

## DOMESTIC FUELWOOD USE IN LOUISIANA

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### ABSTRACT

A telephone survey of Louisiana households and commercial vendors of domestic fuelwood was conducted in 1984 to assess domestic fuelwood use and sources of production. Twenty-two percent of the households surveyed used fuelwood during the 1983-84 heating season. Domestic fuelwood production amounted to 981,000 m<sup>3</sup>, an amount comparable to 10% of Louisiana's 1982 pulpwood production. The survey also pointed out differences in total production by type of producer, condition and species of trees used, land use class, ownership class, and geographic regions. Of the total fuelwood produced, 71% was cut or collected directly by households, while the remaining 29% was cut or collected by tree service companies, other companies, and other individual vendors. The majority of fuelwood came from live trees, primarily oaks, and was cut from private woodlands. Production was greatest in northern parishes near major cities.

Keywords. Consumption, producers, woody biomass, firewood.

### INTRODUCTION

In the South, as in other parts of the United States, interest in wood as a household fuel has been increasing. A marked rise in the drain on wood products by domestic fuelwood producers is of obvious concern to industrial wood energy producers as well as timber producers. Fuelwood demand affects tree species composition, land ownership, and timberland management, and it creates an economic market for marginally commercial wood resources.

Four times more fuelwood is burned in American homes than burned 10 years ago.<sup>1</sup> In the South, 29% of the households use fuelwood. Consumption averages 1.16 m<sup>3</sup> (0.55 cords) per household, or 3.99 m<sup>3</sup> (1.9 cords) per fuelwood-using household.<sup>1</sup> Recent studies have examined domestic fuelwood use with regard to state-level forest resources in Colorado<sup>2</sup>, Wisconsin<sup>3</sup>, and South Carolina.<sup>4</sup> However, the current impact of domestic fuelwood use on state-level timber resources in the South and detailed data for Gulf Coast states are largely unknown.

This study takes a look at the amount of fuelwood used by Louisiana households for the 1983-84 heating season. Sources of wood cut or collected are presented by (a) type of producer, (b) land use class, (c) condition and species of trees used, (d) ownership class, (e) region of the state, and (f) parish (i.e. county) location. The impact of domestic fuelwood production on timber resources is examined by determining the amount harvested from standing live trees in woodland areas.

Excluded from this investigation is domestic fuelwood derived from wood residues and wood consumed for industrial fuel. Terms and conversion factors used in the analysis are listed in the Appendix. Domestic fuelwood production varies annually, and further research is needed to establish trend information.

#### METHODS

Households were contacted by telephone, and the interviewer collected information using a standardized questionnaire. If households cut or collected their own wood, questions were asked about the amount and proportion of wood obtained from various sources. If wood was purchased, households were questioned about the amount purchased and burned within the past 12 months.

The volume cut, collected or burned by each household was asked as an open-ended question. Conversion from truck loads, face cords, and pounds of green wood to cubic meters was made as necessary. Most responses were in cords of fuelwood. A copy of the questionnaire used (OMB No. 0596-0009) and further details are available from the author.

The state was divided into 8 regions based on state planning boundaries and telephone directory service areas (Figure 1). Each region is designated

by its largest city. Names and telephone numbers were selected at random from the residential listings of telephone books of each region.

Calls were made until a quota of interviews was completed from each phone book. The quota was based on a random sample representing 0.064% of the households in the state, and amount sufficient to obtain statewide fuelwood use estimates with a 10% standard error. The quota was subdivided by region and the number of residential listings in each phone book. If there was no response, if no person in the household knew about fuelwood used, or if the person reached asked to be called back at another time, that listing was recontacted. Listings not reached were called on subsequent days (up to 5 different days and times of day) until reached or until the quota was satisfied for that phone book. Another listing was selected at random if the household refused to be interviewed.

