Eric Herschthal and John L. Brooke,
"The Plantation Carbon Complex: Slavery and the Origins of Climate Change in the Early Modern British Atlantic,"
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Appendix II: Land Use Data

Table VIII: Average of British Caribbean Sugar Plantations, ca. 1770

Total Available Acreage: 482
Adult Agricultural Laborers: 134

Land Use	Acreage in Use	Emission Factors (E.F.) Applied: E.F. Value (in parentheses), as Metric tons of Carbon (MtC) ***per acre***	Average emissions (MtC)	Description
Cropland	204	Above-Ground Biomass in Forest (51.6) Below-Ground Biomass in Forest (19.6) Dead Wood Biomass (3.4) Litter Biomass (1) Soil Organic Carbon Stock, applied 26 times (0.4) Carbon drawdown in cropland (-1.9)	16,970	Acreage is an average of Barbados and Jamaica land use needs (see note below for regional breakdown). Combines 169 acres in cane fields and 36 acres in provision grounds and plantain walk (collective provisions for enslaved workers). Soil emission factor applied 26 times to account for 26 years of cropland being tilled.
Pasture and meadow	132	Above-Ground Biomass in Forests (51.6) Below-Ground Biomass in Forest (19.6) Dead Wood Biomass (3.4) Litter Biomass (1) Carbon drawdown in grassland (-3.5)	9,501	Sugar enslavers heavily manured cane fields to prolong soil fertility, and therefore kept a significant amount of pasture to feed their livestock.
Sugar works and enslaver home	21	Above-Ground Biomass in Forests (51.6) Below-Ground Biomass in Forest (19.6) Dead Wood Biomass (3.4) Litter Biomass (1)	1,586	Area cleared for the enslaver's estate and sugar manufacturing facilities ("sugar works")
Remaining woodland, to be used for fuelwood	125	Above-Ground Biomass in Forests (51.6) Below-Ground Biomass in Forest (19.6) Dead Wood Biomass (3.4) Litter Biomass (1) Carbon drawdown in grassland (-3.5)	8,998	Remaining acreage used as a fuelwood lot. Fuelwood might last a generation, or roughly 25 years, before conservation measures were necessary.
Total without fuelwood	357		**28,057**	Emissions that do not include any fuelwood use. These would be the emissions after all the fuelwood had been spent and planters had adopted conservation measures.
Total with all fuelwood used (26 years)	482		**37,055**	Emissions from all land use needs as well as complete use of fuelwood lot. Fuelwood might take a generation, or roughly 25 years, to deplete, before planters shifted to conservation strategies.

Sources and Notes: This table averages the land use and labor size of the smaller sugar plantations of the Lesser Antilles, based on the average Barbados plantation in 1680 (the date and island for which data is most comprehensive) and the average sugar plantations of Jamaica in the mid-eighteenth century. We averaged the two regions because the Lesser Antilles plantations exported a significant share of British Caribbean sugar in the early part of the eighteenth century, and Jamaican sugar plantations became the dominant British sugar exporter in the mid-eighteenth century. See Richard B. Sheridan, "The Formation of Caribbean Plantation Society, 1689–1748," in P. J. Marshall, ed., *The Oxford History of the British Empire*, vol. 2, *The Eighteenth Century* (New York, 1998), 394–414, esp. 401 (table 18.2). The Barbados model assumes 116 total enslaved laborers per plantation, 1 acre in cane per enslaved laborer, and 0.125 acre per slave in provisions, all derived from Richard S. Dunn, *Sugar and Slaves: The Rise of the Planter Class in the English West Indies, 1624–1713* (New York, 1973), 96, 198, 244. The rest of the acreage is derived from the ratio of cane fields to the number of acres in pastures, sugar works and planter home, and total available land; source for ratios is the eighteenth-century Caribbean plantation maps used in David Watts, *The West Indies: Patterns of Development, Culture and Environmental Change since 1492* (Cambridge, 1987), 386-88. These land use needs result in a Barbados plantation with 116 enslaved laborers having 116 acres in cane fields, 116 acres in pastures, 14.5 acres in provision grounds, and 21 acres in sugar works and the main enslaver's estate. When all this acreage is combined, it equals the actual average of total acreage owned per Barbadian sugar plantation in 1680, or 267 acres total. Given the small total acreage owned per plantation, sugar enslavers in the Lesser Antilles likely would have used the wood from the initial woodland converted into pasture for fuelwood, then shifted to fuelwood conservation measures, such as adopting *bagasse* (used cane reeds) for fuel, and the "Jamaica train" boiling method, which required less fuel. If necessary, additional fuelwood could be imported from external colonies. For Jamaican sugar plantation land use and labor needs, we adopt Sheridan's average of 152 slaves per plantation and 1.5 acres of cane per slave; see Sheridan, *Sugar and Slavery: An Economic History of the British West Indies, 1623–1775* (Baltimore, 1974), 219, 230–31. For more precise total acreage and land use practices, we apply the ratio of cane to pastures and meadows, provision grounds, and total acreage found in the Jamaican estate maps for the 1760–79 period and used in B. W. Higman, "The Spatial Economy of Jamaican Sugar Plantations: Cartographic Evidence from the Eighteenth and Nineteenth Centuries," *Journal of Historical Geography* 13, no. 1 (January 1987): 17–39, esp. 26 (table 1). These maps give ratios of 1 acre of cane to 3.14 acres of total acreage owned; 1.5 acres of cane to 1 acre of meadows and pastures; and 4 acres of cane to 1 acre of provision ground and plantain walk. Based on 222 acres in cane, this results in 697 acres owned, 148 acres in meadows and pastures, and 56 acres in provision grounds and plantain walks. Higman does not provide acres for sugar works and the enslaver's estate, so we apply the Barbados acreage of 21 acres here. We assume all the remaining acres—250 out of the 697 total acres owned—would be used for fuelwood, which took a generation, or roughly 25 years, to deplete. Once the fuelwood lot was depleted, Jamaican enslavers would have, like other Caribbean planters, transitioned to fuelwood conservation strategies, requiring minimal additional land clearance in subsequent years. For sources of emission factors, see Appendix I: Table A.I.1.