



Chemical	Unit	Primary forest	Naturally regenerated forest	Hardwood forest	Thick Bamboo	Thin Bamboo	Banana	Recovering pasture	Pasture	Plot 1-non-bamboo	Plot 1-bamboo
Ir	ppb	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
K	%	1.19	0.54	0.24	0.17	0.25	0.41	0.14	0.42	0.14	0.13
Li	ppm	41.5	37.4	19.6	12.7	10.9	17.3	14.7	12.9	8.3	10
Mg	%	0.95	0.32	0.21	0.22	0.13	0.34	0.31	0.25	0.18	0.22
Mn	ppm	1250	1190	1100	2060	2160	2470	2350	2420	1270	1490
Na	%	0.52	0.05	0.17	0.05	0.08	0.08	0.04	0.07	0.04	0.02
Nb	ppm	0.2	5.9	0.3	0.7	0.6	1.4	0.4	0.2	0.1	0.6
P	%	0.07	0.039	0.066	0.168	0.184	0.229	0.12	0.12	0.079	0.118
Rb	ppm	28.1	6.5	10	15.9	16.9	40.5	11.2	25.6	9.3	11.9
Re	ppm	< 0.001	0.004	< 0.001	0.002	< 0.001	0.001	< 0.001	0.001	< 0.001	0.001
Sb	ppm	< 0.1	0.9	0.8	< 0.1	0.7	< 0.1	< 0.1	0.6	0.9	< 0.1
Sc	ppm	30.7	30.7	37.4	42.3	38.2	36.5	53.1	31.5	56.4	54
Se	ppm	0.3	1.2	1	1.3	1.1	1.6	0.7	< 0.1	< 0.1	1
Sn	ppm	1	2	< 1	< 1	< 1	1	< 1	1	1	< 1
Sr	ppm	64.7	6.4	24.4	19.2	29.9	53.6	19.9	39.2	28	64.1
Ta	ppm	< 0.1	0.4	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Te	ppm	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ti	%	0.22	0.77	0.23	0.61	0.22	0.55	0.32	0.21	0.39	0.26
Th	ppm	1.2	0.6	1.2	2.4	6.7	3	1.9	7.7	2.7	2.4
Tl	ppm	0.18	0.18	0.1	0.09	0.11	0.09	0.09	0.11	0.07	0.09
U	ppm	2.1	1.8	3.9	2.5	3.4	2.6	2.5	2.4	1.1	1.9
V	ppm	85	191	133	293	107	165	320	58	203	281
W	ppm	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Y	ppm	17.2	< 0.1	14.4	26.1	24.8	46.7	26.8	25	12	12.9
Zr	ppm	4	142	67	50	128	128	14	4	9	66
La	ppm	8	0.2	7.2	19.2	33.4	57.5	17.6	33	8.6	9.3
La	ppm	10.8	4.8	10	24.1	43.2	71.4	21.6	39	15.8	12.5
Ce	ppm	18.9	0.9	24.3	62.9	62.1	92.9	47	71.5	34	42.7