Except for households recontacted, calls were made on different days and different times of the day between February 16 and March 7, 1984. Most calls were made between 5 and 9 pm during weekdays and 1 to 9 pm on weekends. Calls were made in April, 1984, to households that (a) asked to be

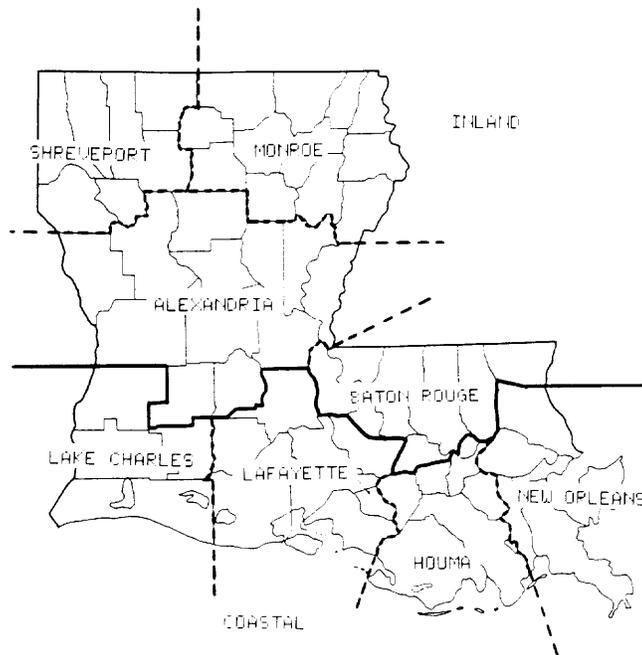


Figure 1. Louisiana telephone survey regions

called back but not reached by March 7, (b) burned wood but did not collect it themselves, and (c) had incomplete or questionable responses.

Of the 1,474 listings selected, 937 were reached. Of these, 911 interviews were completed and 26 were refused. The response rate was 62%. The 537 nonresponses represent households where the residents are seldom home. These households might be expected to burn less wood than households contacted. There was also the chance that households without phones and of lower socioeconomic class might be expected to burn more wood than households contacted. Results were biased if fuelwood was significantly different in quantity of sources from households interviewed. On balance, however, the data from the 911 completed interviews were believed to be representative of Louisiana households.

A survey of all known commercial vendors of domestic fuelwood was used to estimate purchased wood by sources. Lists of potential domestic fuelwood vendors were obtained from commercial telephone directories of fuelwood operators, loggers, wood products dealers, and from classified ads in newspapers for firewood or fuelwood sales. Of 234 contacted, 67 qualified as commercial vendors of domestic fuelwood. Of these, 63 completed interviews. Commercial vendors were grouped into three types based on the name of the enterprise (e.g. John Smith Tree Service = "tree service," Smith Corp. = "other company," John Smith = "other individuals" (not households)).

These 63 commercial vendors of domestic fuelwood accounted for 2.35% of the volume burned but not cut or collected by households. Tree service companies accounted for 19 interviews and 0.78% of the volume; other companies, 21 interviews and 0.75% of the volume; and other individuals (not households), 23 interviews and 0.82% of the volume. Results may not be representative of all commercial vendors. The 97.65% of domestic fuelwood sold but not accounted for was believed to originate from part-time operations associated with tree service companies, logging companies, and other individuals. Results from interviews with known vendors were assumed to be representative of the sources of wood produced by all commercial vendors.

Fuelwood production exported from Louisiana was not determined. Imports reported by Louisiana households and commercial vendors were assumed to be equal in magnitude to exports. For the purposes of accounting at the parish level, the assumed "exports" were divided equally and allocated to each of the 23 parishes bordering Texas, Arkansas, and Mississippi.

