

Criterion 6, Indicator 33—Degree of Recycling of Forest Products

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The purpose of this report is to provide information on the rationale and data provided for Indicator 33 for the U.S. *National Report on Sustainable Forests—2003*. Information on the rationale for the indicator and recommended data to be developed are taken from the report of the Technical Advisory Committee of the Montreal Process¹ and from reports from the technical workshops of the U.S. Roundtable on Sustainable Forests Criteria and Indicators. Data that have been developed are displayed and sources are provided. The data are summarized in the *National Report on Sustainable Forests—2003*.²

A. Rationale for use of the indicator

1. Rationale from the Technical Advisor Committee (TAC)

As global demands for forest products increase, there is a growing awareness of the opportunity and need to extend and improve the efficiency and use of forest products through recycling. This indicator identifies the extent to which recycling/reuse of forest products occurs and can be linked to the conservation of forest resources, as well as reduction in solid waste.

Approaches to measurement

- Volume of paper and paper products re-used/recycled each year.
- Volume of solid wood products re-used/recycled each year; for example, products used in building and construction.
- Market share of recycled products.

Data for this indicator may be provided by the following:

- Government agencies and industry sources.
- Volume of products recycled may be reported as a proportion of annual consumption or production to obtain an indication of the degree of recycling.

2. Interpretation of the indicator as proposed by the TAC

Recycling and re-use are important ways of minimizing waste. High levels of re-use and recycling (particularly as a proportion of consumption) reduce the pressure on forest resources, thus contributing to resource conservation objectives and solid waste reduction.

¹ See http://www.mpci.org/tac/mexico/tn1-6_e.html

² See <http://www.fs.fed.us/research/sustain/>

3. Questions raised by Criteria Technical Committee Six (CTC 6)

- There are no national conservation objectives.
- There is no agreement about the purpose and role of recycling and forest sustainability.
- Increased recycling could be counterproductive to resource conservation—if recycling is emphasized, it could serve as a disincentive for forest investment or retention of forest areas.
- Waste management motivates recycling more often than resource management.
- Recycling is an imperfect tool for tracking pressures on forest resources.
- There is a component of recycling that involves legal mandates in the paper industry.
- How this indicator contributes to forest sustainability is much more complex than the TAC notes interpretation suggests.

B. Data provided to quantify the indicator

The data provided for this indicator focus on

- Recovery of paper from domestic consumption, indicating which portions are used for domestic production and for exports (Table 33–1)
- Portions for solidwood waste that are not yet recovered from municipal solid waste, construction and demolition waste, and mill residue (from wood processing plants) (Table 33–2)

C. Interpretation of data relative to rationale from TAC

The estimate of recovery rate for paper (amount recovered from amount consumed) meets the intent of the rationale to indicate “the extent to which recycling/reuse of forest products occurs.” The recovery rate includes amounts that are recycled in U.S. production and amounts sent overseas.

The estimate of recovered paper utilization rate (wastepaper used in making U.S. paper as a fraction of U.S. paper production) meets the intent of the rationale to indicate a “link to conservation of forest resources” in the United States. Use of recovered paper tends to offset use of U.S. forest resources (roundwood) to make paper.

The estimate of the percentage of recovered paper that is exported indicates the degree to which U.S. paper recovery may be used to offset use of forest resources (roundwood) to make paper overseas.

To indicate the extent of recycling of solid wood, we provide estimates on recovery for three sources—municipal solid waste, construction and demolition waste, and mill residue. Estimates are shown of the total amount of wood waste generated, the amount recycled, burned or unavailable, and the percentage available. The trend in the percentage still available for recycling indicates the degree to which more wood may still be recovered to offset use of forest resources.

D. Limitations of data

Data on recovery and reuse of wood from municipal waste and construction waste and demolition are not complete. Estimates are only available on total that is recovered or unavailable.

E. Options available for remedy if current data are not adequate to measure the indicator

Data on solid wood recycling are for certain specific industries such as pallet manufacture and could be displayed.

Data on use of yard trimmings, municipal solid waste, and construction and demolition waste may need surveys of generators of waste and identified users of waste wood to determine amounts recycled.

F. Cross-cutting issues/relationships with other indicators

Data from this indicator are being constructed to be consistent with indicators on production (29), and consumption (31).

