

Supplementary Information (SI) Insert:

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Cultivation and dynamic cropping processes impart land-cover heterogeneity within agroecosystems: a metrics-based case study in the Yazoo-Mississippi Delta (USA)

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Supplemental Information Table S1 Percent surface area of intra-annual crop rotation (“Dbl Crop”) within the Yazoo-Mississippi Delta, 2008-2021; - indicates when a given form of double-cropping was not recorded within the Delta that year

Year	Dbl Crop WinWht/ Soybeans	Dbl Crop WinWht/ Corn	Dbl Crop WinWht/ Sorghum	Dbl Crop WinWht/ Cotton	Dbl Crop Soybeans/ Cotton	Dbl Crop Soybeans/ Oats	Dbl Crop Corn/ Soybeans
2008	4.86	<0.01	0.37	<0.01	-	<0.01	<0.01
2009	1.55	0.01	-	-	-	-	-
2010	1.11	0.01	<0.01	-	<0.01	0.01	0.02
2011	4.54	0.01	0.02	0.07	-	0.01	0.40
2012	4.43	0.01	0.02	0.02	<0.01	0.01	<0.01
2013	4.37	<0.01	0.03	0.02	-	0.01	0.05
2014	2.56	0.10	0.05	<0.01	<0.01	<0.01	0.01
2015	1.59	0.01	0.02	-	-	<0.01	-
2016	0.44	0.02	-	-	-	0.01	-
2017	0.16	<0.01	0.01	-	<0.01	-	-

2018	0.23	<0.01	0.01	-	-	<0.01	-
2019	0.06	0.01	-	<0.01	-	-	<0.01
2020	0.04	<0.01	-	<0.01	-	0.01	-
2021	0.53	<0.01	<0.01	-	-	0.02	-

Supplemental Information Table S2 Landscape composition (% surface area) of nine land-cover types in the Yazoo-Mississippi Delta, 2008-2021 (PLAND in Table 3). Min = minimum, Max = maximum. FB Era Mean I, II, and III indicate means for each of the nine-land cover types during the corresponding Farm Bill Era.

Year	Soybeans	Corn	Cotton	Rice	Wetlands	Water	Upland Forest	Other Agriculture	Developed
2008	41.11	9.61	4.33	4.65	23.52	4.83	0.29	7.68	3.99
2009	42.26	9.84	3.52	4.74	23.21	4.68	0.28	7.72	3.75
2010	35.51	11.36	6.31	6.56	23.72	4.81	0.29	8.12	3.33
2011	31.53	13.67	9.04	3.50	23.10	4.27	0.29	10.91	3.68
2012	34.44	12.65	7.56	2.61	23.14	4.25	0.30	10.99	4.06
2013	34.38	15.86	4.17	2.71	23.78	4.36	0.29	10.52	3.94
2014	36.97	8.04	6.06	3.81	26.03	4.30	0.30	10.31	4.17
2015	44.37	7.85	4.50	2.80	24.21	4.05	0.30	8.22	3.70
2016	38.23	11.81	6.31	3.79	24.28	3.99	0.27	7.59	3.72

2017	47.10	7.71	8.66	2.29	24.11	4.00	0.29	2.20	3.65
2018	47.42	7.12	8.56	2.63	24.03	3.90	0.30	2.41	3.62
2019	30.02	8.95	9.84	2.37	27.47	4.18	0.35	12.86	3.96
2020	38.02	6.47	7.15	3.21	27.91	4.18	0.36	8.71	3.99
2021	44.71	9.88	5.74	1.89	27.91	4.05	0.34	1.72	3.75
Mean	39.00	10.06	6.55	3.40	24.74	4.27	0.30	7.85	3.81
Min	30.02	6.47	3.52	1.89	23.10	3.90	0.27	1.72	3.33
Max	47.42	15.86	9.84	6.56	27.91	4.83	0.36	12.86	4.17
FB Era I Mean	36.54	12.16	5.82	4.13	23.41	4.53	0.29	9.32	3.79