Chemical	Unit	Primary forest	Naturally regenerated forest	Hardwood forest	Thick Bamboo	Thin Bamboo	Banana	Recovering pasture	Pasture	Plot 1-non-bamboo	Plot 1-bamboo
Pr	ppm	2.3	0.1	2	6.1	10	17.7	5.7	8.4	2.7	3.4
Nd	ppm	9.8	0.4	8.5	25.2	38.6	71.4	24	32.7	11.8	14.2
Nd	ppm	19	< 5	< 5	22	31	70	22	32	26	13
Sm	ppm	2.4	0.1	1.9	5.3	7.5	14.2	5.3	7	2.8	3.2
Sm	ppm	3.2	1.1	2.2	5.7	7.7	13.3	5.3	7.1	4.2	3.4
Eu	ppm	0.81	0.05	0.63	1.53	2.01	3.96	1.7	1.88	0.83	0.9
Eu	ppm	0.7	0.5	0.9	1.6	2.3	4.4	1.8	2.7	1.5	1
Gd	ppm	2.9	0.2	2.5	6.1	7.2	13	6.1	6.4	2.9	3.1
Dy	ppm	3.2	0.4	2.2	4.5	5.1	8.8	4.7	5.5	2.5	2.5
Tb	ppm	0.5	< 0.1	0.4	0.9	1	1.8	0.9	0.9	0.4	0.5
Tb	ppm	< 0.5	< 0.5	< 0.5	< 0.5	1.1	2.2	< 0.5	< 0.5	< 0.5	< 0.5
Ho	ppm	0.8	0.1	0.6	1.1	1.2	2.1	1.2	1.2	0.6	0.6
Er	ppm	2.1	0.4	1.7	3.2	3.5	5.6	3.3	3.2	1.6	1.7
Tm	ppm	0.4	0.1	0.3	0.5	0.5	0.8	0.5	0.5	0.2	0.3
Yb	ppm	0.7	0.4	1.6	3	3.1	4.8	3	2.7	1.5	1.7
Yb	ppm	2.9	2.1	2.6	4.3	4.6	6.6	4	5.4	3.6	2.7
Lu	ppm	< 0.1	< 0.1	0.2	0.4	0.4	0.5	0.4	0.2	0.2	0.2
Lu	ppm	0.48	0.37	0.46	0.66	0.87	1.07	0.75	0.88	0.56	0.43
Mass	g	0.897	1.01	1.01	1.01	1.21	1.15	1.07	0.897	0.945	1.11

Appendix 2: Offsite chemical analysis

	pH	cmol(+)/L					%	mg/L				
	H <sub>2</sub> O	ACIDEZ	Ca	Mg	K	CICE	SA	P	Zn	Cu	Fe	Mn
	5.5	0.5	4	1	0.2	5		10	3	1	10	5
Pasture across the street	6.5	0.23	24.04	2.64	0.51	27.42	1	2	2.2	6	32	14
Pasture near ocean	5.5	0.56	16.06	4.90	0.46	21.98	3	ND	2.8	5	86	93
Hacienda Baru 1	5.6	0.34	10.23	4.44	0.29	15.30	2	1	1.8	3	105	49
Hacienda Baru 2	5.2	1.36	2.50	1.90	0.27	6.03	23	1	1.7	3	114	98
Hacienda Baru 3	5.7	0.24	27.75	6.23	0.30	34.52	1	2	4.2	4	21	14
Hacienda Baru 4	5.9	0.38	3.11	0.96	0.10	4.55	8	2	0.8	1	32	12
Hacienda baru 5	5.8	1.96	6.07	2.92	0.28	11.23	17	5	1.7	3	94	11

Appendix 3: Nitrogen and MO chemical analysis

	%	
	N	MO
Primary forest	0.28	2.7
Naturally Regenerated Secondary Forest	0.31	3.1
Hardwood forest	0.28	3.5
Thick bamboo	0.35	5.5
Thin bamboo	0.23	3.3
Banana plantation	0.26	3.8
Recovering pasture	0.26	4.2
Grazed Pasture	0.30	4.3
Pasture across the street		2.5
Pasture near ocean		3.1
Hacienda Baru 1		4.5
Hacienda Baru 2		5.9
Hacienda Baru 3		3.5
Hacienda Baru 4		4.7
Hacienda Baru 5		1.6