References

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(<http://www.fpl.fs.fed.us/documnts/FPLrp/fplrp595/fplrp595.htm>)

McKeever, D. B. 1999. How woody residuals are recycled in the United States. *Bio Cycle* 40(12):33–44.
(<http://www.fpl.fs.fed.us/documnts/pdf1999/mckee99a.pdf>)

Table 33-1—Recovered paper consumption, imports, exports, recovery rate, and utilization rate, 1965–1999

| Year | Recovered paper | | | | | | | | | |
|------|--|---|---|--|-----------------------------------|-----------------------------------|---|-------------------------------------|--|---|
| | Paper and board, new supply ^a (thousand tons) (1) | Paper and board production ^b (thousand tons) (2) | Consumed at paper and board mills (thousand tons) (3) | Consumed for molded pulp, insulation, and other uses (thousand tons) (4) | Exports (thousand tons) (5) | Imports (thousand tons) (6) | Total recovered paper (thousand tons) (7)=(3)+(5)-(6) | Recovery rate (%) (8)=(7)/(1) | Recovered paper utilization rate (%) (9)=(3)/(2) | Recovered paper exported (%) (10)=(5)/(7) |
| 1965 | 48,270 | 40,489 | 10,231 | — | 292 | 108 | — | — | 25.3 | |
| 1966 | 52,118 | 43,904 | 10,564 | — | 246 | 113 | — | — | 24.1 | |
| 1967 | 51,435 | 43,745 | 9,888 | — | 262 | 86 | — | — | 22.6 | |
| 1968 | 54,351 | 47,085 | 10,222 | — | 253 | 93 | — | — | 21.7 | |
| 1969 | 57,423 | 49,824 | 11,969 | — | 289 | 75 | — | — | 24.0 | |
| 1970 | 55,969 | 48,719 | 11,803 | 418 | 408 | 67 | 12,562 | 22.4 | 24.2 | 3.2 |
| 1971 | 57,450 | 49,741 | 12,106 | 442 | 419 | 68 | 12,899 | 22.4 | 24.3 | 3.2 |
| 1972 | 62,040 | 53,842 | 12,925 | 447 | 415 | 88 | 13,699 | 22.1 | 24.0 | 3.0 |
| 1973 | 65,004 | 56,346 | 14,094 | 499 | 683 | 87 | 15,189 | 23.4 | 25.0 | 4.5 |
| 1974 | 63,308 | 55,756 | 13,982 | 489 | 1,307 | 89 | 15,689 | 24.8 | 25.1 | 8.3 |
| 1975 | 54,113 | 47,997 | 11,748 | 535 | 861 | 72 | 13,072 | 24.2 | 24.5 | 6.6 |
| 1976 | 62,014 | 54,993 | 13,622 | 630 | 1,273 | 106 | 15,419 | 24.9 | 24.8 | 8.3 |
| 1977 | 64,243 | 56,656 | 14,058 | 870 | 1,512 | 92 | 16,348 | 25.4 | 24.8 | 9.2 |
| 1978 | 67,787 | 58,571 | 14,760 | 502 | 1,613 | 70 | 16,805 | 24.8 | 25.2 | 9.6 |
| 1979 | 69,796 | 61,070 | 15,361 | 509 | 2,127 | 78 | 17,919 | 25.7 | 25.2 | 11.9 |
| 1980 | 67,166 | 61,042 | 14,922 | 472 | 2,636 | 87 | 17,943 | 26.7 | 24.4 | 14.7 |
| 1981 | 67,957 | 62,109 | 15,037 | 480 | 2,282 | 79 | 17,720 | 26.1 | 24.2 | 12.9 |
| 1982 | 64,730 | 59,290 | 14,433 | 487 | 2,233 | 74 | 17,078 | 26.4 | 24.3 | 13.1 |
| 1983 | 71,166 | 64,947 | 15,638 | 474 | 2,705 | 100 | 18,727 | 26.3 | 24.1 | 14.4 |
| 1984 | 76,937 | 68,449 | 16,724 | 459 | 3,456 | 110 | 20,530 | 26.7 | 24.4 | 16.8 |
| 1985 | 76,138 | 66,983 | 16,371 | 529 | 3,560 | 88 | 20,369 | 26.8 | 24.4 | 17.5 |
| 1986 | 79,755 | 70,905 | 17,934 | 594 | 4,093 | 99 | 22,521 | 28.2 | 25.3 | 18.2 |
| 1987 | 83,491 | 74,361 | 18,694 | 657 | 4,809 | 127 | 24,033 | 28.8 | 25.1 | 20.0 |
| 1988 | 85,718 | 76,587 | 19,685 | 703 | 5,953 | 161 | 26,179 | 30.5 | 25.7 | 22.7 |
| 1989 | 85,373 | 76,786 | 20,220 | 722 | 6,307 | 173 | 27,077 | 31.7 | 26.3 | 23.3 |
| 1990 | 86,796 | 78,679 | 21,736 | 994 | 6,505 | 123 | 29,112 | 33.5 | 27.6 | 22.3 |
| 1991 | 85,071 | 79,427 | 23,662 | 1,063 | 6,598 | 122 | 31,201 | 36.7 | 29.8 | 21.1 |
| 1992 | 88,273 | 82,868 | 26,185 | 1,137 | 6,782 | 150 | 33,954 | 38.5 | 31.6 | 20.0 |
| 1993 | 91,538 | 84,857 | 28,011 | 1,216 | 6,371 | 138 | 35,460 | 38.7 | 33.0 | 18.0 |
| 1994 | 95,718 | 89,080 | 30,670 | 1,300 | 7,974 | 253 | 39,691 | 41.5 | 34.4 | 20.1 |
| 1995 | 96,062 | 89,450 | 31,391 | 1,390 | 9,908 | 498 | 42,191 | 43.9 | 35.1 | 23.5 |
| 1996 | 94,490 | 90,450 | 33,981 | 1,487 | 8,084 | 474 | 43,077 | 45.6 | 37.6 | 18.8 |
| 1997 | 99,637 | 95,097 | 35,208 | 1,590 | 7,882 | 693 | 43,956 | 44.2 | 37.0 | 17.9 |
| 1998 | 101,137 | 94,586 | 35,770 | 1,700 | 8,117 | 511 | 45,076 | 44.6 | 37.8 | 18.0 |
| 1999 | 103,317 | 97,020 | 36,727 | 2,000 | 8,517 | 426 | 46,818 | 44.0 | 37.2 | 18.0 |