FB Era II Mean	41.67	8.85	6.38	3.17	24.66	4.09	0.29	7.08	3.81
FB Era III Mean	40.04	8.11	7.82	2.53	26.83	4.08	0.34	6.43	3.83

Supplemental Information Table S3 Largest patch index (% surface area) of patches of nine land-cover types in the Yazoo-Mississippi Delta, 2008-2021 (LPI in Table 3). Min = minimum, Max = maximum

Year	Soybeans	Corn	Cotton	Rice	Wetlands	Water	Upland Forest	Other Agriculture	Developed
2008	4.04	0.17	0.07	0.07	1.56	0.15	0.02	0.13	0.39
2009	6.16	0.12	0.04	0.08	1.53	0.15	0.01	0.07	0.69
2010	1.74	0.15	0.17	0.12	1.51	0.15	0.01	0.11	0.20
2011	1.40	0.17	0.24	0.08	1.57	0.13	0.02	0.21	0.60
2012	1.30	0.10	0.42	0.08	1.52	0.11	0.01	0.32	1.09
2013	2.34	0.25	0.08	0.06	1.59	0.12	0.02	0.07	1.31
2014	2.31	0.11	0.11	0.06	1.65	0.12	0.01	0.08	0.77
2015	7.57	0.11	0.14	0.06	1.67	0.12	0.02	0.05	0.58
2016	3.88	0.18	0.11	0.07	1.68	0.12	0.01	0.05	1.10
2017	9.18	0.10	0.14	0.07	1.65	0.12	0.01	0.03	0.96

2018	9.17	0.06	0.55	0.05	1.64	0.12	0.01	0.04	1.04
2019	6.12	0.38	0.47	0.06	2.46	0.13	0.03	1.67	0.21
2020	6.76	0.09	0.20	0.08	2.47	0.13	0.03	0.27	0.21
2021	8.49	0.09	0.21	0.04	2.50	0.13	0.02	0.03	0.22
Mean	5.03	0.15	0.21	0.07	1.79	0.13	0.02	0.22	0.67
Min	1.30	0.06	0.04	0.04	1.51	0.11	0.01	0.03	0.20
Max	9.18	0.38	0.55	0.12	2.50	0.15	0.03	1.67	1.31

Supplemental Information Table S4 Number of patches of each of nine land-cover types in the Yazoo-Mississippi Delta, 2008-2021 (NP in Table 3). Min = minimum, Max = maximum

Year	Soybeans	Corn	Cotton	Rice	Wetlands	Water	Upland Forest	Other Agriculture	Developed
2008	54,428	27,375	5,223	10,009	32,052	15,446	1,606	61,175	58,923
2009	45,235	33,618	4,635	6,303	31,060	18,307	1,989	51,561	58,137
2010	74,261	57,478	18,730	28,008	40,557	26,212	3,899	103,045	38,546
2011	58,057	59,832	16,521	18,136	34,778	21,405	2,656	75,647	58,412
2012	77,331	43,640	24,625	15,064	34,078	38,712	4,984	107,796	31,211
2013	51,189	42,740	15,524	12,808	33,265	31,409	2,215	73,047	56,443
2014	44,093	28,032	12,514	6,022	29,013	23,262	2,420	72,299	59,516
2015	53,039	17,964	8,323	3,363	30,928	17,715	2,014	62,051	53,558
2016	61,647	32,096	10,057	4,944	30,793	17,428	1,601	64,086	52,312
2017	42,563	27,929	5,724	2,443	29,849	16,967	1,428	36,614	53,549