## RESULTS

Twenty-two percent of Louisiana households burned, cut, or collected fuelwood for domestic use during the 1983-84 heating season. Consumption averaged  $0.697 \text{ m}^3$  (0.332 cords) per household (Table 1). The standard error of the estimate is 10%. Fuelwood-using households average  $3.19 \text{ m}^3$  (1.52 cords) per household. Of these, 68% cut or collect their own wood and use  $3.30 \text{ m}^3$  (1.57 cords) per household. The remaining 32% that burn wood but obtain it through vendors use  $2.76 \text{ m}^3$  (1.31 cords) per household. The averages are comparable to that reported for the South Central states from a 1980-81 national survey by Skog and Watterson.<sup>1</sup>

Regional differences within Louisiana are apparent (Table 1). The geographic pattern appears to be associated with climate and household density. The average per household is greater for inland regions than coastal regions and lower for the more densely settled regions, e.g. Baton Rouge and New Orleans.

Table 1. Number of households, density of households, number of samples, and average fuelwood burned, cut, or collected per household, Louisiana 1983-84 heating season, by region.

Region	Number of households	Density of Households	Number of samples	Average (standard error)
	thousands	$\text{km}^{-2}$		cubic meters
INLAND				
Alexandria	144.0	5.2	95	1.508 (0.353)
Monroe	120.0	6.5	85	1.496 (0.357)
Shreveport	157.5	11.7	88	1.149 (0.291)
Baton Rouge	239.7	16.7	152	0.647 (0.119)
All Inland	661.2	8.9	420	1.119 (0.132)
COASTAL				
Lake Charles	79.3	7.1	54	0.734 (0.246)
Lafayette	163.6	12.6	107	0.398 (0.098)
Houma	81.5	8.7	107	0.263 (0.088)
New Orleans	426.2	55.9	223	0.246 (0.066)
All Coastal	750.6	18.2	491	0.376 (0.050)
STATEWIDE	1,411.8	12.2	911	0.697 (0.068)

<sup>a</sup>1980 U.S. Census.

The amount of domestic fuelwood produced for the 1983-84 heating season is 981,000 m<sup>3</sup>. Considering that the state's pulpwood production for 1982 totals 9,780,000 m<sup>3</sup>,<sup>5</sup> domestic fuelwood production amounts to about 10% of the state's pulpwood production.

Seventy-one percent of domestic fuelwood production, 699,000 m<sup>3</sup>, is cut or collected by households; of this amount, 27,000 m<sup>3</sup> comes from adjacent states. The remaining 29% (282,000 m<sup>3</sup>) is produced by commercial vendors. Of the volume from commercial vendors, 13,200 m<sup>3</sup> comes from adjacent states.

Woodlands comprise the major source of domestic fuelwood supply. More than 604,000 m<sup>3</sup> are derived from woodlands, but only 443,000 m<sup>3</sup> come from standing live trees on woodlands. Households obtain the majority from woodlands, but only 38% comes from standing live trees on woodlands (Figure 2a). Commercial vendors obtain 64% of their wood from standing live trees (Figure 2b). A closer examination of commercial vendors suggests important differences in wood sources. Tree service companies obtain less than 10% of their fuelwood from woodlands, while other companies and other individuals obtain 90% of their fuelwood from standing live trees on woodlands (Figure 3).