## *Invertebrate Diversity*

### Appendix 4: All taxon found in litter samples at FCRE

TAXON (Order)	Sub-order	Family	Number found
Oligochaeta			1
Gastropoda			10
Onychophora			1
Isopoda	Oniscidea	Oniscidae	45
Isopoda	Oniscidea	Trichoniscidae	115
Glomerida			7
Penicillata			21
Polydesmida			5
Geophilomorpha			10
Lithobiomorpha			4
Scolapendromorpha			4
Aranae			37
Acari		Tetranychidae	45
Acari		Trombidiidae	15
Opiliones		Troglobedae	10
Pseudoscorpion			46
Ricinuclei			5
Diplura		Japygidae	13
Protura			26
Collembola	Arthropleona		102
Collembola	Symphyleona		52
Odanata	Zygoptera		1
Blattodeae			2
Isoptera			3
Dermaptera			1
Neuroptera		Ascalaphidae	3
Psocoptera			2
Orthoptera			1
Hemiptera		Aphididae	5
Hemiptera		Aradidae	4
Hemiptera		Blissidae	9
Hemiptera	Auchenorrhyncha	Cicadellidae	11
Hemiptera	Auchenorrhyncha	Cicadidae	3
Hemiptera	Gymnocerata	Miridae	3
Hemiptera	Gymnocerata	Nabidae	7
Hemiptera		Phopaldidae	1
Hemiptera	Heteroptera	Piesmatidae	5
Hemiptera		Reduviidae	2
Hemiptera		Rhopalidae	1
Hemiptera	Gymnocerata	Threocoridae	16
Hemiptera			2
Thysanoptera	Tubulifera		58
Coeloptera			3
Coleoptera		Byrrhida	2

Coleoptera	Adephaga	Carabidae	1
Coleoptera	Polyphaga	Chrysomelidae	1
Coleoptera	Polyphaga	Cleridae	4
Coleoptera	Polyphaga	Curculionidae	13
Coleoptera		Latridiidae	6
Coleoptera		Mordellidae	1
Coleoptera	Polyphaga	Ochodaecidae	3
Coleoptera	Polyphaga	Scarabacidae	3
Coleoptera		Scydmaenidae	1
Coleoptera		Silphidae	1
Coleoptera		Staphylinidae	20
Coleoptera			95
Trichoptera			10
Diptera		Acroceridae	2
Diptera	Brachycera	Bombyliidae	1
Diptera	Cyclorrhapha	Calliphoridae	2
Diptera		Cecidomyiid	3
Diptera	Nematocera	Chironomidae	1
Diptera	Cyclorrhapha	Muscidae	1
Diptera		Polichopodidae	1
Diptera	Nematocera	Psychodidae	26
Diptera	Nematocera	Sumiliidae	4
Diptera	Cyclorrhapha	Tachinidae	2
Diptera	Nematocera	Tipulidae	2
Diptera			7
Lepidopera			2
Hymenoptera	Apocrita	Braconidae	1
Hymenoptera	Apocrita	Evaniidae	2
Hymenoptera		Formicidae	282
Hymenoptera	Symphyta	Siricidae	1
Hymenoptera			1

Appendix 5: All taxon found in dry extraction at FCRE

Order	Sub-order	Family	Number found
Oligochaeta			3
Gastropoda			9
Isopoda	Oniscidea	Oniscidae	1
Isopoda	Oniscidea	Trichoniscidae	22
Penicillata			5
Geophilomorpha			2
Lithobiomorpha			1
Scolapendromorpha			1
Aranae			22
Acari		Orbitidae	5
Acari		Tetranychidae	9
Acari		Trombidiidae	38
Pseudoscorpion			4
Diplura		Japygidae	12
Protura			17
Collembola	Symphyleona		504
Collembola	Arthropleona		27
Isoptera		Kalotermitidae	7
Neuroptera	Planipennia	Myrmeleontidae	3
Orthoptera			1
Hemiptera		Alydidae	1
Hemiptera		Aphididae	3
Hemiptera	Auchenorrhyncha	Cicadellidae	77
Hemiptera		Formicidae	2
Hemiptera	Gymnocerata	Miridae	5
Hemiptera	Gymnocerata	Nabidae	1
Hemiptera		Phopalidae	1
Hemiptera	Heteroptera	Piesmatidae	1
Hemiptera	Gymnocerata	Pyrrhocoridae	2
Hemiptera	Gymnocerata	Thyreocoridae	1
Thysanoptera	Tubulifera		18
Celeoptera			1
Coleoptera		Bostrichidae	1
Coleoptera		Byrrhida	3
Coleoptera		Carabidae	1
Coleoptera	Polyphaga	Chrysomelidae	8
Coleoptera	Polyphaga	Cleridae	4
Coleoptera		Curculionidae	55
Coleoptera	Polyphaga	Histeridae	2
Coleoptera		Latridiidae	14
Coleoptera	Gymnocerata	Pyrrhocoridae	1
Coleoptera	Polyphaga	Scarabacidae	6
Coleoptera		Scydmaenidae	4
Coleoptera		Staphilinidae	13
Coleoptera			24
Trichoptera			105