2018	45,808	25,143	10,013	7,738	31,211	16,778	2,831	41,616	53,470
2019	63,895	23,398	15,174	2,844	34,922	18,570	2,888	68,680	38,212
2020	60,443	14,390	12,379	5,543	37,896	21,378	4,620	72,587	35,400
2021	50,000	12,440	6,144	2,626	36,415	19,006	3,414	39,640	40,822
Mean	55,856	31,863	11,828	8,989	33,344	21,614	2,755	66,417	49,179
Min	42,563	12,440	4,635	2,443	29,013	15,446	1,428	36,614	31,211
Max	77,331	59,832	24,625	28,008	40,557	38,712	4,984	107,796	59,516

Supplemental Information Table S5 Mean area (in hectares) of patches of nine land-cover types in the Yazoo-Mississippi Delta, 2008-2021 (AREA_MN in Table 3). Min = minimum, Max = maximum

Year	Soybeans	Corn	Cotton	Rice	Wetlands	Water	Upland Forest	Other Agriculture	Developed
2008	14.27	6.63	15.67	8.78	13.87	5.90	3.36	2.37	1.28
2009	17.66	5.53	14.35	14.20	14.12	4.83	2.65	2.83	1.22
2010	9.04	3.73	6.36	4.43	11.05	3.47	1.39	1.49	1.63
2011	10.26	4.32	10.34	3.65	12.55	3.77	2.08	2.72	1.19
2012	8.42	5.48	5.80	3.27	12.83	2.07	1.15	1.93	2.46
2013	12.69	7.01	5.07	3.99	13.51	2.62	2.47	2.72	1.32
2014	15.84	5.42	9.15	11.94	16.96	3.50	2.31	2.70	1.32
2015	15.81	8.26	10.23	15.72	14.79	4.32	2.80	2.50	1.31
2016	11.72	6.95	11.86	14.50	14.90	4.33	3.16	2.24	1.34
2017	20.91	5.21	28.58	17.68	15.26	4.46	3.78	1.14	1.29

2018	19.56	5.35	16.15	6.42	14.55	4.40	2.03	1.09	1.28
2019	8.88	7.23	12.26	15.76	14.86	4.25	2.27	3.54	1.96
2020	11.88	8.50	10.91	10.94	13.91	3.69	1.48	2.27	2.13
2021	16.90	15.01	17.64	13.63	14.48	4.02	1.90	0.82	1.74
Mean	13.85	6.76	12.46	10.35	14.12	3.97	2.34	2.17	1.53
Min	8.42	3.73	5.07	3.27	11.05	2.07	1.15	0.82	1.19
Max	20.91	15.01	28.58	17.68	16.96	5.90	3.78	3.54	2.46

Supplemental Information Table S7 Area-weighted mean area (in hectares) of patches of nine land-cover types in the Yazoo-Mississippi Delta, 2008-2021 (AREA_AM in Table 3). Min = minimum, Max = maximum

Year	Soybeans	Corn	Cotton	Rice	Wetlands	Water	Upland Forest	Other Agriculture	Developed
2008	14,099.48	368.22	274.11	207.96	6,333.19	625.85	80.58	161.17	1,376.71
2009	22,210.87	341.79	198.25	234.33	6,167.17	578.22	77.85	181.86	2,747.56
2010	5,986.69	381.84	555.84	334.93	5,882.31	617.84	68.41	175.03	693.51
2011	3,940.69	456.90	658.99	249.35	6,371.56	547.98	85.12	389.38	2,195.73
2012	4,074.60	334.92	913.75	228.79	6,252.79	459.86	66.71	391.87	5,729.77
2013	5,309.29	646.07	267.67	236.56	6,853.65	455.16	85.06	151.99	8,243.49
2014	6,912.20	315.21	372.29	216.42	7,406.68	449.07	70.32	155.99	4,143.61
2015	33,995.84	244.39	432.27	184.15	7,294.14	541.63	86.54	132.20	2,686.27
2016	12,934.54	511.83	429.68	252.72	7,317.30	507.06	76.97	148.35	6,195.95
2017	56,608.50	258.03	574.65	282.19	7,240.66	541.60	79.93	82.01	4,881.73