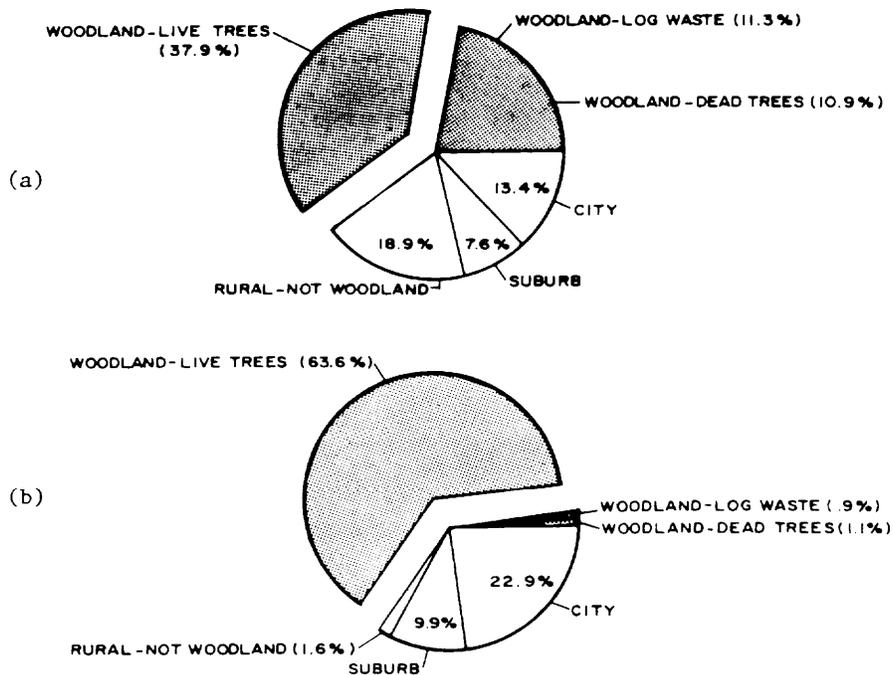


Figure 2. Land use class of domestic fuelwood by (a) households and (b) commercial vendors

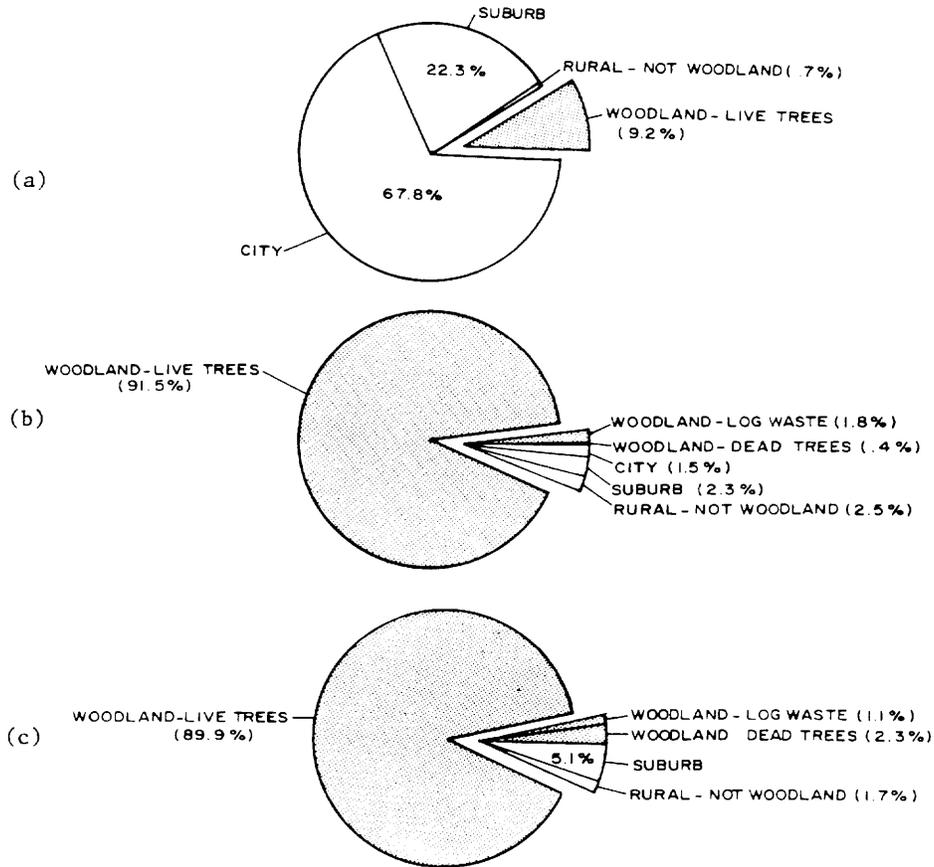


Figure 3. Land use class of domestic fuelwood by commercial vendors: (a) tree service companies, (b) other companies and (c) other individuals (not households)

Domestic fuelwood is virtually all hardwoods. Oaks account for 693,000 m<sup>3</sup> or 71% of the fuelwood produced. Approximately 338,000 m<sup>3</sup> are derived from standing live trees on woodlands. Oaks comprise between 63% and 69% of the fuelwood harvested by households, tree service companies, and other individuals. Oaks comprise better than 90% of the fuelwood harvested by other companies (Figure 4).

