

Table S1. Site and soil information for the cultivation sites. Regions: Madre de Dios (MD), Ucayali (UC), San Martin (SM) and Amazonas (AM). N: site number; coordinates, elevation (m); Cd: cadmium concentration (mg kg⁻¹); geological substrate according to Geological map of Peru [53] soil types extracted from Mapa de Suelos de Peru [54] and sediment origin according to Pfiffner and Gonzales [56]; Soil classification according to the WRB (2015) [55].

Site	Site	Coordinates	Elevation (m)	Cd (mg kg ⁻¹)	Geological substrate	Sediment origin	Soil association
MD1	Florida baja	-12.764, -69.521	250	1.5	Detritus, sand and gravel	Quaternary	Eutric Fluvisol & Gleysol
MD2	Florida alta	-12.782, -69.618	246	1.7	Detritus, sand and gravel	Quaternary	Eutric Fluvisol & Gleysol
MD3	San Juan	-12.867, -69.675	248	1.8	Detritus, sand and gravel	Quaternary	Eutric Fluvisol & Gleysol
MD4	Florida Baja	-12.754, -69.496	244	1.75	Detritus, sand and gravel	Quaternary	Eutric Fluvisol & Gleysol
MD5	Los Cedros	-12.772, -69.563	250	1.39	Detritus, sand and gravel	Quaternary	Eutric Fluvisol & Gleysol
MD6	Las Mercedes	-12.707, -69.444	234	1.43	Detritus, sand and gravel	Quaternary	Eutric Fluvisol & Gleysol
MD7	Bello Horizonte	-12.483, -69.137	230	1.67	Detritus, sand and gravel	Quaternary	Eutric Fluvisol & Gleysol
MD8	Planchon	-12.281, -69.139	266	1.27	Detritus, sand and gravel	Quaternary	Eutric Fluvisol & Gleysol
MD9	Planchon	-12.285, -69.138	266	1.57	Detritus, sand and gravel	Quaternary	Eutric Fluvisol & Gleysol
MD10	Bajo Madre de Dios	-12.488, -69.217	212	1.59	Detritus, sand and gravel	Quaternary	Eutric Fluvisol & Gleysol
MD11	Bajo Madre de Dios	-12.484, -69.184	199	1.7	Detritus, sand and gravel	Quaternary	Eutric Fluvisol & Gleysol
MD12	Bajo Madre de Dios	-12.489, -69.168	202	1.42	Detritus, sand and gravel	Quaternary	Eutric Fluvisol & Gleysol
UC1	Sta Rosa de Dinamarca	-8.697, -74.414	153	1.47	Detritus, sand and gravel	Quaternary	Dystric Gleysol & Cambisol
UC2	Santa Martha	-8.955, -73.686	188	1.7	Alluvial, fluvial, colluvial deposits	Pleistocene	Eutric Fluvisol & Gleysol
UC3	Santa Martha	-8.95504, -73.686	188	1.39	Alluvial, fluvial, colluvial deposits	Pleistocene	Eutric Fluvisol & Gleysol
UC4	Puerto Belen	-9.233, -74.343	170	2.15	Alluvial, fluvial, colluvial deposits	Quaternary	Eutric Fluvisol & Gleysol
UC5	Utucuro	-9.254, -74.362	167	1.79	Alluvial, fluvial, colluvial deposits	Quaternary	Dystric Gleysol & Cambisol
UC6	San Rafael	-8.605, -74.294	156	2.3	Alluvial, fluvial, colluvial deposits	Quaternary	Eutric Fluvisol & Gleysol
UC7	Paraiso	-8.608, -74.311	158	1.1	Alluvial, fluvial, colluvial deposits	Quaternary	Eutric Fluvisol & Gleysol
UC8	Comunita' Roja	-9.307, -74.525	237	1.48	Alluvial, fluvial, colluvial deposits	Quaternary	Dystric Gleysol & Cambisol