Diptera		Acroceridae	7
Diptera	Brachycera	Bombyliidae	1
Diptera	Cyclorrhapha	Calliphoridae	2
Diptera		Cecidomyiid	19
Diptera	Nematocera	Chironomidae	17
Diptera	Nematocera	Culicidae	15
Diptera	Cyclorrhapha	Dropophilidae	9
Diptera	Cyclorrhapha	Muscidae	13
Diptera		Mycetophilidae	12
Diptera	Nematocera	Psychodidae	317
Diptera	Cyclorrhapha	Sarcophagidae	1
Diptera	Nematocera	Simuliidae	38
Diptera	Cyclorrhapha	Tachinidae	9
Diptera	Cyclorrhapha	Tephritidae	7
Diptera	Nematocera	Tipulidae	8
Diptera			131
Lepidoptera		Limacodidae	1
Lepidoptera		Pyralidae	1
Lepidoptera			1
Hymenoptera	Apocrita	Braconidae	1
Hymenoptera	Symphyta	Diprionidae	2
Hymenoptera		Formicidae	70
Hymenoptera	Apocrita	Megachilidae	1
Hymenoptera	Symphyta	Siricidae	1
Hymenoptera	Apocrita	Sphecidae	1
Hymenoptera	Symphyta	Tenthredinidae	1
Hymenoptera			4



Appendix 6: Identified invertebrates in nonbamboo areas of naturally regenerated forests

**LEAF LITTER**

<b>phylum</b>	<b>subphylum</b>	<b>class</b>	<b>subclass</b>	<b>order</b>	<b>suborder</b>	<b>family</b>	<b>abundance</b>
Annelida			Oligochaeta	Haplotaxida			1
Mollusca		Gastropod					2
Mollusca		Gastropod		Pulmonata			1
Arthropoda	Crustacea	Malacostraca		Isopoda	Oniscidea	Trichoniscidae	17
Arthropoda	Myriapoda	Diplopoda	Penicillata	Polyxenida			2
Arthropoda	Myriapoda	Symphyla					1
Arthropoda	Chelicerata	Arachnida	Acari	Prostigmata		Bdellidae	1
Arthropoda	Chelicerata	Arachnida	Acari	Prostigmata		Trombididae	2
Arthropoda	Chelicerata	Arachnida	Acari	Prostigmata			1
Arthropoda	Chelicerata	Arachnida	Acari	Prostigmata	Eupodina	Dictynidae	1
Arthropoda	Chelicerata	Arachnida	Acari	Orbatida		Orbatidae	11
Arthropoda	Chelicerata	Arachnida	Acari	Orbatida		Orbatidae	4
Arthropoda	Chelicerata	Arachnida	Acari				2
Arthropoda	Chelicerata	Arachnida		Araneae			1
Arthropoda	Chelicerata	Arachnida		Araneae		Leptonetidae	1
Arthropoda	Chelicerata	Arachnida		Pseudoscorpions			1
Arthropoda	Hexapoda	Entognatha		Collembola	Arthropleona	Isotomidae	4
Arthropoda	Hexapoda	Entognatha		Collembola	Arthropleona	Isotomidae	1
Arthropoda	Hexapoda	Entognatha		Collembola	Arthropleona	Isotomidae	1
Arthropoda	Hexapoda	Entognatha		Collembola	Arthropleona	Onychiuridae	2
Arthropoda	Hexapoda	Insecta		Isoptera		Hodotermitidae	1
Arthropoda	Hexapoda	Insecta		Orthoptera	Ensifera	Gryllidae	1
Arthropoda	Hexapoda	Insecta		Hemiptera			1
Arthropoda	Hexapoda	Insecta		Hemiptera			1
Arthropoda	Hexapoda	Insecta		Hemiptera	Gymnocerata	Aradidae	1
Arthropoda	Hexapoda	Insecta		Hemiptera			3
Arthropoda	Hexapoda	Insecta		Hemiptera		Pentatomidae	1
Arthropoda	Hexapoda	Insecta		Thysanoptera			1
Arthropoda	Hexapoda	Insecta		Diptera		Psychodidae	1
Arthropoda	Hexapoda	Insecta		Hymenoptera		Formicidae	9