In terms of ownership, most of the wood comes from private land. Forest industry land accounts for 95,000 m<sup>3</sup>; other private land, 844,000 m<sup>3</sup>; and public land, 31,000 m<sup>3</sup>. Examination by type of producer suggests that forest industry land is important mainly to other companies (Figure 5).

Domestic fuelwood production by parish is presented in Figure 6. Production is greatest in northern parishes near major cities. The inland regions of the state produce more than twice as much wood as the coastal

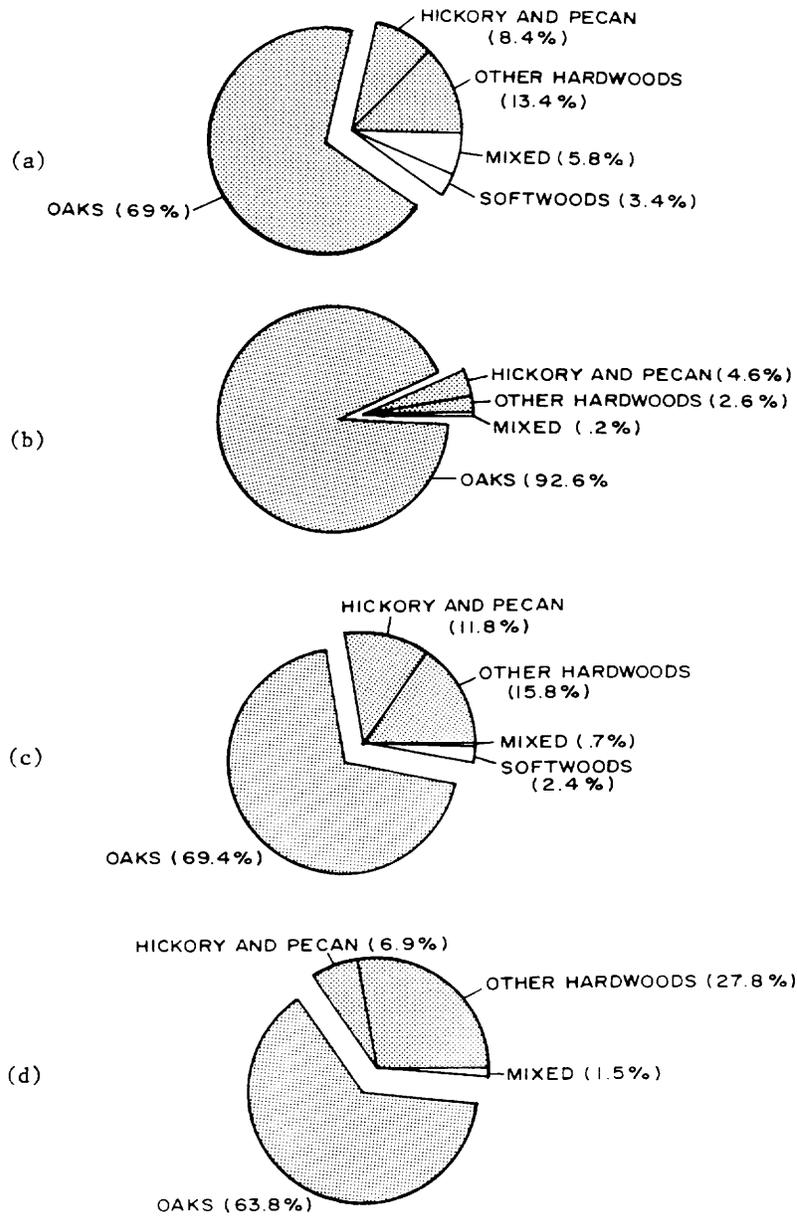


Figure 4. Species of domestic fuelwood produced by type of producer: (a) all households (b) other companies (c) tree service companies and (d) other individuals (not households)

