculated country emissions of carbon dioxide include

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<sup>61</sup> UN 2004b.

<sup>62</sup> FAO 2002.

emissions from consumption of solid, liquid and gas fuels; cement production; and gas flaring. Data are expressed in metric tons of carbon dioxide per capita.

*Consumption of ozone-depleting chlorofluorocarbons (CFCs) in tons (ozone-depleting potential or ODP)* is the sum of the consumption of the weighted metric tons of the individual substances (defined in the Montreal Protocol on Substances that Deplete the Ozone Layer), multiplied by their ozone-depleting potential. Ozone-depleting substances are any substance containing chlorine or bromine that destroys the stratospheric ozone layer. The stratospheric ozone absorbs most of the biologically damaging ultraviolet radiation.

**Sources:** Carbon dioxide emissions data from the Carbon Dioxide Information Analysis Center (2003); CFC consumption data from the UNEP Ozone Secretariat (UNEP 2004).

**MDGI 29:** *Proportion of population using solid fuels* is the proportion of the population that relies on biomass (wood, charcoal, crop residues and dung) and coal as the primary source of domestic energy for cooking and heating. Note that data presented in this report are for proportion of households rather than proportion of population.

**Sources:** national population and housing censuses. Figure for Palau is the percentage of households with no cooking facilities. Figures for other countries are the percentage of households whose main source of fuel for cooking is wood, charcoal or “other” sources.

**MDGI 30 and 31:** see below.

**MDGI 32:** *The proportion of households with access to secure tenure* is the percentage of the urban population that lives in slums. In the absence of data on number of slum dwellers, the United Nations Human Settlements Programme (UN-HABITAT) produces estimates based on a definition of slums as agreed by the Expert Group Meeting on Urban Indicators in 2002. These indicators will be adjusted and the definitions of secure tenure and slums will be refined through future consultations with Expert Group Meeting participants and their related networks of professionals.

Secure tenure refers to households that own or are purchasing their homes, are renting privately or are in social housing or sub-tenancy. Households without secure tenure are defined as squatters (whether or not they pay rent), the homeless and households with no formal agreement.

A slum household is defined by UN-HABITAT as a group of individuals living under the same roof that lack one or more (in some cities, two or more) of the following conditions: security of tenure, structural quality and durability of dwellings, access to safe water, access to sanitation facilities and sufficient living area.

**Note:** Secure tenure has not been adequately defined for the Pacific region, and data for this indicator are consequently not available.

Table 7.9 Improved water definitions used in PIC censuses

Country	Improved water	Not improved water
Fiji Is	metered roof tank well borehole	communal standpipes river or creek other not stated
FSM	public system only community system only community system, catchments public system and catchment catchment tank or drum	individual well public standpoint/hydrant distilled water others
Kiribati	piped water protected well	open well other rainwater
Marshall Is	piped water rain catchment	well bottled water other not reported
Nauru	dispatch/desalinisation plant shared water supply well/ground	rain other not stated
Palau	public water rain water	bottled water bottled water and rain water
PNG	piped to household piped to CU water tank	well piped to other CU stream/creek other
Samoa	piped water exclusive piped water shared well or spring tap	river/lake rain paid bottle other
Solomon Is	piped inside piped outside private rain tank	piped outside shared borehole well river stream other
Tonga	piped own tank	own well other not stated
Tuvalu	tank cistern tank and cistern	well community cistern communal tap other not stated
Vanuatu	own pipe shared pipe home tank well shared tank	village standpipes river spring others not stated

**MDGI 30:** *The proportion of the population with sustainable access to an improved water source, urban and rural, is defined to include the percentage of the population who use any of the following types of water supply for drinking: piped water, public tap, borehole or pump, protected well, protected spring or rainwater. Improved water sources do not include vendor-provided waters, bottled water, tanker trucks or unprotected wells and springs.*

Inconsistencies between definitions and uncertainties over water quality mean the data in this report should be used with caution when assessing access to “safe” water supplies. See text and Table 7.9 for details.

**Sources:** Unless stated otherwise information is from last two censuses. PNG data: PNG Draft MDG Report 2004; Fiji 1990 data from the 1986 Census; 2000 data from the Fiji Draft MDG Report 2004. For Nauru (2002) an additional census question on water supply reliability found that 76% “never or sometimes have water during dry periods.” Note that for Tokelau there is no distinction between urban and rural on the atolls.

Figures may differ from rates calculated previously because of the definitions of improved and not improved.

**Table 7.10 Sanitation definitions used in PIC censuses**

Country	Improved sanitation	Not improved sanitation
Fiji Islands	own flush water sealed shared toilet pit latrine improved	other none not stated
FSM	flush toilet inside flush toilet outside improved	other or none
Kiribati	flush toilet water seal latrine shared flush toilet improved	attolette lagoon beach ocean beach public toilet other
Marshall Is	flush toilet water seal pit latrine improved	none other not reported
Nauru	tank flush inside tank flush outside own toilet facility tank flush share pour flush inside pour flush outside pour flush share share toilet facility improved	none not stated
Palau	flush toilet outhouse or privy improved	other or none
PNG	flush toilet own flush toilet shared traditional pit latrine improved latrine	bucket system closet over sea/river no facility
Samoa	flush with septic exclusive flush shared pisikoa type exclusive pisikoa type shared pit exclusive pit shared	none
Solomon Is	modern toilet inside modern toilet outside outside toilet shared	location not stated not modern not stated
Tuvalu	flush toilet pour flush toilet water seal	reef latrine other none not stated
Vanuatu	own flush toilet shared flush toilet own sealed toilet shared sealed toilet own VIP toilet shared VIP toilet own pit toilet shared pit toilet	other none not stated

**MDGI 31:** *Proportion of the population with access to improved sanitation* refers to the percentage of the population with access to facilities that hygienically separate human excreta from human, animal and insect contact. Facilities such as sewers or septic tanks, pour-flush latrines and simple pit or ventilated improved pit latrines are assumed to be adequate, provided that they are not public, according to the World Health Organization (WHO) and United Nations Children's Fund's (UNICEF) Global Water Supply and Sanitation Assessment 2000 Report.<sup>63</sup> To be effective, facilities must be correctly constructed and properly maintained.

Significant methodological and practical problems are involved in the collection of this data.<sup>64</sup> These include:

- The data are typically collected as part of more general surveys (e.g. household surveys or censuses), and questions may not be designed correctly.
- Facility quality is not systematically addressed.
- The timing of collection and analysis of household survey data is irregular, with long intervals between surveys.

The inadequacy of information regarding suitability of waste disposal methods and of facility location, construction and main-tenance means these data should be used with caution when assessing access to "improved" sanitation. See text and (Table 7.10) for details.

**Sources:** Information is from last two censuses. Figures may differ from rates calculated previously because of the definitions of improved and not improved.

<sup>63</sup> WHO/UNICEF 2000.

<sup>64</sup> UN 2004b.