Sources: Howard (2001), table 47; AF&PA (2002), p. 4.

^a Production plus imports minus exports; includes paper, paperboard, wet machine board, and construction paper and board.

^b Production excluding wet machine board and construction paper and board.

Table 33–2—Waste wood generated, recovered, combusted, or not usable, and available for recovery in the United States, by source, 1990–1998

| | | Wood waste (million tons) | | | | | | | | | Total wood waste available |
|------|----------------------------------|---------------------------|----------------------------|-------|-----------------------------|-----------------|-------|---------------------------|------------------|-------|-------------------------------------|
| | | Municipal solid waste | | | Construction and demolition | | | Primary timber processing | | | |
| Year | Wood waste | Waste wood | Woody yard trimmings | Total | Construc- tion | Demoli- tion | Total | Bark residues | Wood residues | Total | |
| 1990 | Generated | 12.2 | 33.3 | 45.5 | 10.3 | 24.4 | 34.7 | 29.2 | 84.1 | 113.4 | 193.5 |
| | Recovered, combusted, not usable | 5.9 | 18.0 | 23.9 | 3.9 | 17.1 | 20.9 | 27.5 | 78.8 | 106.4 | 151.2 |
| | Available for recovery | 6.3 | 15.2 | 21.5 | 6.4 | 7.3 | 13.7 | 1.7 | 5.3 | 7.0 | 42.3 |
| | % available for recovery | 52% | 46% | 47% | 62% | 30% | 39% | 6% | 6% | 6% | 22% |
| 1991 | Generated | 11.9 | 33.3 | 45.2 | 9.1 | 24.6 | 33.8 | 28.7 | 82.1 | 110.8 | 189.7 |
| | Recovered, combusted, not usable | 5.9 | 18.4 | 24.3 | 2.7 | 17.1 | 19.8 | 27.2 | 77.4 | 104.6 | 148.7 |
| | Available for recovery | 6.1 | 14.8 | 20.9 | 6.4 | 7.5 | 13.9 | 1.5 | 4.7 | 6.2 | 41.1 |
| | % available for recovery | 51% | 44% | 46% | 70% | 30% | 41% | 5% | 6% | 6% | 22% |
| 1992 | Generated | 12.3 | 33.3 | 45.5 | 9.1 | 24.9 | 34.1 | 28.6 | 81.2 | 109.8 | 189.3 |
| | Recovered, combusted, not usable | 6.0 | 18.8 | 24.8 | 2.6 | 17.2 | 19.8 | 27.2 | 77.0 | 104.3 | 148.8 |
| | Available for recovery | 6.2 | 14.5 | 20.7 | 6.5 | 7.7 | 14.3 | 1.4 | 4.1 | 5.5 | 40.5 |
| | % available for recovery | 50% | 44% | 45% | 71% | 31% | 42% | 5% | 5% | 5% | 21% |
| 1993 | Generated | 11.7 | 31.6 | 43.3 | 9.5 | 25.2 | 34.7 | 26.4 | 74.4 | 100.8 | 178.8 |