AM1	Comunita' Guabal	-4.468; -77.734	183	1.48	Sandstones, outcrops with silty sand, clay and quartz	Quaternary	Dystric Cambisol - Haplic Acrisol
AM2	Comunita' Guabal	-4.450; -77.650	206	1.5	Sandstones, outcrops with silty sand, clay and quartz	Quaternary	Dystric Cambisol - Haplic Acrisol
AM3	Comunita' Guabal	-4.42997; -77.636	208	2.04	Sandstones, outcrops with silty sand, clay and quartz	Quaternary	Dystric Cambisol - Haplic Acrisol
AM4	Comunita' Yamayakat	-4.991; -78.373	412	1.65	Metamorphic complex (mica schists, phyllites and meta-andesites)	Pleistocene	Dystric Leptosol - Cambisol - Regosol
AM5	Comunita' Yamayakat	-4.965; -78.386	480	1.57	Metamorphic complex (mica schists, phyllites and meta-andesites)	Pleistocene	Dystric Leptosol - Cambisol - Regosol
AM6	Comunita' Yamayakat	-4.945; -78.345	410	2.85	Metamorphic complex (mica schists, phyllites and meta-andesites)	Pleistocene	Dystric Leptosol - Cambisol - Regosol
AM7	Comunita' Yamayakat	-5.639; -78.553	450	2.7	Metamorphic complex (mica schists, phyllites and meta-andesites)	Pleistocene	Dystric Leptosol - Cambisol - Regosol
AM8	Quebrada seca	-5.63508; -78.544	429	1.59	Carbonaceous schists (sandstones and limestones)	Cretaceous	Eutric Regosol - Haplic Calcisol
AM9	San Jose' Bajo	-5.697; -78.436	673	1.48	Carbonaceous schists (sandstones and limestones)	Cretaceous	Eutric Regosol - Haplic Calcisol
AM10	San Jose' Bajo	-5.638; -78.452	700	1.87	Clastic and volcanic schists	Cretaceous	Eutric Regosol - Haplic Calcisol
AM11	El Tigre	-5.715; -78.351	751	2.24	Clastic and volcanic schists	Cretaceous	Dystric Leptosol - Cambisol - Regosol
AM12	Diamante alto	-5.696; -78.343	1050	2.22	Clastic and volcanic schists	Cretaceous	Dystric Leptosol - Cambisol - Regosol
AM13	Naranjos alto	-5.697; -78.346	740	1.78	Clastic and volcanic schists	Cretaceous	Dystric Leptosol - Cambisol - Regosol

SM1	Bolivar-Santa Fe'	-8.133; -76.522	498	1.82	Fluvial deposits	Pleistocene	Eutric Leptosol - Cambisol - Regosol
SM2	Bolivar-S Carlos	-8.111; -76.550	472	1.95	Fluvial deposits	Pleistocene	Eutric Leptosol - Cambisol - Regosol
SM3	Nuevo Casma	-7.910; -76.666	525	2.42	Alluvial deposits	Cretaceous	Eutric Leptosol - Cambisol - Regosol
SM4	Nueva Bambamarca	-8.146; -76.578	498	2.66	Alluvial deposits	Pleistocene	Eutric Leptosol - Cambisol - Regosol
SM5	Fondo S Martin	-8.024; -76.632	463	3.32	Alluvial deposits	Cretaceous	Eutric Leptosol - Cambisol - Regosol
SM6	Balsa Probana	-8.083; -76.554	494	1.98	Alluvial deposits	Cretaceous	Eutric Leptosol - Cambisol - Regosol
SM7	Santa Rosa	-8.12101; -76.576	478	3.08	Alluvial deposits	Pleistocene	Eutric Leptosol - Cambisol - Regosol

Table S2. Site number and parameters recorded in the cultivation sites. Regions: Madre de Dios (MD), Ucayali (UC), San Martin (SM) and Amazonas (AM). N: site number; TC: tree coverage (%); HC: herbaceous coverage (%); Year: year of the plantation; Cd: cadmium concentration (mg kg^{-1}); Management of cultivation: cut and deposit (CD), partial cut and deposit (PCD), compost (C); no cut (NC); + indicates the use of fertilizers (including Guano de Isla', Sulfomag, Dolomite and Phosphatic rock).