regions. Many of the differences are attributable to the greater use of wood by northern households. The inland regions are generally colder, more rural, and contain the majority of woodland in the state (6). Woodland is a source for greater proportion of fuelwood production in the inland regions of the state for both households and commercial vendors (Figure 7).

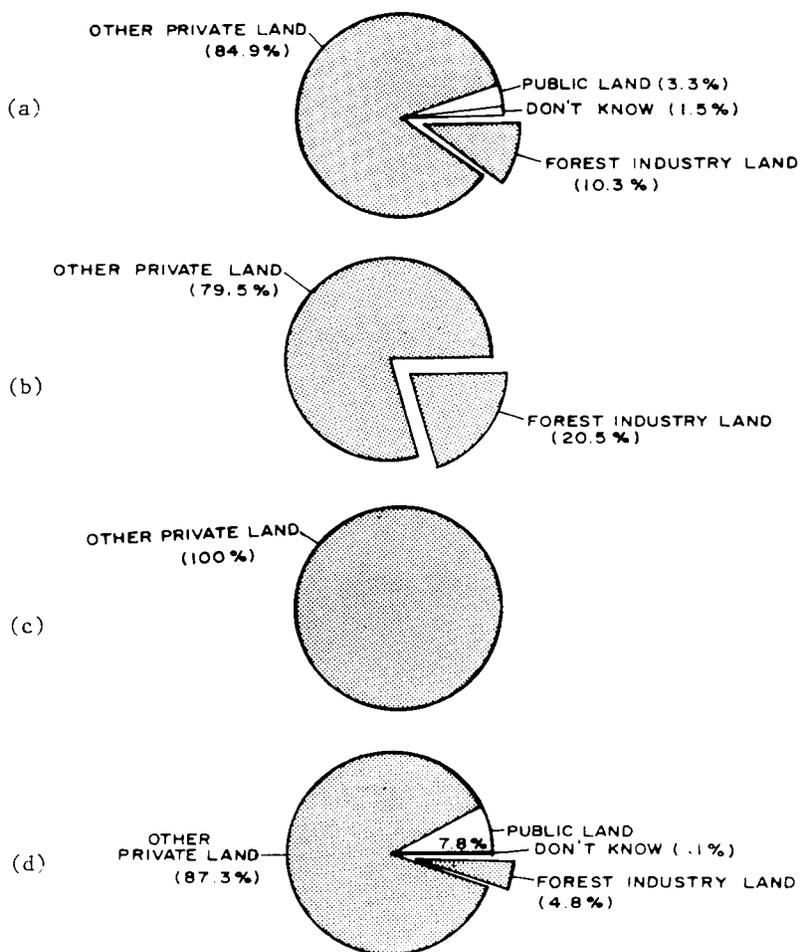


Figure 5. Ownership of land upon which domestic fuelwood was harvested by type of producer: (a) all households (b) other companies (c) tree service companies and (d) other individuals (not households)

Annual domestic fuelwood production, principally hardwoods, amounts to 443,000 m<sup>3</sup> of the standing live tree volume on woodlands. Hardwood growing-stock volume associated with biomass production has been estimated at 69% of standing live hardwood trees in Louisiana.<sup>7</sup> If an assumption is made that 2/3 of the standing live tree volume cut for fuelwood is hardwood growing stock, then the drain on timber resources amounts to 295,000 m<sup>3</sup> annually.