| | Recovered, combusted, not usable | 5.8 | 18.7 | 24.5 | 2.6 | 17.3 | 19.9 | 25.3 | 71.1 | 96.4 | 140.8 |
| | Available for recovery | 5.9 | 12.9 | 18.7 | 6.9 | 7.9 | 14.8 | 1.2 | 3.3 | 4.4 | 38.0 |
| | % available for recovery | 50% | 41% | 43% | 73% | 31% | 43% | 5% | 4% | 4% | 21% |
| 1994 | Generated | 11.3 | 29.9 | 41.2 | 9.5 | 25.4 | 34.9 | 26.5 | 73.8 | 100.3 | 176.4 |
| | Recovered, combusted, not usable | 5.7 | 18.5 | 24.2 | 2.5 | 17.3 | 19.8 | 25.5 | 71.2 | 96.6 | 140.6 |
| | Available for recovery | 5.6 | 11.4 | 17.0 | 7.0 | 8.1 | 15.1 | 1.0 | 2.7 | 3.7 | 35.8 |
| | % available for recovery | 50% | 38% | 41% | 74% | 32% | 43% | 4% | 4% | 4% | 20% |
| 1995 | Generated | 10.4 | 28.2 | 38.6 | 8.6 | 25.7 | 34.3 | 24.7 | 71.4 | 96.1 | 169.0 |
| | Recovered, combusted, not usable | 5.4 | 18.3 | 23.7 | 2.2 | 17.3 | 19.6 | 23.9 | 69.5 | 93.4 | 136.7 |
| | Available for recovery | 5.0 | 9.9 | 15.0 | 6.3 | 8.3 | 14.7 | 0.8 | 1.9 | 2.7 | 32.4 |
| | % available for recovery | 48% | 35% | 39% | 73% | 32% | 43% | 3% | 3% | 3% | 19% |
| 1996 | Generated | 10.8 | 26.5 | 37.4 | 8.8 | 25.9 | 34.8 | 24.5 | 67.0 | 91.6 | 163.7 |
| | Recovered, combusted, not usable | 5.9 | 18.5 | 24.4 | 2.2 | 17.4 | 19.6 | 23.9 | 65.7 | 89.6 | 133.6 |
| | Available for recovery | 5.0 | 8.0 | 13.0 | 6.6 | 8.6 | 15.2 | 0.6 | 1.3 | 1.9 | 30.1 |
| | % available for recovery | 46% | 30% | 35% | 75% | 33% | 44% | 2% | 2% | 2% | 18% |
| 1997 | Generated | 11.6 | 26.3 | 37.9 | 8.6 | 26.2 | 34.8 | 24.9 | 67.6 | 92.5 | 165.2 |
| | Recovered, combusted, not usable | 6.2 | 18.8 | 25.1 | 2.1 | 17.4 | 19.5 | 24.3 | 66.3 | 90.6 | 135.2 |
| | Available for recovery | 5.3 | 7.5 | 12.9 | 6.5 | 8.8 | 15.3 | 0.6 | 1.3 | 1.9 | 30.1 |
| | % available for recovery | 46% | 29% | 34% | 76% | 34% | 44% | 2% | 2% | 2% | 18% |
| 1998 | Generated | 11.8 | 25.2 | 37.0 | 8.7 | 26.4 | 35.1 | 24.5 | 65.8 | 90.3 | 162.4 |
| | Recovered, combusted, not usable | 6.4 | 18.4 | 24.8 | 2.1 | 17.4 | 19.5 | 23.9 | 64.5 | 88.4 | 132.8 |
| | Available for recovery | 5.4 | 6.8 | 12.2 | 6.6 | 9.0 | 15.5 | 0.6 | 1.3 | 1.9 | 29.6 |
| | % available for recovery | 46% | 27% | 33% | 76% | 34% | 44% | 2% | 2% | 2% | 18% |

Source: McKeever (1999).