**DRY EXTRACTION**

<b>phylum</b>	<b>subphylum</b>	<b>class</b>	<b>subclass</b>	<b>order</b>	<b>suborder</b>	<b>family</b>	<b>abundance</b>
Annelida			Oligochaeta	Haplotaxida			4
Arthropoda	Crustacea	Malacostraca		Isopoda	Oniscidea	Trichoniscidae	1
Arthropoda	Chelicerata	Arachnida	Acari	Orbatida		Orbatidae	2
Arthropoda	Chelicerata	Arachnida	Acari	Prostigmata		Bdellidae	1
Arthropoda	Chelicerata	Arachnida		Araneae	Labidognatha	Dictynidae	1
Arthropoda	Hexapoda	Entognatha		Collembola		Isotomidae	1
Arthropoda	Hexapoda	Entognatha		Collembola		Isotomidae	1
Arthropoda	Hexapoda	Insecta		Isoptera		termitidae	2
Arthropoda	Hexapoda	Insecta		Homoptera	Auchenorrhyncha	Cicadellidae	2
Arthropoda	Hexapoda	Insecta		Homoptera	Auchenorrhyncha	Cicadellidae	3
Arthropoda	Hexapoda	Insecta		Homoptera	Auchenorrhyncha	Cicadellidae	1

Arthropoda	Hexapoda	Insecta		Homoptera	Auchenorrhyncha	Cicadellidae	1
Arthropoda	Hexapoda	Insecta		Hemiptera		Pentatomidae	1
				Hemiptera			
Arthropoda	Hexapoda	Insecta		larvae		Pentatomidae	1
Arthropoda	Hexapoda	Insecta		Coleoptera		Byrrhidae	1
Arthropoda	Hexapoda	Insecta		Coleoptera	Polyphaga	Scolytidae	11
Arthropoda	Hexapoda	Insecta		Coleoptera	Polyphaga	Staphylinidae	1
Arthropoda	Hexapoda	Insecta		Coleoptera	Polyphaga	Pselaphidae	1
Arthropoda	Hexapoda	Insecta		Coleoptera	Polyphaga	Scydmaenidae	1
Arthropoda	Hexapoda	Insecta		Coleoptera	Polyphaga	Leiodidae	1
Arthropoda	Hexapoda	Insecta		Trichoptera			1
Arthropoda	Hexapoda	Insecta		Trichoptera			1
Arthropoda	Hexapoda	Insecta		Diptera			1
Arthropoda	Hexapoda	Insecta		Diptera	Nematocera	Chironmidae	2
Arthropoda	Hexapoda	Insecta		Diptera	Nematocera	Psychodidae	3
Arthropoda	Hexapoda	Insecta		Diptera	Nematocera	Ceratopognidae	2
Arthropoda	Hexapoda	Insecta		Diptera	Nematocera	Mycetophilidae	1
Arthropoda	Hexapoda	Insecta		Diptera	Nematocera	Mycetophilidae	3
Arthropoda	Hexapoda	Insecta		Diptera		Culicidae	22
Arthropoda	Hexapoda	Insecta		Diptera		Culicidae	4
Arthropoda	Hexapoda	Insecta		Diptera		Culicidae	4
Arthropoda	Hexapoda	Insecta		Hymenoptera		Cynipidae	1
Arthropoda	Hexapoda	Insecta		Hymenoptera		Formicidae	1
Arthropoda	Hexapoda	Insecta		Hymenoptera	Apocrita	Cyncipoidea	1
Arthropoda	Hexapoda	Insecta		Hymenoptera	Symphata		1