Site	TC (%)	HC (%)	Year	pH	Cd (mg kg^{-1})	Cacao variety	Management
MD1	35	75	2	4.4	1.5	ccn51	CD (+)
MD2	25	0	2	4.4	1.7	ccn51	CD (+)
MD3	45	60	2	4.4	1.8	ccn51	CD (+)
MD4	45	80	2	4.5	1.75	ccn51	CD (+)
MD5	15	10	2.5	4.6	1.39	ccn51	CD (+)
MD6	35	75	2.5	4.9	1.43	ccn51	CD (+)
MD7	35	50	2	4.9	1.67	ccn51	CD (+)
MD8	25	20	3.5	5	1.27	ccn51	CD (+)
MD9	75	60	2	5	1.57	ccn51	CD (+)
MD10	55	15	2	5	1.59	ccn51	CD (+)
MD11	15	0	2	5.1	1.7	ccn51	CD (+)
MD12	15	20	3	5.2	1.42	ccn51	CD (+)
UC1	5	35	3	5.3	1.47	ccn51	PCD (-)
UC2	5	35	3	5.3	1.7	ccn51	PCD (-)
UC3	5	35	3	5.7	1.39	ccn51	PCD (-)
UC4	35	20	2.5	5.7	2.15	ccn51	NC (-)
UC5	5	35	3	6	1.79	ccn51	PCD (-)
UC6	35	35	3	6	2.3	ccn51	PCD (-)
UC7	5	35	3	6.1	1.1	ccn51	PCD (-)
UC8	5	35	3	6.3	1.48	ccn51+criollo	PCD (-)
AM1	0	0	4	6.3	1.48	ccn51+criollo	C (-)
AM2	5	5	8	6.4	1.5	ccn51	CD (-)
AM3	15	0	5	6.4	2.04	ccn51	CD (-)
AM4	15	50	8	6.5	1.65	ccn51	CD (-)
AM5	45	50	12	6.6	1.57	ccn51	NC (-)
AM6	65	15	8	6.6	2.85	ccn51	CD (-)
AM7	25	5	8	6.8	2.7	criollo	CD (-)
AM8	25	5	5	6.9	1.59	ccn51+imc07	CD (-)
AM9	25	10	8	7.6	1.48	criollo	CD (-)
AM10	15	15	10	7.7	1.87	ccn51	CD (-)
AM11	15	10	7	7.8	2.24	criollo	CD (-)
AM12	15	5	8	8	2.22	criollo	CD (-)
AM13	5	20	5	8.1	1.78	ccn51	CD (-)
SM1	5	0	20	8.1	1.82	ccn51	CD (+)
SM2	0	5	6	8.1	1.95	ccn51	CD (+)
SM3	25	5	6	8.1	2.42	ccn51	CD (+)
SM4	5	0	3	8.2	2.66	ccn51	CD (+)
SM5	50	10	5	8.2	3.32	ccn51	CD (+)
SM6	5	10	4.5	8.3	1.98	ccn51	CD (+)
SM7	5	50	3	8.3	3.08	ccn51	PCD (+)

Table S3. Site number and AEF: agro-ecosystem function indicator based on the scores assigned for each of the criteria satisfied: a) proximity to the primary forest (<0.5 km); b) presence of > 2 tree species other than Cacao within the plantation; c) occurrence of native insects acting as ecological indicators, scoring a point when at least three individuals of each taxa (Euglossine bees (Apidae) and *Forcipomyia* flies (Ceratopogonidae).

Site	(a) Proximity to the primary forest	(b) Presence of > 2 tree species	(c) Native pollinators acting as ecological indicators	Total (AEF)	score
MD1	1	1	1	3	
MD2	0	1	0	1	
MD3	1	1	2	4	
MD4	1	1	0	2	
MD5	1	1	2	4	
MD6	1	1	2	4	
MD7	1	1	2	4	
MD8	1	1	1	3	
MD9	1	1	2	4	
MD10	1	1	2	4	
MD11	1	1	1	3	
MD12	1	1	1	3	
UC1	1	1	1	3	
UC2	1	1	1	3	
UC3	1	1	1	3	
UC4	1	1	2	4	
UC5	1	1	1	3	
UC6	1	0	2	3	
UC7	1	1	1	3	
UC8	1	0	2	3	
AM1	0	1	0	1	
AM2	0	1	0	1	
AM3	1	1	1	3	
AM4	1	1	1	3	
AM5	1	1	2	4	
AM6	1	1	2	4	
AM7	1	1	1	3	
AM8	1	1	1	3	
AM9	1	1	1	3	
AM10	1	1	1	3	
AM11	1	1	0	2	
AM12	1	1	0	2	
AM13	1	0	1	2	
SM1	1	1	0	2	
SM2	1	1	0	2	
SM3	1	1	1	3	
SM4	0	1	1	2	
SM5	1	1	1	3	
SM6	1	1	0	2	
SM7	1	1	0	2	