The growing-stock portion of domestic fuelwood production is equal in magnitude to 2% of the state's 18,300,000 m<sup>3</sup> roundwood harvest, or 8% of the 3,800,000 m<sup>3</sup> hardwood roundwood harvest for 1983.<sup>8</sup> The impact is somewhat more pronounced if one compares domestic fuelwood production with pulpwood production. The 295,000 m<sup>3</sup> is equal to 3% of the state's 9,780,000 m<sup>3</sup>

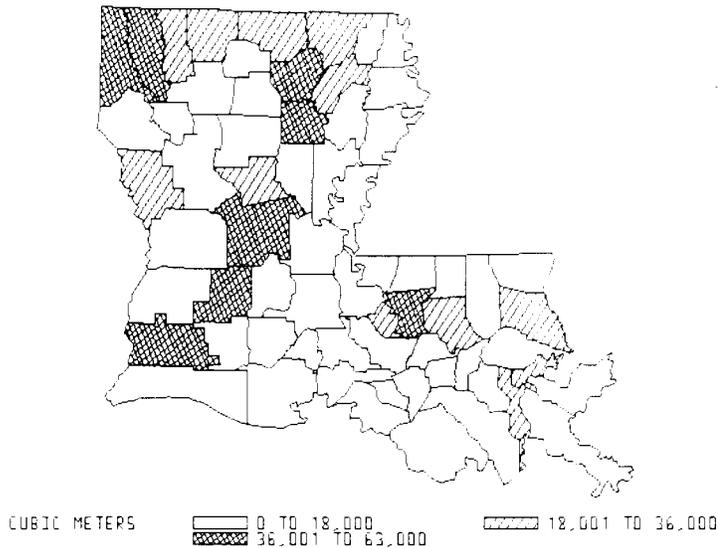


Figure 6. Louisiana domestic fuelwood production by Parish, 1983-84 heating season

pulpwood production (roundwood and residues), or 19% of the 1,530,000 m<sup>3</sup> hardwood roundwood harvested for pulp in 1982.<sup>5</sup>

#### CONCLUSIONS

Louisiana's timber industry derives most of its raw wood material from pulpwood (largely softwoods) and softwood lumber. Hardwoods represent less than 1/4 of the state's timber harvest.<sup>8</sup> The domestic fuelwood production impact is limited, but may increase, particularly if households obtain more wood from commercial vendors, or if a greater fraction of fuelwood is cut from growing-stock trees. Survey results suggest competition, chiefly for oaks, is most likely near metropolitan areas in the northern part of the state.

#### APPENDIX

City- Inside city or village limits.

Forest industry land - Land owned by companies or individuals operating primary wood-producing plants.