#### Appendix 7: Identified invertebrates in bamboo areas of naturally regenerated forests

##### LEAF LITTER

phylum	subphylum	class	subclass	order	suborder	family	abundance
Annelida			Oligochaeta	Haplotaxida			1
Arthropoda	Crustacea	Malacostraca		Isopoda	Oniscidea	Trichoniscidae	23
Arthropoda	Myriapoda	Diplopoda					1
Arthropoda	Myriapoda	Symphyla					3
Arthropoda	Chelicerata	Arachnida	Acari	Orbatida		Orbatidae	10
Arthropoda	Chelicerata	Arachnida	Acari	Orbatida		Orbatidae	5
Arthropoda	Chelicerata	Arachnida	Acari	Orbatida		Orbatidae	13
Arthropoda	Chelicerata	Arachnida	Acari				1
Arthropoda	Chelicerata	Arachnida	Acari	Prostigmata		Bdellidae	1
Arthropoda	Chelicerata	Arachnida	Acari	Prostigmata			4
Arthropoda	Chelicerata	Arachnida	Acari				1
Arthropoda	Chelicerata	Arachnida		Opilliones			1
Arthropoda	Chelicerata	Arachnida		Opilliones			1
Arthropoda	Chelicerata	Arachnida		Opilliones			1
Arthropoda	Chelicerata	Arachnida		Pseudoscorpiones			1
Arthropoda	Chelicerata	Arachnida		Pseudoscorpiones			1
Arthropoda	Hexapoda	Entognatha		Collembola		Onychiuridae	1
Arthropoda	Hexapoda	Entognatha		Collembola		Onychiuridae	3
Arthropoda	Hexapoda	Entognatha		Collembola		Onychiuridae	1

Arthropoda	Hexapoda	Insecta	Psocoptera	Troctomorpha		5
Arthropoda	Hexapoda	Insecta	Hemiptera			2
Arthropoda	Hexapoda	Insecta	Coleoptera	Polyphaga	Scolytidae	3
Arthropoda	Hexapoda	Insecta	Coleoptera		Dermestidae	1
Arthropoda	Hexapoda	Insecta	Coleoptera		Curculionidae	4
Arthropoda	Hexapoda	Insecta	Coleoptera	Archostemata	Carabidae	1
Arthropoda	Hexapoda	Insecta	Hymenoptera		Formicidae	1
Arthropoda	Hexapoda	Insecta	Diptera		Culicidae	1
Arthropoda	Hexapoda	Insecta	Diptera	Nematocera	Psychodidae	1
Arthropoda	Hexapoda	Insecta	Diptera	Nematocera	Mycetophilidae	1
Arthropoda	Hexapoda	Insecta	Hymenoptera		Formicidae	1
Arthropoda	Hexapoda	Insecta	Hymenoptera		Formicidae	200+

### DRY EXTRACTION

phylum	subphylum	class	subclass	order	suborder	family	abundance
Annelida			Oligochaeta	Haplotaenida			4
Arthropoda	Crustacea	Malacostraca		Isopoda	Oniscidea	Trichoniscidae	1
Arthropoda	Hexapoda	Entognatha		Diplura		Japygidae	1
Arthropoda	Hexapoda	Entognatha		Diplura		Japygidae	1
Arthropoda	Hexapoda	Insecta		Homoptera	Auchenorrhyncha	Cicadellidae	1
Arthropoda	Hexapoda	Insecta		Hemiptera		Miridae	2
Arthropoda	Hexapoda	Insecta		Coleoptera	Polyphaga	Scolytidae	4
Arthropoda	Hexapoda	Insecta		Coleoptera		Staphylinidae	1
Arthropoda	Hexapoda	Insecta		Trichoptera		Hydroptilidae	1
Arthropoda	Hexapoda	Insecta		Diptera		Chironomidae	2
Arthropoda	Hexapoda	Insecta		Diptera		Simuliidae	1
Arthropoda	Hexapoda	Insecta		Diptera			1
Arthropoda	Hexapoda	Insecta		Diptera		Psychodidae	2
Arthropoda	Hexapoda	Insecta		Diptera		Culicidae	2
Arthropoda	Hexapoda	Insecta		Hymenoptera		Formicidae	2