2018	55,666.32	237.65	1,228.85	188.98	7,223.93	514.85	74.89	96.08	5,699.56
2019	28,036.29	594.68	1,347.01	227.62	9,511.29	526.60	110.55	4,813.58	716.20
2020	33,423.10	341.94	767.53	215.65	10,411.46	519.53	115.22	615.98	851.31
2021	46,072.17	339.76	661.73	172.68	9,694.14	529.73	107.33	64.18	918.32
Mean	23,519.33	383.80	620.19	230.88	7,425.73	529.64	84.68	539.98	3,362.84
Min	3,940.69	237.65	198.25	172.68	5,882.31	449.07	66.71	64.18	693.51
Max	56,608.50	646.07	1,347.01	334.93	10,411.46	625.85	115.22	4,813.58	8,243.49

Supplemental Information Table S7 Coefficient of variation of mean patch area (in hectares) of patches of nine land-cover types in the Yazoo-Mississippi Delta, 2008-2021 (AREA_CV in Table 3). Min = minimum, Max = maximum

Year	Soybeans	Corn	Cotton	Rice	Wetlands	Water	Upland Forest	Other Agriculture	Developed
2008	3,141.49	738.38	406.09	476.22	2,134.84	1,024.82	479.65	818.21	3,278.71
2009	3,545.47	779.71	357.94	393.76	2,087.59	1,089.07	532.52	795.60	4,746.45
2010	2,571.95	1,006.24	929.27	864.07	2,304.69	1,330.67	694.07	1,079.73	2,058.27
2011	1,956.99	1,023.76	791.93	820.31	2,250.96	1,201.58	632.35	1,191.35	4,292.85
2012	2,197.95	775.39	1,250.83	829.98	2,205.17	1,486.10	756.45	1,422.71	4,826.50
2013	2,042.87	954.76	719.44	763.26	2,250.34	1,313.74	578.05	740.56	7,905.04
2014	2,086.30	755.81	629.93	413.83	2,087.66	1,129.02	542.31	754.18	5,591.75
2015	4,636.51	534.68	642.38	327.30	2,218.42	1,115.31	547.23	719.86	4,534.83
2016	3,320.77	852.17	593.44	405.27	2,213.84	1,077.72	483.56	808.09	6,788.73
2017	5,202.19	696.36	437.12	386.74	2,175.85	1,097.85	449.06	843.43	6,152.36

2018	5,333.81	658.69	866.58	533.34	2,225.94	1,077.36	598.89	931.99	6,671.94
2019	5,618.69	901.55	1,043.43	366.69	2,527.70	1,108.27	690.81	3,686.85	1,910.25
2020	5,302.17	626.31	832.59	432.48	2,733.56	1,182.21	875.71	1,645.09	1,995.58
2021	5,220.79	465.08	604.22	341.66	2,585.18	1,142.91	744.18	878.21	2,298.38
Mean	3,727.00	769.21	721.80	525.35	2,285.84	1,169.76	614.63	1,165.42	4,503.69
Min	1,956.99	465.08	357.94	327.30	2,087.59	1,024.82	449.06	719.86	1,910.25
Max	5,618.69	1,023.76	1,250.83	864.07	2,733.56	1,486.10	875.71	3,686.85	7,905.04

Supplemental Information Table S8 Average Euclidean nearest-neighbor distance (in meters) of nine land-cover types in the Yazoo-Mississippi Delta, 2008-2021 (ENN_MN in Table 3). Min = minimum, Max = maximum