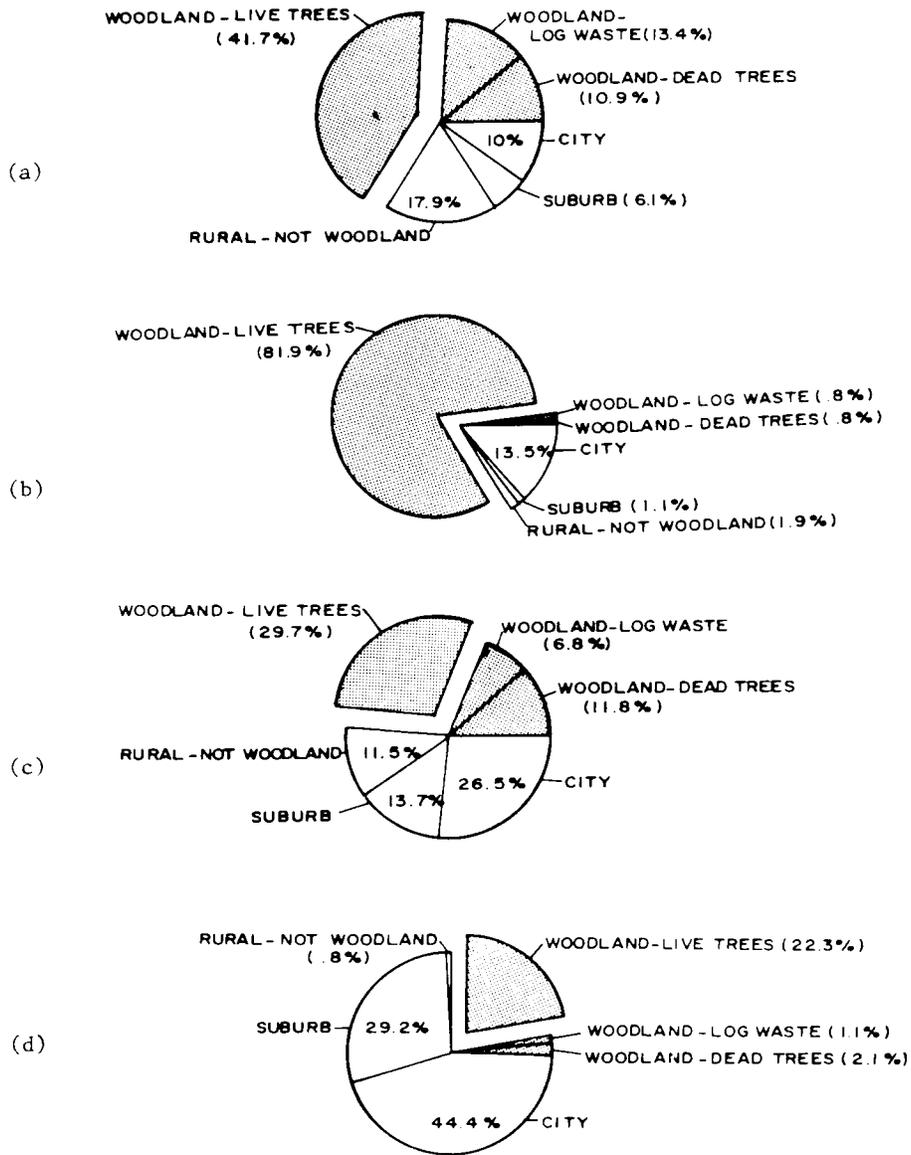


Figure 7. Land use class of domestic fuelwood production for inland and coastal regions of Louisiana by households and commercial vendors: (a) all households - inland regions (b) commercial producers - inland regions (c) all households - coastal regions (d) commercial producers - coastal regions

Growing-stock volume - Volume of sound wood in the bole of commercial trees 127 mm (5.0 inches) diameter at breast height from a 0.305 m (1 foot) stump to a minimum 101.6 mm (4.0 inch) top diameter outside bark of the central stem or to the point where the central stem breaks into limbs.

Logging waste - Noncommercial trees and the unused portions of trees cut or killed by logging on timberland.

Residues - Wood wastes derived from primary wood-producing plants.

Roundwood - Logs or other round sections cut from trees required to produce lumber, plywood, wood pulp, paper, or other similar products.

Rural--not woodland - Outside city or village limits; wood sources include trees on pasture or cropland.

Standard cord - A pile of logs 4 by 4 by 8 feet (128 ft<sup>3</sup>). A cord of fuelwood contains 2.1 m<sup>3</sup> (75 ft<sup>3</sup>) of solid wood. A cord of pulpwood contains 2.24 m<sup>3</sup> (80 ft<sup>3</sup>) of solid wood.

Suburb - Outside city or village limits; wood sources include trees in fencerows, windbreaks, or yards of homes.

Timberland - Forest land that is producing, or is capable of producing, crops of industrial wood and not withdrawn from timber utilization by administrative statute or regulation.

Woodland - Woodland areas outside city or village limits, not including fencerows, windbreaks, yards of homes, pasture, or cropland. In this study, "woodland" is assumed to be timberland.

Commercial vendor of domestic fuelwood - An individual or business operation that sells logs or other round sections of trees to households for use as fuelwood.

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