Year	Soybeans	Corn	Cotton	Rice	Wetlands	Water	Upland Forest	Other Agriculture	Developed
2008	94.02	196.40	285.28	318.41	120.86	222.02	516.51	129.23	94.29
2009	101.31	177.68	295.66	388.96	122.17	198.65	596.61	133.60	100.61
2010	93.49	139.43	210.18	207.28	107.83	176.39	530.87	103.70	122.42
2011	102.78	127.66	194.94	254.41	116.11	202.81	648.40	115.59	98.41
2012	95.01	151.70	180.44	278.69	117.21	172.03	459.37	104.91	116.53
2013	100.21	142.59	219.32	295.10	118.99	173.64	621.59	116.75	94.26
2014	110.83	195.27	226.21	393.55	123.23	196.24	482.16	124.71	92.95
2015	94.68	212.97	286.95	487.88	122.10	207.75	496.87	127.88	100.45
2016	97.40	176.35	244.16	449.59	121.91	208.97	467.17	127.19	99.95
2017	93.16	182.17	239.00	648.79	123.18	213.62	465.50	175.83	101.51

2018	93.87	176.82	269.86	362.29	121.47	208.47	558.02	161.33	102.16
2019	107.61	212.80	240.64	602.38	112.30	208.93	565.84	124.72	78.60
2020	102.42	278.55	248.25	410.43	108.97	203.91	515.22	125.44	77.82
2021	101.28	275.04	327.37	605.31	111.62	208.71	572.17	171.33	90.42
Mean	99.15	188.96	247.73	407.36	117.71	200.15	535.45	131.59	97.88
Min	93.16	127.66	180.44	207.28	107.83	172.03	459.37	103.70	77.82
Max	110.83	278.55	327.37	648.79	123.23	222.02	648.40	175.83	122.42

Supplemental Information Table S9 Average of contiguity index (unit-less) of nine land-cover types in the Yazoo-Mississippi Delta, 2008-2021 (CONTIG_MN in Table 3). Min = minimum, Max = maximum

Year	Soybeans	Corn	Cotton	Rice	Wetlands	Water	Upland Forest	Other Agriculture	Developed
2008	0.24	0.17	0.36	0.22	0.34	0.26	0.21	0.22	0.20
2009	0.24	0.17	0.34	0.29	0.34	0.24	0.17	0.23	0.19
2010	0.18	0.15	0.19	0.13	0.28	0.19	0.11	0.17	0.19
2011	0.22	0.17	0.24	0.15	0.32	0.21	0.14	0.21	0.19
2012	0.19	0.17	0.19	0.15	0.31	0.15	0.11	0.17	0.21
2013	0.23	0.19	0.20	0.16	0.33	0.20	0.17	0.22	0.20
2014	0.22	0.17	0.23	0.25	0.34	0.24	0.18	0.22	0.20
2015	0.22	0.21	0.23	0.32	0.34	0.25	0.18	0.22	0.20
2016	0.22	0.16	0.24	0.28	0.34	0.25	0.20	0.20	0.20
2017	0.25	0.20	0.38	0.33	0.34	0.25	0.21	0.17	0.20

2018	0.23	0.20	0.24	0.18	0.33	0.25	0.13	0.16	0.20
2019	0.18	0.14	0.19	0.28	0.29	0.24	0.13	0.20	0.27
2020	0.19	0.15	0.19	0.25	0.27	0.21	0.10	0.19	0.26
2021	0.22	0.21	0.24	0.29	0.28	0.22	0.12	0.13	0.23
Mean	0.22	0.18	0.25	0.24	0.32	0.22	0.15	0.19	0.21
Min	0.18	0.14	0.19	0.13	0.27	0.15	0.10	0.13	0.19
Max	0.25	0.21	0.38	0.33	0.34	0.26	0.21	0.23	0.27

Supplemental Information Table S11 Contagion index (% surface area) of nine land-cover types in the Yazoo-Mississippi Delta, 2008-2021 (CONTAG in Table 3). Min = minimum, Max = maximum. Note: as metric is only calculated at the landscape scale, all nine-land cover types are represented by the yearly value.

Year	CONTAG
2008	50.82
2009	51.77
2010	47.25
2011	46.99
2012	47.04
2013	49.01
2014	50.05
2015	53.26
2016	50.43
2017	55.66

2018	55.50
2019	48.94
2020	51.35
2021	56.43
Mean	51.04
Min	46.99
Max	56.43